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THEORY TO PRACTICE AS A COGNITIVE, EDUCATIONAL AND SOCIAL CHALLENGE

CONFERENCE PROCEEDINGS

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P R E F A C E

Today the relationship between theoretical and practical approaches is becoming more integrated and interconnected. Therefore, it is important to explore the possibilities how to connect theory and practice - the general education and the specialized training - in the most effective and appropriate manner. In this context, the increase of the efforts regarding more cooperative, spherical and holistic approaches arises the demand for launching interdisciplinarity between many human, natural, social and technical fields.

The Theory to Practice as a cognitive, educational and social challenge conference (T2P) aims to find out whether the scientific and social reasons can lead to interdisciplinary approaches? Is cooperation between different academic areas achievable? What could pedagogues and engineers, bio-scientists and philosophers, agronomists, economists and mechanical engineers, natural scientists and writers -and so on- have in common?

T2P brings together a variety of experts from the region and beyond to present current research and cases which address the topic of theoretical and practical approaches, particularly as it is relevant to the challenges of the Western Balkan region and beyond. In particular, participants are exploring:

1. Explore interdisciplinarity as nowadays challenge, proposition, and practice in the field of scientific research, education, politics, and society
2. Networking with educational institutions who are active in interdisciplinary areas at the Western Balkans, EU and beyond
3. Developing HEI regional capacity to lead academic events and activities using EU and another best world expertise.

Having the considerations mentioned above as a starting point, the T2P consortium (under the Erasmus + Capacity Building Program) proceeds to the implementation of the 1st International Scientific Conference, hoping to highlight particular aspects of the issue and to become a forum for a fruitful scientific, educational and social dialogue for everyone who might be interested.

This conference gives visibility to successful sustainability initiatives and promote cooperation for sustainable education development in the region.

The T2P Conference 2020 Organizing Committee

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

17th -18th September 2020, Mitrovica, Kosovo

INFLUENCE OF COMPREHENSIVE CURRICULAR REFORM ON OUTCOMES OF UPBRINGING SUBJECTS IN ELEMENTARY CLASSES

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Abstract

Comprehensive curricular reform through an extensive *School for Life* program is a major innovation in the Croatian education system. It has brought many changes to the basic documents and it is important to examine these changes and explore how much they have positively affected the performance of subjects and the learning outcome. The methodology of this research is of a qualitative nature and a comparative analysis was performed comparing the Educational plan and program (2006) and Curriculum (2016; 2019) for upbringing subjects Music Culture, Art Culture and Physical and Health Culture. The main goal is to highlight the changes brought by the new curriculum of upbringing subjects and how they have reflected on educational theory and practice. The news that appeared in the new curricula were singled out and analyzed. Positive changes are visible in terms of greater connection between theory and practice, emphasis on experiential learning and individualized approach to students. Teachers are given more freedom in planning, preparing and conducting classes. Some upbringing steps have also been taken, such as avoiding stigmatization and emphasizing the specifics of students. One of the main innovations is the development of critical thinking and opening the way for modern teaching. There is a lack of major interventions in the teaching content itself. The evaluation also remains a big issue, where clearer criteria are adopted, but when it comes to upbringing subjects, more thorough changes are still needed.

Key words: Curriculum, evaluation, upbringing, School for life.

1. INTRODUCTION

Upbringing subjects in primary school, in addition to the educational component, contain almost the most important components of the *School for life*. Awareness of the necessary changes in the educational system has been growing over the years. As a result of awareness of the importance of dealing with changes in the educational system at almost all levels, there comes a Curriculum of subjects according to which the teaching process is realized. The upbringing components permeated all subjects, precisely because the final learning outcome was not a (good) grade, but the knowledge that the student will take and apply outside the school

building. The paper presents an analysis of the curriculum of upbringing subjects and the Curriculum, highlights important changes and recommendations to make teaching as modern and purposeful as possible. The curriculum includes goals, contents and learning conditions and evaluation, and these elements are interrelated, which makes them a complex system (Pastuović, 1999; Bognar & Matijević, 2002).

The teaching process also represents different levels of knowledge that are realized through the teaching material, and results from different levels and influences of the society that participates in the construction of content. These contents need to be democratized, in order to teach and to upbring the student in accordance with the environment in which they finds themselves (Dewey, 1966; Giroux, 2005; 2011; Islamović, 2013). The most important goal of such a democratic education is to develop a democratic way of thinking and create democracy with the natural thought of man (Hotaman, 2010). The development of critical thinking is also very important, which enables the student to develop different skills, attitudes and behaviors (Perry, 2009). It is important to teach children tolerance in education, so that in later life they can have undisturbed coexistence, respect and respect each other and show understanding and acceptance of diversity (Jovović, 2017).

2. MATERIALS AND METHODS

The methodology of this research is of a qualitative nature and a comparative analysis was performed comparing the Educational plan and program (2006) and Curriculums (2016; 2019a; 2019b; 2019c) for upbringing subjects Music Culture, Art Culture and Physical and Health Culture. The main goal is to highlight, describe and analyze the changes brought by the new curriculum of educational subjects and how they have reflected on educational theory and practice. News that appeared in the new curricula were singled out and analyzed by the method of comparative analysis.

3. RESULTS AND DISCUSSIONS

3.1. Curriculum of the subject Music Culture and the Educational plan and program of Music Culture in the lower grades of primary school

The curriculum of the subject Music culture is divided into several units that describe in great detail the essence of the subject and offer ways in which classes should be organized. First of all, the subject is described in the Curriculum, emphasizing the importance and purpose of the subject. Music Culture will give the student a richer picture of the world, understanding of art and the importance of distinguishing between art and reality, the student will build his own identity, get to know his and other cultures, build his personal identity, create his own ways of judging art and develop critical thinking. Expressing one's own thoughts, feelings and attitudes arise from the development of critical thinking and the development of creativity (MZO, 2019a). According to the Framework National Curriculum (CKR, 2016), the teaching of Music Culture, and later Music Art, is based on five principles: anthropological, psychological, cultural-aesthetic, the principle of interculturality and the principle of synchronicity. Educational goals are very clearly stated; one of the main goals is to introduce students to the art of music through classical, traditional and popular music. For the development of creative

thinking, importance is placed on understanding music in different contexts and it is important to introduce the student to different areas of musical art. In the implementation of teaching, it is necessary to be guided by knowledge about the development of children's creativity, which will later awaken a number of skills. Children's creativity is manifested primarily in children's play (Brešan, 2008).

However, a child will only be able to express himself creatively when he feels free (Kroflin, 1987). Furthermore, the student will become aware of the values of regional, national and European cultural heritage in relation to world culture. The importance of expressing and sharing ideas, feelings and attitudes is emphasized. Educational goals are included in the form of three domains - listening to and getting to know music, expressing through and with music, and music in context. The Educational plan and program (MZOS, 2006) permeates Music Culture in two basic principles: psychological and cultural-aesthetic principle. In the lower grades, according to the Educational plan and program, music teaching encourages positive emotions, feelings, belonging, togetherness and tolerance. In class teaching, it is not necessary to introduce a musical notation and process music-theoretical contents (MZOS, 2006). The differences between the Educational plan and program (MZOS, 2006) can be clearly seen by analyzing the educational outcomes, which are elaborated in the Curriculum (MZO, 2019a) by domains and classes.

3.2 Curriculum of the subject Art Culture and the Educational plan and program of Art Culture

The purpose of the subject Art Culture (MZO, 2019b) is mostly manifested in shaping the social and personal identity of students, enriching and enriching the image of themselves and the world, developing creative thinking, adopting art and visual literacy and practical application of techniques, tools and media. Students create preconditions, ie foundations for complete learning by connecting with artistic communities and cultural-scientific institutions, visiting and understanding the importance and value of cultural-artistic events, etc. Getting to know and adopting visual language takes place by observing specific works of art. Students develop imagination and design their own solutions to certain art problems, while learning about and using different art techniques. The Curriculum (MZO, 2019b) emphasizes encouraging students to take action and improving their own potential, fostering a culture of dialogue, developing tolerance and respect. The teaching of Art Culture will contribute to the use of various acquired competencies in all areas of activity and to creative and meaningful expression. Back in 1987, definitions of creative education were created, and the role of teachers in art activities was often emphasized. Kroflin et al. (1987) emphasize the importance of the child's independent research and cognition, without the pressure of adults, whereby the teacher should keep in mind that any form of pressure on the child disrupts the creativity of students. Educational goals in the Curriculum (MZO, 2019b) are expressed through five components. The main goals of teaching are to adopt and understand visual language, to cultivate visual perception, to express creative thinking and critical thinking, to understand the role of a work of art and the context of its creation, to participate in various art activities and art events. Goals are achieved in three domains: creativity and productivity, experience and critical attitude, art in context. They are specifically elaborated by grades. When it comes to visual language, it should be emphasized that the child already knows the visual language, brings it with him (Kroflin, 1987), and manifests itself as a combination of the child's eyes, hands and imagination (Brešan, 2008).

3.3 Curriculum Physical and Health Culture and the Educational plan and program for Physical and Health Culture

Physical and health culture extends throughout primary and secondary education. According to the Curriculum for the subject Physical and Health Culture (MZO, 2019c), teaching is based on the acquisition and improvement of motor and functional skills and abilities, development of habits that will contribute to a better lifestyle, encouraging students to participate in various kinesiology programs, creating critical thinking and positive thinking about physical exercise, which will contribute to appropriate and constant adaptation to new working and living conditions. The teaching strives for social inclusion, solving situational problems, one of the goals is the development of students' self-confidence, responsibility, development of moral values, acceptance of diversity, and the emphasis is on strengthening national identity, getting to know and understanding their own culture, etc. The Curriculum (MZO, 2019c) brings five goals that are reflected in recognizing the importance of physical culture in everyday life and enabling students to exercise independently and follow the exercise, and finally students adopt a number of upbringing values. The Curriculum (MZO, 2019c) explains the areas of teaching Physical Education and Health; kinesiological theoretical and motor knowledge, morphological characteristics, motor and functional abilities, motor achievements and health and educational effects of physical exercise. All contents are focused on core competencies. Students acquire simpler motor skills and each year it gradually expands depending on the student's stages of development.

The Educational plan and program for Physical Education and Health (MZOS, 2006) emphasizes biotic conditioning, so teaching is aimed at the optimal development and improvement of kinesiological knowledge, abilities and skills. One of the main educational components is the creation of a system of student values according to physical exercise. The main goal is to train students to exercise independently and promote health. The entire program for elementary school is aligned with the development of all students.

4. DISCUSSIONS

From all the above, it is clear that educational subjects according to the Curriculum (MZO, 2019a; 2019b, 2019c) enable students, not only for the practical implementation of theoretical knowledge, but also for important life components of every (healthy) developed person. Great emphasis is placed on getting to know yourself and accepting yourself, and therefore getting to know diversity and accepting everything that is different. Awareness of the individual approach to each person is raised. Skills are acquired, the theory is largely associated with the practical part, the performance of which is the ultimate goal (for example, the musical notation is used for later performance of songs on a musical instrument). National identity and a sense of belonging, knowledge of culture and interculturalism are emphasized in almost every recommended lesson. Critical attitude, moral judgment, explanation of one's own attitudes and understanding of other people's opinions, and the value of one's own and other people's opinions are adopted from the earliest school age. The curriculum truly lays the foundations, not only for the transition to a higher class, but for a lifetime because, above all, it emphasizes values that are instilled and remain present throughout life. However, the question is how teaching is really conducted and how educational subjects are valued - what to evaluate at all? Teachers

are given a lot of freedom in the teaching of educational subjects, which means that it remains up to them how they will conduct teaching and what they will evaluate. Unfortunately, often the teaching of, for example, music culture is reduced to just listening to a certain song from the textbook and repeating it several times. Teachers are not interested enough in playing (Nikolić & Ercegovac-Jagnjić, 2009; Šulentić Begić & Birtić 2012; Svalina 2011; 2015; 2016; Pongračić 2017). The musical competencies of primary school teachers are the subject of numerous researches. Rojko (2012) considers the teaching of Music Culture to be of very poor quality, and the reason for this is the insufficient musical competence of teachers. Svalina (2015) points out that those teachers who play in class value their competencies better. In schools (still) assessing singing, the purpose of such evaluation is not entirely clear, and the criteria may not be entirely objective, but mostly depend on the teacher or classmates - which gives room for development and expression of observations and opinions, but opens the door to the ubiquitous rejecting individuals *who are not good enough*, emphasizing diversity and biased comments. Such grades are not realistic and should not exist, although on the other hand the door can be opened for the personal development of each student individually, as well as community development - however, are grades really needed (what about students who do not do well in educational subjects)). One important recommendation and change in the school system is not to name individuals if they refuse to sing in front of the class, precisely to avoid the first step of stigmatization which later often escalates into systematic abuse. However, for those who want to, musical extracurricular activities are often organized in schools. According to Šiljković et al. (2007) most students choose sports and music extracurricular activities. Almost as important as the teacher's performance in regular classes, it is just as important in extracurricular activities - almost crucial (Cindrić, 1992). A subject such as music culture can be a subject for students to get to know themselves, their culture, find their own identity, meet others and love differences, or a subject to go to with a cramp (depending on the teacher) because he knows his colleagues will from the class to mock again because he "can't sing". In terms of musical skills, the teacher here has the opportunity to develop a sense of rhythm, melody, improve hearing, etc. in individual students and therefore monitor the progress of each student. However, this should not be forced even in situations where the teacher deems them unsuitable for such activities. They are important here in the competencies of teachers, teachers do not come with the same opportunities, however, as with students, teacher also have room for improvement. Teachers are musically educated long before entering the classroom, but still face great challenges in mastering the art of playing or singing that requires continuous work throughout the years of study and (as in teaching) combining formal, informal and informal ways of teaching and learning music content (Goodness, 2016), and in the end they are often struggling with setting personal criteria. Therefore, it is important that each teacher continues his education and explores the educational process. "Only a teacher who constantly makes efforts to improve their personality and professional activities can meet the growing challenges of their profession and the expectations of students, parents, colleagues, but also the wider community" (Ljubetić & Kostović Vranješ, 2008, p. 227).

Art culture is one of the most specific subjects, it is mostly determined by its dynamism and less structure with respect to other subjects, and what makes it so are the many didactic-methodological, personal, social, material and other conditions (Tomljenović, 2016). The selection criteria are focused on the student, ie on the student opportunities and conditions in which teaching is conducted (Tacol, 2011). The teacher here too, much like in music culture,

has a great responsibility and his prior knowledge and readiness are very important. The quality of teaching is reflected in the learning process of students. He also has a great responsibility in choosing the strategies he uses (Tomljenović, 2016). In art culture, the best works are often chosen and later hung on the board. Also, a democratic teaching climate, which must come primarily from teachers, is important for creative students, where their ideas are accepted and there is no fear of ridicule (Čandrlić, 1998). Involving students in artistic processes develops a sense of creativity and initiative, emotional intelligence, a sense of independence and freedom of thought and action (Brajčić, 2016). It is easy to conclude that in addition to the prescribed program and arranged teaching preparations and plans, one should constantly answer the questions that are asked and question one's own performance in the teaching process. Teacher creativity is one of the most important prerequisites for successful and creative contemporary teaching, and it is the basis of any research work (Bognar & Somolanji, 2008), which every class of Art Culture actually is.

5. CONCLUSIONS

In Croatia, the need for the regulation of the educational system has been recognized, and as a result, comprehensive curricular reform has been carried out through an extensive *School for Life* program, which is a great novelty in the Croatian educational system. Given that the teaching process takes place according to the Curriculum (MZO, 2019a; 2019b; 2019c), the analysis of the Educational plan and program (MZOS, 2006) for upbringing subjects, from which they are mostly recognized, can identify significant differences. Connecting theory and practice, ie purposeful learning, individual approach to learning, better organization of teaching, encouraging creative thinking, creating a basis for critical judgment, freedom of expression and learning to argue, emphasizing the specifics of each student, mutual respect and evaluation in a new way are just some of the highlighted necessary changes for the more successful education and better upbringing.

Grades are also one part of the educational process in school. They are often not indicators of true knowledge, either because of teacher objectivity and complexity, which are not always the same, or because all students are different with different interests and abilities. Evaluation in schools should not be such a stressful part of the whole process if students are taught in which direction to look and how to deal with failure, which is sometimes an integral part of everything and depends on ourselves. A questionnaire for students was conducted, which was completed by 3957 students. Half of the students finished the previous grade with an excellent grade. Almost all students involved in the project notice changes in teaching that are accompanied by the new Curriculum. Most students have a positive attitude towards school and teaching, as well as towards problem solving. Students mostly (two thirds) like to go to school, access homework with ease, simply solve homework. As many as 90% of students believe that teachers can ask anything they do not understand and that teachers take care of their students. Also, there is a high percentage of students who use technology in learning with ease. Most students believe that success in school is influenced by effort. 90% of students agree that they are given tasks in which they have to apply what they have learned. Rewriting of teaching content is still prevalent. Just over half of students find learning in an interesting way. Teachers are generally satisfied and believe that they understand the curricular approach and interdisciplinary connections, but also that the educations helped them the most to understand them (*School for*

Life). All curricular changes are applicable and have a very positive effect on the process itself, and they bring answers to many (until then) questions and open the way to modern teaching. In order to go beyond traditional teaching and achieve what the Curriculum requires, it is necessary to introduce a modern way of teaching and create a foundation for successfully responding to the challenges of society.

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DISTANCE EDUCATION IN 2020 ALBANIA

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Abstract

The latest situation has paralyzed the whole world, including Albania, and allowing only a few selected professionals to work, among them educators. One more time, the importance of education is highlighted. This paper provides insights into the current developments of education in Albania due to COVID-19. Distance education is a novice in Albania. Thus, previous works addressing this topic lack or are very few. Reflecting on the way education is being provided this period, the article intends to analyze the new education approach, distance education, the way it affects students' learning process, perception about education, and their overall academic results through semi-structured interviews for teachers, questionnaires for students and observation. The article reveals that both challenges and opportunities come along with distance learning. Consequently, distance education is a quick response to the isolation situation with its advantages, such as keeping up students with the education, flexibility in engaging students with learning, practicing new skills through ICT, and promoting self-learning. Some of the challenges include the shift in perception regarding learning and what learning implies, the impossibility of all students to access the internet and computers, the lack of interaction, and the skepticism regarding this new approach of education in Albania. These results demonstrate that Albania needs to improve and further implement computing technology in teaching.

Key words: Albania, E-Learning, ICT, Distance Education, Distance Learning.

1. INTRODUCTION

The year 2020 got the world into a fight with a hazardous virus. Everything changed, starting from the suspension of work, gatherings, activities, and daily routine change. Nevertheless, the importance of education and educators in a country is witnessed, as, amongst all the professions, it was not suspended, instead shifted to another form. For the first time in Albania, the whole education system changed, embracing a new system, without having the experience, but only the goodwill to respond to the isolation situation. Quickly, Distance Education (DE) and Online Education became buzz words among everybody. For the majority of teachers, the DE became "the new normal." During this period in our country, distance learning is done through correspondence classes via the internet.

For almost six years, Albania has incorporated in a way or another technology in education, pre- and university level[1] since the first launch of the "Age of Technology" by former Prime Minister Berisha. Technology is being used in academic institutions by educators as well as learners through PowerPoint presentations, videos, emails, and posting lessons on education websites. (Rogers, 2001) Despite using the aforementioned tools, recently, Albania faced an inevitable transition in the education system, contemporary moving from the traditional education system, to the classroom education, to DE using online learning. The COVID-19 outbreak forced this unexpected shift in the education system. However, the real question is, *How the learners and instructors receive distance education?* Moreover, *How effective distance education is for the Albanian education system?*

1.1 An Overview of Distance Education

The birth of DE is argued among many scholars. Some claim that DE dates as early as the year 1728 when advertised in a newspaper at that time "Boston Gazette" that "Caleb Phillips, Teacher of a new method of Short Hand" was searching for learners to send them lessons weekly. Whereas, modern DE initiated and started to being practiced together with the development of postal service in the 19th century until "Isaac Pitman taught shorthand" in the 1840s in Great Britain through correspondence. (Subrahmanyam & Ravichandran, 2013) Some believe that DE began in the late 1800s with the first correspondence program from the University of Chicago. Whereas others take as the beginning of DE the last twenty years driven by the fast development of technology, globalization, and social perspectives toward knowledge. (Brad Mehlenbacher, 2010)

DE is a field of education where the focus is on the teaching methods and technology to deliver teaching to those who are/ cannot be physically present in the classroom. According to related literature, DE is a prepared/ organized teaching/learning experience or way of instruction characterized by quasi-permanent separation (in time and space) of the teacher and the learner/s. (Keegan, 1980) Moreover, "DE is not about technology; it is about people – about improving the knowledge, skills, attitudes, aptitudes, and values of teachers," aiming to improve the "learning and achievements of our students of today and tomorrow." (Burns, 2014) In this article, distance learning is referred to learning where students and instructors are separated from one another.

DE is an approach that has many variations. These variations include "the types of media or technology used (print, radio, computer); the nature of the learning supplement to the traditional classroom, seminar, workshop, degree program); institutional settings: topics addressed; and level of interactivity support (face-to-face, online, blended, none)." (Burns, 2014) It also combines various media (CD-ROMs, DVDs/VCDs, group teaching and learning software (GTLS), computer-aided instructions, intelligent tutoring systems, and digital learning games) to deliver the lesson. This last variation is also known as multimedia-based distance learning (Burns, 2014).

[1] In September 2015, in Albania is launched for the first time the project "digital classes" by the Ministry of Education and Sports. (For more information, see: Karafili, A., 2017. Klasa inteligjente në shkollën digjitale. *Gazeta Mapo*, 16 August).

1.2 Distance Education in Albania

The "intelligent class" is piloted for the first time in May 2014, at Andon Zako Çajupi High School. Whereas, in September 2015, Albania launched for the first time the project "digital classes" by the Ministry of Education and Sports,[2] where students and teachers will operate during a class hour through tablets and electronic pens. (Karafili, 2017)

In 2005 the Albanian government presented the Master Plan for the "e-school" program. This program has made possible the informatization of the schools and the integration of ICT in schools. Since 2007 this subject is taught from grade 7 to grade 12. At the same time is aimed the improvement of the curricula in order to meet European Standards. ((A.L.T.R.I)) Besides, distance learning, which is also one of the forms of higher education mentioned in the "For the Higher Education in the Republic of Albania, changed" law no. 9741 of the date 21/05/2007, includes the "e-school" program's goals listed in the National Strategy of Pre-University Education and the Intersectoral Strategy for the Information Society. (LIGJ Nr.9741, PËR ARSIMIN E LARTË NË REPUBLIKËN E SHQIPËRISË I NDRYSHUAR ME, 2007) These documents, strategies, and laws issued from the government mention the elements essential for the "e-school" process which are: (1) the development of academic, digital contents; (2) the equipment of schools with portable labs; (3) ICT integration and improvement in different subjects of the school curriculum; (4) the continuation of the improvement of internet service in all the schools; (5) building capacities by training teachers for the ICT integration in all the Albanian academic institutions; (6) online application for the university system; and (7) the development of online content (digital library). ((A.L.T.R.I))

The end of the year 2009 scored the completion of the project "e-school", aiming at enabling Internet connection of secondary and high schools, equipping them with computer labs, and training teachers to manage them and teach with a contemporary curriculum. However, there has always been room for improvement. It is good to move to a new stage of cooperation, that of sharing experiences, and the development of the teaching process from the "e-school" system to that of "e-Education" system. ((A.L.T.R.I))

Thus, these developments slowly opened the road for DE. On 09 March 2020, the Ministry of Education, Youth and Sports ordered the teaching process's termination in all public and non-public educational institutions for two weeks. (Ministria e Arsimit, Sportit dhe Rinisë, 2020) This decree was followed with another decision to suspend the whole teaching process in all public and private schools until further notice. Since that day, the education system has shifted to that of online learning. Even though it came as a quick response to the pandemic, it seemed the best solution for the country's education system. The investment in ICT has been, for many years, one of the priorities of Albania. According to the Cross-Sectorial Strategy, digital Agenda of Albania 2015-2020, "the main goal of the incorporation of ICT in education is the increase of the teaching quality and the preparation of students with the proper skills of digital citizenship in order to be capable of studying, searching and working in a world driven more and more by the informatization of services." (Publike, 2015) However, Albania never experienced as massive remote teaching as this year, and very few[3] teachers had a training regarding distance education. (L.M., 2020) Such remote teaching witnessed new initiatives by

[2] Current – Ministry of Education, Sports, and Youth
[3] Interview with a secondary school math teacher on 17.05.2020

Ministry of Education, Sports, and Youth such as, the YouTube channel[4] and the "RTSH Shkollë,"[5] Digital Education Hub,[6] and Schoolme,[7] akademi.al,[8] used to provide online lessons for learners.

2. MATERIALS AND METHODS

The methodology used in this study is that of qualitative and quantitative methods of research through questionnaires and interviews. There are conducted ten interviews with four secondary and four high school teachers and two university lecturers, three males and seven females, where the majority was from urban areas (60%) and others from rural areas (40%). Moreover, forty questionnaires are conducted with students; ten questionnaires were distributed to secondary level students, twenty-two questionnaires to high school students, and eight questionnaires to university-level students, participating 23% males and 77% females from rural (35%) and urban (65%) areas. Questionnaires were organized into three variables, examining the DE's perception from education actors, the DE's advantages, and disadvantages. The questionnaires and the interviews are held during the April-May period. All the questionnaires and the interviews data were anonymized after data collection.

Another vital method used is the observation as being close to both students and teachers during this DE period and witnessing their approach, attitude, and feelings regarding this new teaching/ learning method. Moreover, a thorough analysis is done of the relevant foreign and Albanian literature regarding distance education.

Such research design, utilizing observations, questionnaires, and interviews, strengthens the reliability of the data; and contributes to the maximization of trustworthiness. (Hays, 2011) Besides, such a study helps to understand how DE is received by the front line actors of education, instructors, and learners. However, a study with more data will better picture this newly embraced education system in Albania.

3. RESULTS AND DISCUSSIONS

In this third part, the results from the questionnaires and interviews will be discussed, highlighting three key issues; (1) the perception, (2) the advantages, and (3) the disadvantages of DE resulting from the questionnaires, interviews and observation.

[4] Ministria e Arsimit, Sportit dhe Rinisë (2020). Available at: https://www.youtube.com/c/MinistriaeArsimitSportitdheRinis%C3%AB/videos (Accessed: 05 July 2020)

[5] RTSH, 2020. *"RTSH Shkollë," kanal i ri i televizionit publik në ndihmë të nxënësve.* Available at: https://www.rtsh.al/lajme/rtsh-shkolle-kanal-i-ri-i-televizionit-publik-ne-ndihme-te-nxenesve/ (Accessed: 05 July 2020)

[6] For more information: Anon., 2020. *Vodafone E-Learning.* Available at: https://www.vodafone.al/avantazhet-vodafone/digital-education-hub/ (Accessed:12 July 2020).

[7] For more information: Anon., 2020. *Schoolme.* Available at: https://www.schoolme.education/landing/ (Accessed:12 July 2020).

[8] For more information: Anon., 2020. *akademi.al.* Available at: https://app.akademi.al/login (Accessed:12 July 2020).

3.1 The Perception of Distance Education

Distance Education is received differently by various actors of education. The respondents' approach towards DE falls into three main categories: a technology-based education away from the classroom, a broader spectrum than online teaching, and a pandemic-brought education system alternative.

In addition, DE is a way of learning away from the classroom environment through technology, which is an assertion of the majority of both teachers and students. At times, both teachers and students use DE interchangeably with online learning, which clearly shows their insufficient knowledge regarding this teaching approach. Nevertheless, a small percentage of instructors and learners regard DE as a broader spectrum than online learning. Another approach of DE by Albanian first-line actors of education is the relation of the current situation with DE and the perception that it as an alternative teaching/ learning method during pandemic times or as acceptable for the current pandemic situation, figure 4 in "*Advantages*" section of this article. It is perceived as the pandemic "came with a solution" for the education system, and as soon as the pandemic goes, it will take with it DE as well. Many students consider DE as unfair, stressful, and discriminatory for some of them. They believe that such an education method was suitable to keep students active in learning, but most of them lack the proper knowledge they would have gained if they were in the auditors or school. The exams done online are not efficient because "most of the students copy, and most of them have not fully understood the lessons," the majority of students assert. Quite the opposite, 70% of the instructors considered DE an excellent opportunity to revisit and reflect upon their teaching methods and better understand technology.

Thus, a definition derived by the respondents' responses would be, "*DE is an approach of education using means of technology, in the absence of the classroom setting, suitable during the pandemic and normal situation for a country*."

Moreover, based on the question of whether DE is a good option for study, only 25% of learners replied positively. As much as 75% replied that DE is not a good option for study. Even though 87.5% of them claimed to be good users of technology. On the other hand, it seems that 66.7% of instructors, shown in figure 1 in this section, are in between whether DE is a good option for study or not. Only 11.1% of them replied positively to DE as a good option for study, and 22.2% said that DE is not a good option for study. Yet, 77.8% of instructors replied to be good users of technology.

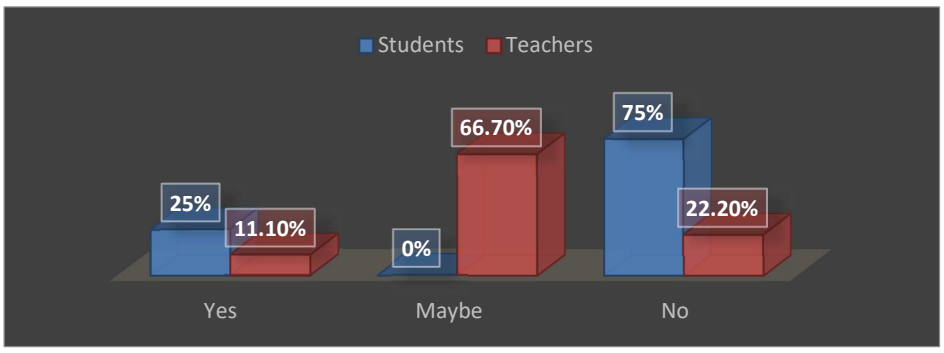

Figure 1. Do you think DE is a good option for study?

To this end, 38% of students, as shown in figure 2, think that DE is achieved moderately by the Albanian education system. 48% of them believe that DE is not achieved (respectively 29% of them believe that it is not achieved at all, and 19.4% of them share the opinion that DE is little achieved. In comparison, 13% of students replied that the DE is achieved (respectively 6.5% replied that DE is achieved and 6.5% of them said that DE is fully achieved). On the contrary, instructors seem to be all on the same opinion, with 88.9% of them replying that DE is achieved moderately, and only 11.1% think that DE is achieved. It results that students have had more discontent than instructors with regard to DE because of the non-suitable physical infrastructure and the difficulties in the content acquirement of the lessons, especially those who had the graduation exams. This outcome is second by students' protests regarding the ban on university fees because the teaching process was done away from the classroom setting and claimed that online education failed to be efficient. And the protests of high school seniors regarding the Matura exams (Keta, 2020) as, according to them, the exams contained questions that were not discussed in the classroom.[9] (Keta, 2020)

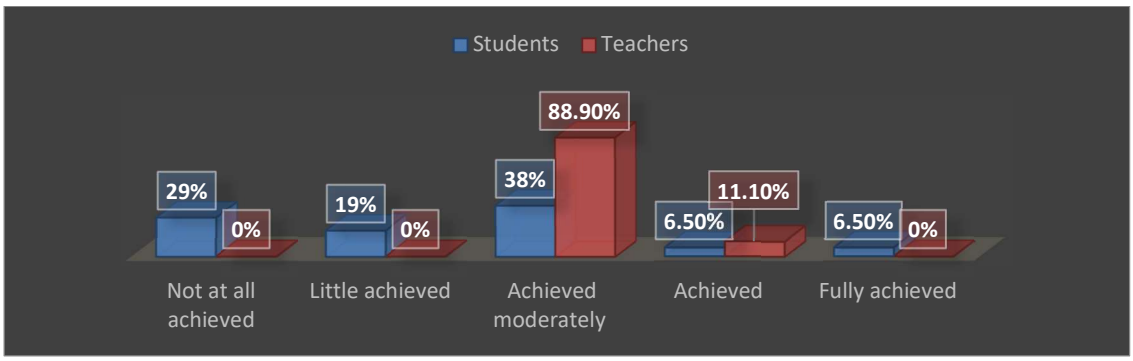

Figure 2. How much do you think DE is achieved in Albania?

3.2 Advantages of Distance Education

The results from the questionaries, interviews, and observation regarding the DE's advantages fall into such categories, embracing new learning methods, emotions-friendly, and inclusiveness.

As for the category of embracing new teaching and learning methods, DE contributes to a more significant amount in the development of self-directed learning and the opportunity to explore in a broader range of information independently. Moreover, some advantages mentioned by the respondents are the use of technology for the benefit of education, how it helps them with the digital competence, the incorporation of more interactive and innovative methods in teaching, and teachers' advancement in technology. 70% feel optimistic about DE as it helped them reflect on the methods they teach and better understand technology. Such results lead to an understanding that in Albania, the incorporation of technology in classroom teaching by most teachers is still alien, even though before the pandemic, there was a general call for ICT use in education. The current situation gave us a clearer approach to virtual studies because we

[9] As the Ministry of Education, Sports, and Youth promised to compose a simplified model of Matura exams with only the information provided in the classroom set, before the lockdown. (For more information: Keta, E., 2020. Maturantët shpërthejnë në protesta pas testit të maturës shtetërore. *Reporter.al*, 12 June).

understood that perhaps DE does not apply to all countries or needs its infrastructure due to the obligation to use ICT in all situations.

The other advantage mention by the respondents is related to the emotional state. Respondents claimed that DE is flexible and helps them feel less stressed because they do not have to worry about being in school on time, have more time to learn, do not have to answer to the teacher, and are near their families. From the answers, it is understood that students that study away from home, in another city, are less stressed with DE. Some relate DE with the pandemic situation and consider it as stress relief and activity that keeps them active during isolation. In contrast, secondary and high school level learners have another approach to DE. Many high school students do not prefer DE and feel stressed while studying in the distance than physically. Perhaps many social aspects influence such an approach, such as the desire to be friends, or because high school is a more structured education system, in contrast to university, where students are more flexible than the secondary level learners and transition from academic life to the professional one. Also, for some of the respondents, DE means less stress when it comes to answering teachers' questions as for them, it is easier to reply to teachers online and through typing. Thus, DE can be a good method of enhancing shy students' engagement[10] in the classroom setting and creating a more inclusive school environment. (Reid, 2020) As for the teachers is concerned, the majority of them have experienced DE with less stress because they have more time to prepare and have no contact with students in the classroom, which, according to them, being in contact with students the annoyance and stress are part of a considerable time of the day. Only 20% of them replied that DE does not make them feel less stressed.

The last category is inclusiveness. Regarding whether learners interact during DE (figure 3), 64.4% replied that they do interact, and 35.6% of them replied that they stay passive during DE. Whereas 77.8% of the teachers replied that there is some sort of interaction during DE, 11.1% replied negative, and 22.2% of them replied that they sometimes have interaction. However, even though the majority claimed to have some interaction, many also added that the time is very short. Thus, the interaction is minimal. Moreover, DE is considered more comprehensive, providing education, even learners who do not have the opportunity to get an education because of school distance or financial issues. However, a good question would be whether students who do not have the opportunity to go to school have the technology and the devices for DE?

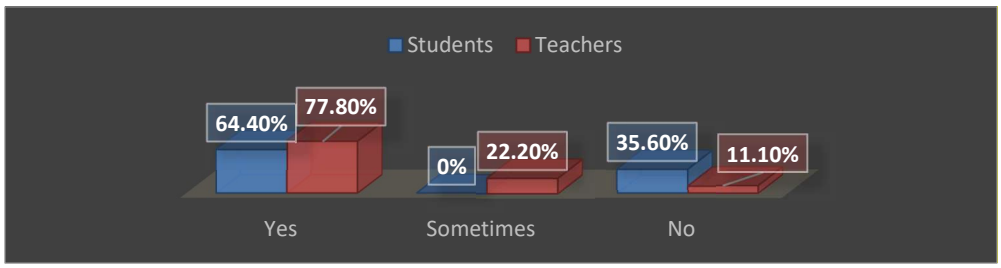

Figure 3. Do students interact within the time of the online lessons through questions, or discussions?

[10] (For more information: Reid, C., 2020. *How to reach shy students by engaging them online.* Available at: https://www.jotform.com/blog/reach-shy-students-online/).

Besides, 50% of students believe that DE is a good alternative to teaching in pandemic times. Whereas, 43.3% of them replied that maybe DE is a good alternative in pandemic situations. Only 6.7% think that DE is not a good alternative. On the contrary, teachers unanimously believe that DE is a good alternative for education during pandemic times.

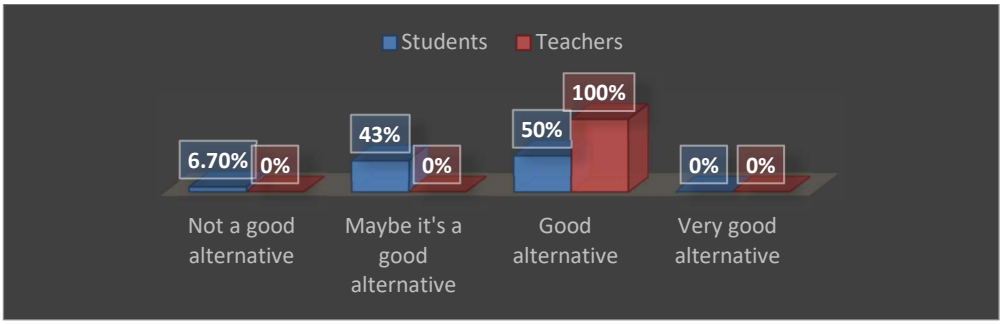

Figure 4. Is DE a good education alternative during pandemic times?

3.3 Disadvantages of Distance Education

Based on the respondents' results, DE's disadvantages fall into four categories: social, infrastructure, motivation, and content disadvantages.

Thus, DE is thought to create difficulties in establishing relationships between people. This claim is supported by 60% of the student respondents. 33.3% of them partially agree that DE creates obstacles in establishing friendships. Only 6.7% of students replied negatively. Moreover, 63.5% of teachers think that DE may be an obstacle to creating relations. Whereas, 37.5% of them agree that DE brings difficulties in creating relations. Therefore, if DE continues for a long time, there will be a lack of socialization, communication, and group work among people, and as one student said, "you cannot learn body language online." Moreover, learners will not have the proper attitude; they will not know how to behave. Practicality should be applied and is crucial in education, but DE offers only technological knowledge. Students need to see a role model and be guided, which can be done only in school. The purpose of education is to prepare the youth and student for professional and real life. Instructor need to discuss, argue, and develop students' personalities, who might be their future colleagues. People learn more when they interact and share ideas. ICT should be used in education, but a good solution would be a balance and a combination of education tools.

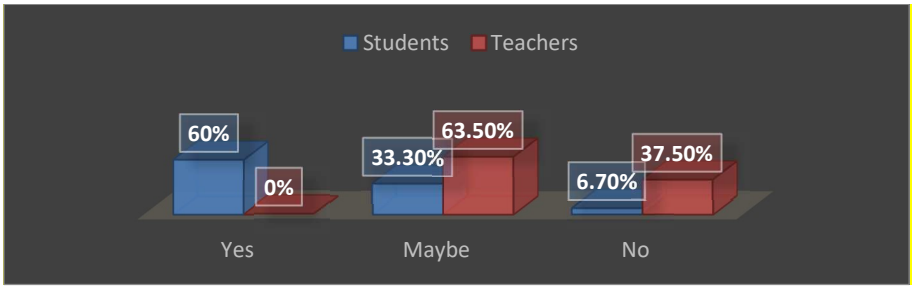

Figure 5. Do you think that DE creates difficulties in creating relationships/ friendships?

The disadvantages listed by students that fall under the infrastructure category are the loss of internet connection and power, the lack of smart devices, and the short time for teaching/ learning process. Thus, as many as 59.4% of student respondents said that loss of internet

connection and power are an obstacle for DE, but 40.6% of them responded that this issue had not been a problem for them. As far as the instructors are concerned, the response of only 22.2% of them was positive, and the majority of them, around 77.8%, said that internet connection and power had not been a problem. However, most teachers, around 77.8%, replied that they do get destructed by the family members while teaching.

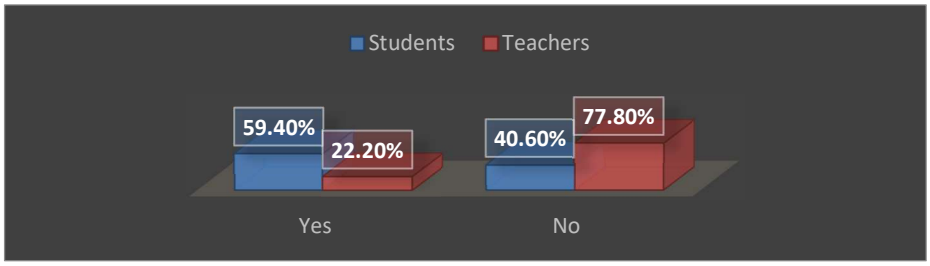

Figure 6. Has the loss of internet connection or power been an obstacle for you to conduct/ attend online classes?

Another disadvantage that is also witnessed during DE by students is the lack of motivation. Likewise, only 12.5% of students stay with the camera and mike open during DE. 56.3% of them replied that they do not enter with the camera and mike open during the DE, and 31.3% of them replied that sometimes they stay with the camera and mike open. Moreover, a considerable number of students are not online or actively participating in the lesson. Also, students do not believe in the benefits of DE as the lesson, in their words, "*can never be understood 100% without being in the classroom and listening to the teachers' explanation*." And, some of them consider DE as an activity to keep them busy with their homework and closing the academic year.

Lastly, regarding the content disadvantages, DE does not seem to integrate the rest of the competencies fully. Some students claim that they do not understand science subjects, have not all the questions answered and clarified by the teacher as many students question simultaneously, and they lack the exercise examples done by the teacher. It encourages students to focus more on their marks and not on their learning skills and competences. Teachers themselves cannot control this phenomenon through DE. Consequently, students can ask someone else to do their tests and homework, ending up having a good mark but lacking the skills.

4. CONCLUSIONS

In conclusion, it can be said that DE is about people, helping teachers and learners improve their knowledge, skills, attitudes, and values. In Albania, such a method of education came as a "rescue" technique of the entire education system during pandemics. Such a shift in the education system resulted in being a great challenge for the teachers, students, and the system. It also shifted the perception of students and teachers regarding the process of learning and what it implies. Thus, before the pandemic, the incorporation of ICT in education was strongly supported. During the pandemic, with a clearer approach to virtual studies, we understood that perhaps DE does not apply to all countries because of the obligation to use ICT in all situations. Albania lacks the proper physical and content infrastructure for DE. Moreover, for many

students, it is seen just as a temporary thing or related to the pandemic period, that will go together with the pandemic.

Also, DE came with its advantages and disadvantages. Starting with the new teaching initiatives undertook by the state. For many instructors and learners DE promotes self-learning, and develops the digital competence. However, education aims to prepare the youth for their professional and real life with all the competencies needed. DE offers only technological knowledge and lacks the practicality, the application of which is crucial in education.

Nevertheless, even though teachers closed their online sessions by June 12th, 2020, to start a new challenging academic year in the classroom setting, in shifts, the Ministry of Education, Sports, and Youth has decided to continue these initiatives and incorporate them in the curricula, combining in this way, the traditional and DE. To this end, DE will continue to be implemented in the Albanian education system as "blended methods" in the teaching process.

In conclusion, some recommendations would be: (1) reconsidering DE through, (a) ameliorating physical and content infrastructure; (b) providing training for instructors; (c) equipping students with the right devices to access DE, and also (2) developing a well-thought, country context-wise program which will provide for students and instructors the right knowledge, tools, and skills to develop DE.

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UNDERSTANDING THE DEVELOPMENT OF STUDENT TEACHER'S SELF-EFFICACY AND PROFESSIONAL IDENTITY IN SCHOOL PLACEMENT

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Abstract

Teacher knowledge and practices have increasingly become a research area of considerable interest. Through effective mentoring practices in school placement, student teachers learn new concepts or approaches to teaching in the classroom. Student teachers' early career experiences are mainly related to classroom self-efficacy and their own professional identity as a teacher. The purpose of this study is to understand how student teachers develop their self-efficacy in teaching during school placement and how they describe its influence in constructing their sense of professional identity. This qualitative study collected data from 10 pre-service student teachers (4th year of studies at bachelor level) of the Faculty of Education at the University of Prishtina and 10 primary mentor teachers. Data are collected through semi-structured interviews, while they are analyzed through the thematic analysis method. The results show that mentoring practices that contributed more to the development of student teacher's self-efficacy in teaching are the modelling of usage of instructional strategies, development of student teacher's pedagogical knowledge on classroom management techniques and feedback on creating an effective learning environment. Also teaching practice, specifically the development of self-efficacy in teaching had enabled them to construct self-identity and to establish the values of an effective teacher.

Key words: professional identity, mentor teacher, student teacher, self-efficacy, school placement.

1. INTRODUCTION

Teaching practice during teacher education is a starting point of a long and slow process in creating professional identity and toward teacher professionalism. Teacher's professional identity emerged as a research area during the period 1988-2000 (Beijaard et al., 2004). In their view, this happened because professional identity is an area in which researchers conceptualize professional identity differently, investigate varying topics within the framework of teachers' professional identity and pursue a diversity of goals. Hong (2010) see the teacher professional identity as well as its development as an ongoing process of clarifying believes about teaching and learning, and to establish a discrete sense of what one's roles and purposes are, and what

one values as a professional teacher. After the student teachers are admitted in teacher education programs, the practice teaching experiences are the most important contributor to their perspectives and insights. Early experiences both prior to and during the initial teacher preparation programme combine with personal beliefs and prior experiences to form teachers' professional identity, which in turn informs their future practices and influences their decisions and behaviour as teachers (Beijaard et al., 2004).

1.1 Literature review

The primary goal of the student teaching practice is to provide the student teacher with the opportunity to apply effective teaching practices and behaviors under the guidance of an experienced and qualified university and mentor teachers. According to Canrinus, Helms-Lorenz, Beijaard, Buitink & Hofman (2011), self-efficacy is one of the indicators for the teachers' sense of professional identity. Teachers' sense of their professional identity concerns teachers' perceptions of themselves as teachers based on their interpretations of the context in which they function and their interaction with this context (Kelchtermans, 2009). During teaching practice, student teacher shapes their professional identity and self-efficacy in teaching. Therefore, from mentor teacher is expected not to train student teachers to behave in prescribed ways, but to broaden their horizon in teaching by sharing with them effective teaching skills and activate their self-efficacy. Pre-service students gain the theory which applies in a variety of teaching situations in the classroom. Teacher training programs have received attention as researchers and practitioners attempt to understand how to best ensure graduates are equipped to teach all learners and districts are able to reduce turnover rates (Ludwig, Kirshstein, & Sidana, 2010).

Based on Bird & Hudson (2015) results of research regarding student teachers' perceptions of their mentoring experiences in student teaching, modelling effective teaching and rapport with students were perceived to be the most representative practices of the mentors while mentors' modelling of classroom management and well-designed lesson plans were lower on the student teachers' responses. It has been found that high teacher efficacy is associated with teacher perseverance of challenging tasks, such as management issues, and positive classroom management (Romi & Leyser, 2006). Effective mentoring should be viewed as the most important factor in the development of student teachers teaching skills, pedagogical knowledge and self-efficacy in teaching. Therefore, it's necessary to plan mentoring, in order to enhance the preservice teachers' learning experiences (Barrett, 2002). Responsibilities assigned to mentors are increased as their role in teacher education has become quite prominent. Because there is no one formula in developing the preservice teacher's self-efficacy to teach successfully in the classroom, it's necessary to research on the impacts of different factors in self-efficacy development.

1.2 Statement of the Problem

There is a rising amount of pressure on Kosovar universities that offer teacher education to increase student teacher academic performance and to offer better conditions for pedagogical practice in public schools. Given that self-efficacy predicts student teachers' competence proficiency, the use of a monitoring system for tracking students' self-efficacy development is advisable (Van Dinther et al., 2014). In order to fully understand how mentoring practices can contribute to student teacher's self-efficacy in teaching and foster their sense of professional

identity, this study investigated the student teacher's and mentor teacher's perceptions regarding the contribution of self-efficacy in teaching in constructing student teacher's sense of professional identity.

1.3 Research questions

The research questions that guided this article were:

Which mentoring practices influence the development of student teacher's self-efficacy in teaching during school placement?

How can the development of student teacher's self-efficacy in teaching contribute to the construction of the student teacher's sense of professional identity?

2. MATERIALS AND METHODS

This qualitative study attempted to identify the contribution of mentoring practices to the development of student teacher's self-efficacy and professional identity. Qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them (Denzin, & Lincoln, 2005, p. 3). The thematic approach to data analysis is adopted for this study. Thematic analysis is a useful approach for summarizing key features of a large data set, as it forces the researcher to take a well-structured approach to handle data, helping to produce a clear and organized final report (King, 2004 as cited in Nowel et al., 2017). Data collection consists of interviews with mentor teachers and student teachers. The semi-structured interviews are conducted with strict attention to rich data collection. The interviews were administered individually by a researcher. Teachers and students were selected based on mixed random-convenient sampling. A total of 10 mentor teachers were involved in interviews who had been teaching from 5-25 years in schools, and 10 student teachers (4th year of studies at bachelor level) of Faculty of Education at the University of Prishtina. Initially, participants initially signed the sound recording agreement which informed them that the interview is confidential and will only be used for research issues with the guarantee that their identity will not be revealed in any circumstance. The interviews lasted between 20-35 minutes each.

It's developed a more thorough understanding of data through having transcribed it. After transcription, during the reading of material patterns of responses are carefully coded and recorded. The analysis involved a constant moving back and forward between the entire data set. After coding, codes are further organized in larger sub-themes. Developed sub-themes are combined into themes to be able to draw conclusions from the data. After the themes are named, for each it's conducted and written a detailed analysis.

3. RESULTS AND DISCUSSIONS

This results section shares the findings from interviews with student teachers and mentor teachers. Below are outlined the themes that derived from the interviews with respondents regarding their perception on the contribution of mentor teachers mentoring practices on student teachers self-efficacy in teaching (see Table 1.) and contribution of student's self-efficacy in constructing their sense of professional identity. (see Table 2.)

3.1 Modelling usage of instructional strategies

Modelling teaching practices allows the mentor to "coach" through practical demonstrations (Hudson, 2002). During teaching practice, pre-service teachers develop their knowledge, skills and self-efficacy for teaching, and as Bandura (1981) argues, self-efficacy for teaching can be enhanced through modelling. Without modelling practices mentees may not be able to visualize effective teaching (Hudson, 2002). Interviewed student teachers noted that they benefited significantly from mentors' practices regarding classroom management by observing teacher modelling usage of instructional strategies. They emphasized that the mentor teacher's modelled student engagement techniques focusing on inclusion and motivation of pupils.

Table.1. Codes and themes derived from the thematic analysis of interview data with mentor teachers and student teachers

Codes (from mentor teachers interviews)	**Codes (from student teachers interviews)**	**Themes**
Explain time planning strategies Modelling lesson planning Doing together lesson writing Modelling use of learning resources Modification of techniques Modelling introduction of lecture Attitude/appearance Modelling assessment	Student engagement in groups Modelling engagement of passive pupils Inclusion of pupils with special needs Modelling questioning Motivation of pupils Setting learning objectives	Modelling usage of instructional strategies
Explaining attractive techniques for classroom management Importance of incorporating daily routines Fostering different situations to learn how to act How to act in conflict situations Modeling effective techniques for classroom management Assigning additional works to pupils	Starting week with a discussion on the importance of classroom rules and discipline Combine active and passive pupils in groups Engage pupils who first finished the schoolwork to help others; Usage of positive and negative reinforcement Meeting with pupils and their parents Usage of effective classroom management techniques	Increasing pedagogical knowledge on classroom management techniques
Feedback on appearance in front of pupils How to use concretization tools Advices to create a close relationship with pupils Being patient and quiet Giving positive reinforcement Comments on using inclusion strategies Ice-breaking activities	Linking theory with practice Motivation of pupils Building a close relationship with pupils Foster self-confidence Speaking closely and quit with disruptive pupils Feedback on using hands-on activities	Feedback on creating an effective learning environment

"She (teacher) used different strategies, but more the ones that require everyone to be involved. For example, she used an interweaving technique where everyone has a part to work and thus

included everyone. Or, for example, the teacher chooses those who were more passive to respond. This had a great impact to engage them with the teacher. She asked questions all the time (Student 1).

On the other side, mentor teachers state that they were more focused on modelling skills for lecture preparation as lesson planning, time planning, lesson writing, choosing learning resources, etc. They were very collaborative to share with student teacher their personal notebook with daily lesson plans, to prepare together lesson plans focusing on important parts as introduction, strategies, time management, learning resources, etc. They state that it's very important to draw the pupil's attention, which was the most challenging part for students.

"Time management is very important. Students should learn more techniques which are attractive to pupils in order to achieve their engagement in activities" (Mentor 2); *"Usually I do not have a problem with classroom discipline. At the beginning of a lecture I create the atmosphere to listen. I say "We must listen. What does listening mean: open your ears, close your mouth, listen to the teacher. If I notice that someone is making noise, I close the book, approach to child and ask if there is something that he/she want to share with others. Shouting to them is a big mistake"* (Mentor 4).

3.2 Increasing student teacher's knowledge of classroom management techniques

Early career teachers' learning tasks are mainly related to content knowledge, students' characteristics, classroom management, and their own professional identity as a teacher (Feiman-Nemser, 2001). According to Reupert & Woodcock (2010), classroom management practices are teacher's actions to establish order in the classroom that engage students or elicit their cooperation in positive social interaction, active engagement in learning, and self-motivation. Student teachers and mentors state that classroom discipline is the "*key concern*" (Mentor 3) and a "*very complex issue*" (Student 4). Classroom management was very challenging because of the large number of pupils in a class. Mentors say that teaching practice helped students to "i*mplement in practice classroom management techniques that they knew in theory"* (Mentor 5).

Student teachers state that engaging pupils in activities was the most used strategy for classroom management from the mentor's. Assigning additional works to those pupils who first finished the schoolwork or engaging them to help others, combining active and passive pupils in groups are some of the techniques that mentors used to maintain the classroom discipline. Both students and mentors emphasize the importance of positive teacher-pupil rapport. Students noted that those mentors who had a very close rapport with pupils were more successful in classroom management. *"I advise my students to be close to children, to create a good rapport with them. Everything is much easier when they love you"* (Mentor 8).

3.3 Feedback on creating an effective learning environment

It's noted that most of the student teacher express that they learn a lot from a mentor teacher, especially the importance of attitude toward pupils. They admit that they started the practice with low self-confidence while at the end of practice they felt very satisfied with their achievements in establishing a learning environment.

"The teacher made clear explanations and listened attentively to the pupils' questions. I gained the ability to teach a lesson seeing the teacher, how she spoke to pupils. In this way, I have

increased my confidence to speak in front of pupils, based on the initial preparations. I gained confidence because the teacher encouraged me all the time" (Student 4). *"Teacher was quite energetic and enthusiastic. She influenced me to engage more"* (Student 1).

Mentors say that the use of tools that can link learning with reality is important if we want children to understand the lesson. This creates a working atmosphere that encourages children to engage and understand better. "*Using concretization tool during lesson makes pupils more interested to listen and to remember more. At the beginning of the lesson, it's important to create a learning atmosphere* (Mentor 4).

3.4 Constructing student teachers professional identity

Professional identity is an ongoing process of integration of the 'personal' and the 'professional' sides of becoming and being a teacher (Beijaard, Meijer, & Verloop, 2004). Based on the report findings of "Education International" (2019), teachers see their ongoing self-development and professional learning as the single most important influence on their professional identity. According to Day (2004), a positive sense of identity with subjects, relationships and roles is important to maintaining self-esteem or self-efficacy, commitment to and a passion for teaching. Our findings indicate that except for developing self-efficacy in teaching, student teachers were constructing a sense of self-identity and values of an effective and professional teacher during school placement. Mentor teachers state that, by developing self-efficacy in teaching, students gain in confidence, start defining their career goals and they took initiative to create their personal style of teaching, especially in classroom management. Mentors also emphasize the importance of learning to *"relate to others"* (Mentor 8) and *"create collegiality"* (Mentor 9) as contributors in the construction of student teacher's professional identity.

Table 2. Codes and themes derived from the thematic analysis of interview data's with mentor teachers and student teachers

Codes (from mentor teachers interviews)	**Codes (from student teachers interviews)**	**Themes**
Gain in confidence Personal style of teaching Personal style of behavior management Responsibility as teacher Importance of teacher collegiality How to relate to others	Identity as teacher Feeling as teacher Feeling good in front of pupils Understand profession of teacher Understand transition into profession	Constructing self-identity as a teacher
Define career goals Responsibility as teacher Attitude Able to adapt in the classroom Broaden spectrum of a variety of experiences and activities for professional development	Reflective practitioner Understanding responsibility being a teacher Building self-confidence Reflect on weaknesses Attitude Caring for pupils	Establishing values of an effective teacher

"*At the beginning of the teaching practice, during the conversation with the student, I realized that her career goals were not quite clear. I advised her to reflect on this, while she will be in*

class working with the children. It seems to me that her unsatisfactory experience during the past school placement has decreased her self-confidence. At the end of the teaching practice, she had more self-confidence because I talked to her all the time. She had the opportunity to make contacts with other school colleagues, and this helped her a lot to see herself as a future teacher" (Mentor 9)*; "The student was very capable, she came every day prepared with ideas for new activities that we could do during the lesson, especially in classroom management. She had begun to develop her own teaching style"* (Mentor 6).

While mentors emphasize the influence of social inclusion in shaping student teacher's "sense of self", student teachers are more focused on their personal feelings as future teachers and understanding of the profession. Different school placement activities and school context factors can shape the student teacher's professional identities. Teachers are expected to think and behave professionally, but not simply by adopting professional characteristics, including knowledge and attitudes that are prescribed. Teachers differ in the way they deal with these characteristics depending on the value they personally attach to them (Beijaard, Meijer, & Verloop, 2004). Student teacher's engagement in reflective practices has encouraged their sense of reflective practice and their experiences in being a "*reflective practitioner*" (Student 1, Student 7). Students express that reflection on daily activities in school placement and their experience during teaching, made them think about their weaknesses but also about details that they didn't like at mentor teacher's practices.

"Keeping a diary during practice was a stimulus for critical thinking and reflection on daily activities. As I was writing, I reflected on the positive and negative sides of the practice and daily experience of working with the mentor and students. The teacher has encouraged me to think critically about the weaknesses I can see in her. I liked that it is self-critical and that she reflects on she's own practices. So will I do as a future teacher" (Student 7).

4. CONCLUSIONS

This article draws links between the mentoring practices, pre-service teachers' self-efficacy in teaching and the construction of their sense of professional identity. Student teachers are expected to take a proactive approach to their personal development and participation in daily activities during school placement. Even from students is expected to seek engagement and feedback from a mentor, results show that students were more observer than practitioner. The data raised the issue of a small number of lessons that students teach during school placement, even they are in their last year of study. Students prompt to reflect on teachers as models, and replicate these models in their teaching practices. But, there are also indicators that by developing self-efficacy in teaching, students were establishing their personal style of teaching, especially in classroom management.

Results show that mentoring practices that contributed more to the development of student teacher self-efficacy in teaching are mentors modelling practices of instructional strategies, development of student teacher's pedagogical knowledge on classroom management techniques and feedback on creating an effective learning environment. Also, it's noticed that student-teachers start engagement in reflective practices, gain their sense of "self" as a future teacher, start creating a personal style for behavioral management and understood the importance of setting career goals. Besides developing self-efficacy in teaching, students were

constructing identity as a teacher and were establishing the values of an effective teacher. While mentors emphasize the influence of social inclusion in shaping student teacher's "sense of self", student teachers are more focused on their personal feelings as future teachers, responsibility and understanding of the profession. Based on student teacher's and mentor perception, keeping notes and dairy during school placement contributes to student reflective and critical thinking but, there is a need to be supportive structures of reflections that support identity formation, and that invite analytical and evaluative reflection. Despite the positive mentoring experiences, mentors emphasize the need for their motivation (financial support), closer cooperation with university mentor's and concrete tasks for students based on which they can be evaluated during school placement. On the other side, students suggest that mentors should provide more time to discuss teaching approaches and explore more opportunities for students to teach in each subject.

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CORRECTING STUDENTS' ERRORS IN ENGLISH WRITING: FROM THEORY TO PRACTICE

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Abstract

Making errors is inevitable while learning a second or foreign language. However, the error correction techniques and ways of giving feedback to students are critical for improvement and learning. The aim of this paper is to examine the ways of error correction to students' writing and their influence on students' writing performance. Furthermore, the paper seeks the answer to the question if teachers in their everyday situations provide suitable error correction, as recommended by the relevant literature. The assumption is that if the teachers know students' error correction preferences and act according to them, it can lead to students` improvement in language learning and better development of the writing skill, in particular. One hundred and twelve (112) elementary school students from Mitrovica, Kosovo and three (3) English teachers participate in the study. Findings are based on data analysis from students' and teachers' questionnaires especially created for the purpose of this study. The recommendations are expected to be useful for all current and prospective English teachers.

Key words: errors, writing, preferences, techniques, performance.

1. INTRODUCTION

Language learning, like all other kinds of human learning processes, includes making errors. In the past, language teachers thought of their students' errors as something unwanted. In fact, it was regarded as an element that had to be avoided at all cost. In the last fifteen years, however, views on students` errors have changed significantly. Researchers of applied linguistics have begun to view errors as fundamental components and a proof for creativity in the language learning process; especially concerning writing in the English language. Giving feedback is an important part of learning and teaching EFL process. It can guide, motivate, and encourage students to improve their accuracy in second language (L2) writing. One type of feedback that EFL teachers mostly use when dealing with students` writing is error correction, which is an important method since it contributes to students to develop writing as an important language skill. The role of written corrective feedback has been considered as important since teachers can communicate with their students individually which is rarely possible in everyday class (Ferris & al, 1997). Although written error correction has been questioned (Truscott, 1996), many L2 teachers think that written corrective feedback can lead L2 students' to accuracy in

writing (Hyland &Hyland, 2006; Brown, 2007). As discussed elsewhere, this research will focus on the writing errors that second language learners make in their attempts to improve English language writing in the foreign language context. Specifically, this research aims to analyze how the L1 interferes in this process with elementary school students and the attitude of teachers towards their students' errors.

2. LITERATURE REVIEW

2.1. A brief history of Error analysis

Behaviorist theory was the most important psychological theory in the 1950s. The behaviorists assumed that foreign language learning was basically a process of mechanical habit formation (Richards & Rodgers, 1986).They believed that student` errors should be corrected straightaway and if possible they had to be avoided, or else errors would become a habit and would stick in learners` mind. Thus, teachers at that time put this theory in practice in their language classroom, where they focused their language lessons on drilling and memorization in order to fix the correct forms into learners` mind. The behaviorist theory was criticized by many researchers in the field of applied linguistics during the 70s and 80s; that is why they published many papers in order to state the significance of learners` errors, and that they should not be avoided in the language classroom. After that many theories regarding errors were developed, such as Contrastive Analysis and Error Analysis which treated students` errors from a different point of view, in contrast to the first language theories. In their study(Jobeen, Kazemian, & Shahbaz, 2015, p. 60) concluded that "it is essential for learners to make mistakes in the process of language learning" and that systematic analysis of these errors serves as a linguistics analysis and it provides a deep insight in the process of language learning. Hence, error analysis usage is one of the best ways to explain errors that learners make when learning a second language. This analysis can tell the source of students` errors and the causes of occurrence.

2.2. Definitions of errors

In order to effectively prevent students` errors one must first define what the word error means. Errors are often difficult to identify, and they differ depending on the students` first language, whether they are native speakers or not, for the reason that students who are learning English cannot avoid errors when learning a second language (Gass & Selinker, 1994). According to Agnes (1998) error means believing what is not true, a wrong belief, something incorrectly done. Whereas (Lennon, 1991, pp. 180-195) gave this definition on errors: It is "a linguistic form or combination of forms which in the same context and under similar conditions of production would, in all likelihood, not be produced by the speakers` native speakers counterparts".

Corder (1967) supported the view that the term error should refer to a regular pattern in students` utterance that does not consistently correspond with the target language model. That is why errors are a part of the actual so called by (Selinker, 1972) as "interlanguage" system of a student, and hence not identified as incorrect by the student. (Hendrickson, 1978, pp. 387-398) viewed errors from the teaching perspective, describing it as, "an utterance, form or structure that a particular language teacher deems unacceptable because of its inappropriate use or its absence in real-life discourse". Despite these definitions on errors, defining errors in the

classroom context is not easy. From this point of view (Verall, 1972), as quoted by (Allwright & Bailey, 1991, p. 85) the term error is defined as a "form unwanted by the teacher".

2.3. Typology of errors

Researchers usually categorize errors as performance errors and competence errors. Performance errors occur when learners are tired but these errors can be avoided and are not that serious. Whereas, competence errors, are more serious than performance errors since competence errors occur as a consequence of insufficient competence. Researchers (Burt &Kiparsky, 1978)distinguish between local and global errors. Local errors refer to minor errors such as grammar, spelling, that do not hinder understanding of a text, whereas global errors are more serious than local errors, because they interfere with communication and disrupt the meaning of texts. Ellis, (1994) mentions a study by (Dulay & Burt, 1974) where they classified errors they collected during a study into three categories:

1. Developmental (i.e. those errors that are similar to L1 acquisition)
2. Interference errors (i.e. those errors that reflect the structure of the L1)
3. Unique (those errors that are neither developmental nor interference)

After their former classification of errors (Dulay, Burt, & Krashen, 1982) claimed that there were two basic ways of classifying errors: from linguistic categories (morphology, phonology, etc.) or structure taxonomies (errors of addition, omission, etc.). The later one classifies errors into four categories: omission, addition, misformation, and misordering. By using this kind of taxonomy to divide errors, the cognitive process that connects mother tongue and target language can be emphasized. This taxonomy also highlights the fact that errors cannot be avoided during the process of producing the target language. Thus, errors of omission refer to the absence of an item which must be present in a well-formed utterance. This includes noun and verb inflections, for instance the "s" in houses and "s" in student`s book and "ed" in worked, the "ing" in swimming. Errors of addition is the opposite of omission; the presence of an extra item which must not be present in a well-formed utterance. Some examples are learners adding "ed" to the verb "put", in order to form the past tense of the verb. Errors of misformation happen where a wrong form of the morpheme was used instead of the right one. For example, learners add "ed" to the verb "fall" to form the past tense of this verb. Errors of misordering refer to the errors where the items are used correctly, but placed in the wrong order.

2.4. Error correction and feedback techniques to correct students` errors

Research shows that error correction has a positive influence when learning a second language. (Hendrickson, 1978, pp. 387-398), states that, "when an error of a second language learner is corrected, it has a greater impact on his proficiency than when it remains uncorrected". Whereas (Truscot, 1999) indicates that the inconsistent correction of grammatical errors might be even worse if not equally bad as no error correction at all. He also notes that error feedback inconsistencies are unavoidable, therefore there ought to be no oral grammar correction whatsoever. According to (Harmer, 1998) the teacher should follow three steps when the error occurs. First, the teacher listens to the students. Secondly, he/she identifies the problem, and thirdly, he/she puts the error right in the most efficient way. Similar to this, (Ramadan, 2019) lists several techniques on when and how to correct students` errors, and when not to correct their errors, based on the situation and on the type of error. Since no teacher has time to deal with all the errors of the students, a system of correction should be established to correct errors

according to their nature and significance. In such a system, priority should be given to errors which may affect communication and cause misunderstanding. If a teacher knows about all these items, he can direct himself accordingly. According to (Corder, 1981) teachers should be able not only to discover and describe errors linguistically but also understand the psychological reasons of their occurrence. He also claims that for teachers, being aware of the diagnosis and correction skills for errors is fundamental as it might help them understand why and how they can interfere to help their students. One of the biggest problems for teachers is to know when and if to correct students, and how to do it. Over-correcting students might result in students losing motivation and the destruction of the flow of the class. There are different techniques that can be used to correct mistakes and errors such as the following:

1. Correcting all mistakes and errors

This technique includes the correction of students` writing. When using this technique it is important to correct students` writing within a short period of time, since correction after a while will not have its effect as students will not remember what they wrote and why they did it.

2. Correcting mistakes and errors by selection

This technique entails that teachers should correct only the mistakes and errors of students` writing, in those areas where the teacher thinks it is more necessary.

3. Correcting mistakes and errors by using signs

This technique involves the use of codes, such as: Gr- grammatical mistake, Sp - spelling mistake, L- lexical mistake, etc. By using these codes, students are more aware of the kind of errors they have made, and hence they can correct it.

4. Explaining mistakes and errors

This technique is done by writing comments on students` notebooks in order to give attention to the mistakes and errors that students kept making despite the former correction by the teacher.

5. Self-correction

When students are aware of the kind of mistake they have made, they should be able to correct their own mistakes. Self- correction is a very effective technique, because students will remember better the mistakes and the correct form as well.

6. Peer correction

It is a technique which involves students correcting each other's writing. According to (Edge, 1990, p. 26) "peer correction has the following advantages:

- It encourages cooperation, students get used to the idea that they can learn from each other
- Both learners (who made the error and who correct) are involved in listening to and thinking about the language
- The teacher gets a lot of important information about the learners' ability -if students learn to practice peer correction without hurting each other's feelings, they will do the same in pair-work activities. However, it may happen that whenever the teacher asks for peer

correction from the whole class, it is always the same students who answer. In this case the teacher has to make sure that other students are involved as well".

2.5. Students' attitudes towards errors and their preferences regarding error correction

Before correcting students` errors it is important that the teacher knows students` preferences towards error correction since if teachers do not know their students` preferences then this situation leads to a disillusion, which may eventually become an obstacle in language development of the student (Horwitz, 1988). In a study on L2 student writers, (Leki, 1991)finds that most students are open to written error correction while there is only a small number of students who regard error correction as distracting and/or discouraging. Rather, they prefer not to be corrected whenever they are writing, leading to them refusing participation in the classroom interaction just because they do not want to be corrected. Additionally, (Ferris & Roberts, 2001)found out that L2 students prefer, expect, and appreciate teachers' feedback when they make errors in writing. Likewise, (Chastain, 1988) points out that without corrective feedback, it is difficult for students to find out whether they have completed the task correctly.

In conclusion, this literature review shows that over time, the views of teachers about their students` errors have changed, since they started seeing their errors as a proof that students are trying to succeed in language learning. This allowed for teachers to discover the causes of their students` errors more easily, and proceed in this process by telling students the correct form, and minimizing their errors in the future.

3. METHODOLOGY

3.1 Introduction

This section presents the research methodology under which the study was conducted. The nature of the study which was adopted to examine the writing errors of the elementary level students will be explained as well. The other part of this section describes the participants, the setting of this study and the research tools that were used to conduct the research.

3.2 Research design

A wide and appropriate methodology is required in order to conduct a research. Traditionally there are two types of research methods: qualitative and quantitative method. According to (Nunan, 1997, p. 3) "quantitative research is obtrusive and controlled, objective, generalizable, outcome oriented and assumes the existence of facts which are somehow external to and independent of the observer or researcher. Qualitative research, on the other hand, assumes that all knowledge is relative, that there is a subjective element to all knowledge and research, and those holistic, ungeneralised studies are justifiable". This study employs a quantitative method in order to answer the research questions and to test the hypothesis.

3.3. Research methods and techniques

The sociolinguistic survey is an essential part of the research for achieving the desired and required results where a questionnaire will be given to 112 students and their English teachers of Sh.F.M.U Eqrem Çabej in Mitrovica about writing errors mostly made by them. Thus, the quantitative method will be used to conduct this research.

In order to test the hypothesis, to obtain the information required from the subjects and to reach the objectives of the study two main tools will be used: a questionnaire and a test designed for three classes of 5th grade students of Elementary school "Eqrem Çabej" in Mitrovica.

Moreover, a questionnaire which elicits teachers' views, opinions and decisions in class regarding students` errors and teachers` practices on the use of L1 in class is going to be conducted.

3.4. Participants and setting of the study

The participants of this study were the students of elementary school "Eqrem Çabej" which is located in the city of Mitrovica. Students are ranging in the age group of 10-11 years old. One hundred and twelve students of fifth grade from three classes were chosen as the participants of this study. Students are familiar with the English language since they have been learning it for three years now and have prior knowledge in this language. Whereas teachers working in the school that students study at are going to be part of this study as well, in order for the results of this study to be more valid and reliable. They have several years of experience in the field of English language teaching and they have participated in different training programs for teaching English in elementary levels.

3.5.1 Instruments

3.5.2 Description of the students` questionnaire

The questionnaire aims at finding out whether the learners give importance to the errors that they make in writing class, and they will be asked about the feedback they get in writing. It will be distributed to 112 students and it consists of 11 questions which are arranged in a logical way. The questions are either closed questions requiring from the students to choose „yes or „no answers, or to pick up the appropriate answer from a number of choices. Students are asked to specify their gender in the beginning of this questionnaire.

3.5.3 Description of the teachers` questionnaire

The questionnaire aims at finding out teachers` beliefs regarding error feedback, their general opinions about writing class; whether writing is important or not, and they will be asked about their practices on the use of L1 in L2 classroom. It will be distributed to 3 teachers of English, teaching in the same school and it consists of 15 questions which are arranged logically. They have to choose from strongly disagree (1), to strongly agree (4).

3.5.4. Description of the test

The test aims at finding out the errors that students make in writing, their causes and treatment. It consists of 15 questions in total and the students have to write the most appropriate answer in the gap. It will be distributed to the same 112 students from three classes of fifth graders that filled out the questionnaire. The questions are based on Corder`s taxonomy of errors which had to do with errors of omission, addition, substitution and errors of permutation.

4. RESULTS AND DISCUSSION

4.1. Analysis of the results on students` questionnaire

As it can be seen from the questionnaire` results students write rarely therefore this might be the reason they make mistakes in writing. The majority of the students who took the questionnaire (56%) of them answered that they think writing in English is complicated; this maybe the result of not practicing writing that much in class.

Even though error making is an important part of second language learning, when the students were asked whether errors are important in learning a second language, most of the students acknowledged that they are not important. This is a problem because if students think this way they will want to prevent their errors and this may hinder them to write in English in order to prevent possible mistakes during the process. The students from fifth grade assume that they are corrected by the teacher, whereas there are some who said that they are not corrected by their teacher, probably the limited time and the big number of students per class makes teacher unavailable for all the students, and thus they have no time to correct all students` errors. Nevertheless the majority of the students (48%) would prefer their teacher to circle or underline all of their errors. An issue regarding error feedback is that the majority of the students answered that their teachers do not tell them what type of error they have made (ex whether present continuous should have been used instead of present simple etc.), and teachers do not use marking codes for their students` errors (such as V for verb, adj for adjective etc.). This of course makes students unaware of the type of error they have made and thus prevents them to progress in writing, since in the questionnaire they said that by reading teachers` feedback they could improve their writing. Students also admitted that they like peer feedback because their peers are capable of correcting them.

4.2. Analysis of the results on teachers` questionnaire

In the questionnaire which was designed for teachers of English language they all agreed that writing skills are important, and all of them think that teaching writing is hard. Nevertheless, they do not feel the need for their students to take special courses in writing. These teachers accepted that they need more training in teaching writing since most of the prior trainings were on the general methodology of teaching but not primarily on teaching writing.

All of the teachers (100%) who participated in this questionnaire strongly agreed that correcting their students` errors makes them succeed in language writing. But when asked whether teachers who do not correct all of their students` errors are considered lazy mostly of them (67%) disagreed and they said that sometimes this is impossible because they do not have enough time for this. Teachers admitted that they are the only source of marking their students` errors and they are depending upon them on error marking and error correction. Whereas when asked about providing students with the marking codes when giving feedback they did not respond pro this on a high percentage, only (33%) of them agreed that teachers should provide marking codes when correcting their students` errors.

As for the use of L1 in class, teachers (100%) of them answered that their students like when teachers use L1 for classroom management and to explain grammar rules because they feel more comfortable when the teacher does so, plus they understand the lesson much better, and the teachers think of continuing with the use of L1 in class for the reason that their students make more progress in language learning in this way. However, the downside of this according

to the findings is that the more the teachers use L1, the more their students speak L1 than L2. Since classroom time is the only place they speak English, they are hence minimizing their time on practicing English language resulting to a minimal progress in language learning.

4.3. Analysis of the results on students` test

The reason for choosing the test for the students as one of the tools for conducting the research was in order to find out the type of errors students make when writing in English, and the sources of these errors. In order to analyze and diagnose their most common errors Corder`s taxonomy was used. This kind of taxonomy divides errors into errors of omission, addition, substitution and errors of permutation.

On the first part of the test which included errors of omission, in the case of the first question omission of the definite article "the" the majority of the students (83%) answered incorrectly because they did not use the definite article where they were supposed to. Instead they used indefinite article or nothing at all. Whereas in the second question where they were supposed to use the indefinite article "a" (52%) of them omitted it and hence they gave a wrong answer. The third question had to do with preposition "to" but the majority of the students (75%) responded incorrectly by using "from" instead of "to" or other forms. This tells that they have problems with an understanding of the usage of prepositions. The fourth question was about using the third person singular in the gap but students (68%) gave a wrong answer by leaving the sentence as it is, and writing nothing in the gap. In the fifth question where students were supposed to use the possessive "s" they encountered problems with the misuse of this grammatical form since the majority of them (84%) did not use it at all in the sentence. However, students did better in the sixth question where they were supposed to use the possessive pronoun "his" where only (21%) of them responded incorrectly. The majority of the students (81%) gave a correct answer in the seventh question which had to do with the use of copula "are" , and only (19%) of them gave a wrong answer.

The second part of the test deals with errors of addition where students add different unnecessary grammatical forms to the sentence. In the first two questions of this part students added the definite article "the" and the indefinite article "a" even though the sentences were already correct. They also had problems with the prepositions and the unnecessary addition of the plural "s" in the sentence where the majority of the students who took the test (79%) gave a wrong answer on this question.

On the third part of the test which dealt with errors of substitution students made a significant number of errors. Starting from the first question of this part which deals with choosing an appropriate word that fits the sentence best, (83%) of the students gave a wrong answer. Students gave also wrong answers in the second question of this section where (63%) of them chose the wrong part of speech. However, students did better in the last question of this part, in the question which deals with tense use, where only (20%) of them answered incorrectly.

Students did also give a correct response on the last question on the section of errors of permutation where they had to place the elements in the right order. Only (23%) of them answered incorrectly in this question, which means that they have practiced before in these exercises.

As it can be seen from the analysis of this study above the highest percentage of errors that students made in the test were the errors of omission with (48%). The second highest percentage

is followed by errors of addition with a percentage of (29%). The percentage of errors of omission is (20%), followed by a lower percentage (3%) of errors of permutation.

5. CONCLUSION

This study aimed at identifying, describing and diagnosing the type of errors that elementary students make when writing in English. The participants of this study were fifth grade students, in the age 10-11 years old. The research was conducted in elementary school "Eqrem Çabej" in Mitrovica. The focus of this research was to identify the type of errors these students make in writing and the causes of their errors. Moreover how the use of L1 in class impacts English language learning was studied as well.

To conduct the research various tools were used, such as a questionnaire for the students, a questionnaire for the teachers of this school, and a test designed for the students as well. Thus, a number of different errors were found in their tests mostly errors of omission and these of addition. Students` answers on the test were compared to their mother tongue forms and it can be said that the cause of the errors are interlingual and itralingual reasons, as well as other factors. That means that these students have a long way to go in improving their writing skills. It is the teachers' responsibility and the syllabus designers to work on their students' writing skills since errors in writing require more attention than the others. If students have a good foundation of grammar they will have better writing abilities. It is also important that the teacher knows the source of errors and how to deal with them. Students can also correct their own writing and simultaneously they will improve their linguistic competence by following these strategies. This study reveals that learners make mistakes in writing but they can be improved with motivation that comes from the learner combined with hard work and also teachers' motivation and regular correction of the students' errors. However, this study dealt with a limited number of linguistic aspects and obviously there is much work to be done in this field in the future.

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THE NEW CHALLENGES OF THE LAW CURRICULUM ACCORDING TO THE HIGHER EDUCATION LAW IN ALBANIA

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Abstract

The paper's aims are general research on Albanian Higher Education Law, its new approaches to the implementation of new structures on the higher education system in Albania with a specific evaluation of the implementation of new curricula and academic programs on Law Faculties in Albania. Law no. 80/2015 in its content gave life to a reformulation of Law programs differently from the previous one, leaving specific tasks for higher education institutions to design the respective curricula. This brought that, the new academic year 2020-2021 will find Law Faculties, in private and public universities in Albania, with new study programs, with a plan that goes from the 3 + 2 curricula to the 5-year, master's integrated degree program. Law Faculties will face, for the first time, this new challenge. The methodology will consist of a compared study of legislation, recommendations of international institutions on the evaluation of higher education institutions of Albania, policy papers on identifying the causes why higher education needs improvements on its programs, and why this started up from the law faculties. Analysis of the improvement of integrated programs in Justice in a specific case study, the university of Durres will show the strengths and weak points of this reform, as another methodology component.

Keywords: Albanian legislation, higher education institution, alumni, law program, economic and social impact.

1. INTRODUCTION

The establishment of the University of Tirana (1957) (archive.org), as the first institution of higher education in the country composed by 6 faculties, paved the way for the qualification of the first professionals trained entirely in Albania. The professionals who gave their contribution in this university received a good part of their education in foreign universities and all together created the first departments, the first programs of study as well as first experiences in academic teaching and Albanian innovation.

The political changes abandoned completely the "*intelligence of the time*", which found itself underpaid and underrepresented in academic level. The academic staff was impotent towards the indifference and incorrect behavior of the student body. The free market economy and the opening of borders offers the conditions for a massive exodus of teachers and professors abroad

(World Bank, 2008). The phenomena of brain drain found the entire education system and the universities in particular unprepared. The necessity for urgent intervention led to immediate measures, started by drafting of a legal framework focused on the establishment of a network among the educational institutions. During 1994-1995, the Albanian law on education was based on democratic and constitutional principles, aiming the increasing of the quality of education as an opportunity to improve the economic and social situation.

Pursuant to *Article 57 of the Constitution*, the right to education is guaranteed to all citizens and the state is obliged to provide an education system fair and equal to all of them. Based on Constitution is guaranteed the autonomy of higher education institutions and the academic freedom. The university attendance is based on selective criteria organized on different forms through years according to the education reforms. Such selection forms were based on competition or exams. Even with a fragmented public opinion on the competition as an instrument of selection, this was not considered as a violation to the right of education. It would be considered as a violation of right if there is any deviation from the normal procedure that guarantees fair competition of candidates and transparency of the results. Additional number or non-competitive admission of students, without a legitimate cause or reasons may produces a violation of the constitutional principle and offers unreasonable privileges.

The Constitutional Court on the decision no. 9 dated 19.03.2008, confirmed the autonomy of higher education institutions as a constitutional right stating that "*respecting the principle of autonomy of higher education institutions, based on Art. 57/7 of the Constitution, requires the creation of these dimensions that empower the higher education institutions to make decision freely and independently. Self-government, collegiality and appropriate academic orientation are the essential elements of a true autonomy for higher education institutions"*.

1.1 Abbreviations

ASCAL - the Quality Assurance Agency in Higher Education (QAAHE)
DCM - Council of Minister's Decision
ECTS – European Credit Transfer and Accumulation System
IAL - Higher Education Institution (HEI)
MASR - Ministry of Education, Sports, and Youth
PI – Master Professional

2. SOME REFLECTIONS ABOUT THE INTEGRATED LAW PROGRAM

According the Law 80/2015, the study program constitutes a set of academic and/or scientific research activities, the successfully fulfillment, entitles the student with a certificate, diploma, or scientific degree from a higher education institution that offers this type of program (Article 6/22).

Based on art. 6/25, the system of full-time studies includes the organization of study programs with a normal academic load of 60 credits in each academic year. According to the law, in case of law program, it will pass from 3 + 2 (Bachelor + 2 Master) program to the integrated 5-year program with 300 ECTS.

Based on the law *On higher education*, the year 2017-2018 was envisaged by the legislator as the academic year which would changed the law curricula, but for various reasons this was impossible:

- this period was characterized by a significant delay of legal documents that affected directly the normal functioning of the higher education system (Krasniqi, A. 2018);

- lot of time and effords were spended on fixing the issue of massification of university attendance and its results, the higher number of private universities (Study on Higher Education Reform, 2014), creating the approprate instruments of controll and license the public and non-public universities (ASCAL, 2020);

- the late establishment of structures on the quality and accreditation of university programs delayed on the achievement of law expectations (art. 133 and 137 of Law 80/2015);

- the late establishment of functional structures in the universities after elections and missing the legal acts for the Higher Education Institutions (art 132, Law 80/2015).

- the long harmonization of the curricula at the national level on the same program according to the name, type and, levels or titles of study. This was an important issue for the students who has to undertake the State Exam.

So, is the new academic year 2020-2021, which open the light to the integrated program in Law for all the universities.

Where this curricula consist?

Pursuant to the requirements of the law (Article 82) and bylaws[11], Departments / Faculties of Law in public and non-public IAL reviewed the *curricula-s* of the study program in "Law" Bachelor by reorganizing it in two basic directions: *firstly*, reducing the courses to 38 (37 courses + diploma) and *secondly* reflecting the legal provision of law on credits distribution about formative topics.

The most important elements of this reform consisted on:

1. Inclusion of the main subjects, necessary for the legal knowledge of a law student. The *curricula* is based on the principle of interdisciplinary dependence.

2. Distribution of course profile over the years and academic semesters, aiming not only at a proportional distribution in terms of *quantity of courses* or *modules* in one semester, also following a chronological order of these courses.

3. Categorization of subjects, according to law, respects their content and purpose with different profiles.

4. Proportionality in the distribution of three profiles: public, civil, and penal. Such a balance in the design of this *curricula* will offer the opportunity to a law student to achieve a general law education. The courses of the first year offers basic knowledge on the legal background. Specific knowledge are part of continuative education through elective courses to encrease student knowledge dimension into three profiles: public, civil, and penal.

[11] Law no. 80/2015, DCM No. 41, dated 24.01.2018, Instruction No.1, dated 14.01.2020.

5. Elective courses are made available to the student starting from the second year, offeing them the chance to be confident with rules and basic elements of legal studies. As part of the curricula, the student is free to choose among the approved elective courses which of them to follow.

The curricula-s organization, requires by law a compatibility of it through different university programs not less than 70%.

Why is this similarity required?

For many reasons:

-Increases the possibility for student's to follow and transfer their studies to another university;

- Increases the capacities and the competition spirit between universities to increase and select the most qualified students;

-Increases the qualification capacities of the academic staffs;

- Increases the cooperation and inter-institutional coordination in projects, students and academic staff mobility, conferences, workshops, open lectures between Law Faculties.

One of the arguments that helps the unification of higher education law programes and not only is the fact that, the Albanian market is small, which imposes a genuine competition only if we have a restrected number of institutions with special status. For many years, the IALs in Albania had different statuses with quality measurig instruments which created the possibility for abuses in the system (Higher Education Reform study, 2014).

Defining similarities in the study plan offers more opportunities for the students and staff mobilities, data's on completed courses and increases the chances of institutional cooperation and research.

By the other side, similar *curricula-s* on the same profile may create problems with the guaranties of autinomy of decission making process of the department on programs implemantation by preserving their characteristics and strength points of each of their study programs.

3. STRENGTH POINTS OF THE INTEGRATED LAW PROGRAM. CASE STUDY OF THE FACULTY OF POLITICAL AND LEGAL SCIENCES, ALEKSANDËR MOISIU UNIVERSITY, DURRËS / ALBANIA

The transition to the 5-year integrated program in law studies reflects the best European experiences. Other inputs consisted on:

- A 3-year "Bachelor" diploma became ineffective on orientation of graduated students towards the labor market or to discharge the universities from students who fails on continuing their master studies.

-The lack of a national employment framework with a correct definitions of professions and fields where graduated students may be imployed, had a negative impact too. Under these circumstances, the pressure of undergraduates to continue their education, even when they did not deserve it, has been high. Also, IALs, were not consistent on applying the admission criteria to the second cycle (mainly public ones) or did not apply selective admission criteria (mainly

non-public ones). Curricular orientation on humanities brought an overcrowding of students on discharge of technical and applied sciences programs, which was reflected directly on the labor market conditions.

-*Curricula*-s failed on the adaption to socio-economic changes and market developments affected their quality. The similarities of these curricula-s increased artificially the competition in the labor market, among graduates of the same field (Study on Higher Education Reform, 2014).

- Achieving national and international academic standards, as a continuous goal of IALs, through promoting and developing critical and analytical thinking, serves on building responsibility and commitment of a person, community, culture, and entire society.

-The Law curricula with summarized knowledge and in-depth studies as part of group-courses aims to make the students aware and competitive on the national and internationa market in the future.

The Bachelor program, shows an *increment in the number of students* from all over Albania. The case of UAMD shows that Law program started its progress, in the academic year 2010/2011, with 40 students to reach 265 students in the academic year 2018/2019.

In the case of UAMD, this program was identified *as a preferred branch by students,* by filling all the MASR quotas given every year, and at the same time trying to *increase them*. The progressive increment of student's enrollement in this program was not affected by the close geographical position with other universities in Tirana, Elbasan, or Shkodra with similar study program.

The demand for this study program was related to the *post-graduate* opportunities offered to all interested students on improving their studies. In the second cycle of studies, the Department of Law offered in Master of Science programs like Private Law and Public International Law and in the Professional Master offered programs like Property Law and International Commercial Law. The aim of these second cycle programs was *to guarantee the standards in teaching*, *contemporary programs*, *implementation of best international education practices* and to offer employment opportunities for the graduated students on national and international level. The diversity on programs creates more opportunities for each student on orienting them into the labor market according to their qualifications and market requirements. Every year at UAMD more than 100 students start their studies in Master's program, the number which reflects the progressive growth over the years.

The organization of the 5-year *curricula-s* required a working group aware about the existing program, its problems, the need for intervention and improvement in respect of law, the qualification of the academic staff, study programs which reflects the labor market demands. The working team grouped the specific activities of the reorganized curricula according to the categories required by law, identifying the importance of new subjects, the variety of choices for students and respecting the academic freedom on the selected individual course.

- The curricula tried to provide a flexible content giving small importance on the study plan to the compulsory subjects, while the characteristic subjects identify the specific area of competences of the future lawyers, in accordance to students requests and the programmed topics during 5 years law education. This training will be an asset for the graduated students

career and pave the way to their admission at the School of Magistrates, or pursuing a notary career or practicing law as a lawyer.

- The conception of different groups of elective courses (in the case of UAMD, there are created five groups of elective courses) is related to the numbers of final specialization destinations. The independent choice of the exams define a personal profile of the student. Or? Or gives a legal-economic "*value*" to the university career for each student, combining law studies in economic areas where deeply knowledge is needed such as environmental protection, competition law, bankruptcy, or the field of social and cyber rights. This reform aims to personalize the study program of each student by offering him/her the chance to choose it in absolute freedom.

- What do the numbers say? The five-year *curricula* in "Law" differs substantially from the previous one not only in numbers. The 3-year Bachelor program required the fulfillment of 38 exams (for a total of 180 credits), without counting the exams of the second cycle. Instead of it, 5-year *curricula-s* requires accomplishing of 38 exams with a total of 300 credits. Each student of this study program will be able to choose between 4 different profiles of elective courses. This orients the choice, i.e. the specialization.

- The possibility of confrontation – as result of a deep reflection among students and stakeholders. The education offer of the Law Department is structured to face the labor market without losing quality and paying attention to our legal traditions. This confrontation is destined for renewal, flexibility oriented towards successive and continuous changes.

The labor market offers employment opportunities in both sectors public and private. In the public sector, the need for students with "Law" profile is very high. The role of lawyers as a key function in public, central and local administration provides high employment guarantees for law graduates. The opportunity for graduates to participate as members on judiciary institutions after completing the integrated studies program constitutes an added value of law studies.

Justice reform in Albania affected the necessity of changes at the academic level. The integrated study program enables young professionals to complete their training at all areas of law. The new justice institutions, as the biggest employers of the moment in the public sector, sought and demand for the well-formed qualities of the future lawyers.

Among 75,654 employees in public institutions during 2018, the largest number of them is employed at the Ministry of Justice, 5688 employers, the highest number compared to the other ministries (except Ministry of Education which has 31,004 employees (Law No.130/2016, Law No.109/2017).

Meanwhile, in 2018 with the establishment of new institutions, there we created new job positions for legal professionals, like the Center against Violent Extremism and Radicalism which employed 8 experts, the Agency for the Diaspora employed 15 experts, State Committee of Cults -10 experts, Independent Qualification Commission -50 experts, Special Appellate College – 37 experts and Public Commissioner employed 26 experts (Law No.130/2016, Law No.109/2017).

In the private sector, graduates have the opportunity to be integrated into "*the free professional's system*", concretely as attorney at law, notary, and private/public bailiff services.

In addition to the possibility of practicing professions closely related to their profile and legal education, even the private sector offers more opportunities to employ all those students who want to be focused on private sectors fields.

According to the employing entities by regions during 2013-2014, the region of Durrës is ranked the second in the country, creating large number of employment opportunities for recent graduates (INSTAT 2010-2014).

- Student perception. According to INSTAT, the largest number of study demands belongs to the branches of Business, Administration and Law, starting from the academic year 2014-2015 with 42,089 admissions, 2015-2016 - 41,523 admission; 2016-2017- 36,471 admissions; 2017-2018 - 30,233 admissions until 2018-2019 which includes 33,447 admission in Albania.

The high demand to study in this profile is related to the opportunity offered by the labor market for all graduates to pursue their dreams.

How does the new formative offer help the student? This formative transition is interesting because it sets a precedent for the institutional democracy. The department provides information and clues on the courses and subjects that can be offered during the implementation of the *curricula-s*, orienting students towards a complete training on the required specialization. The meetings between the professors and the students aimed on reaching a consensus on the group of subjects which constitutes a big interest for the students. Taking the opinion of stakeholders (business, lawyers, heads of public institutions) highlighted the need for a legal training designed towards the economy and not only. Curricula-s flexibility, the possibility of obtaining a specialization are important steps towards a job market with a well-defined academic profile like the figure of a *data protection officer* or *a social lawyer*.

1. Age of access to the labor market. This program lowers the age of access to the labor market. Newly graduated students are professionally trained, ready to apply for a job position and have in their hands a diploma in both cycles of studies. Previously the degree required an additional study to provide access to the labor market, which conditioned many new graduates to be part of this market, requiring more time for them to choose between Professional or Scientific education. The situation directly affected the delay of young people's access to the labor market, and pushed them more and more away from it and possibly influencing them to drop out of the second cycle of studies.

2. Possibility of transferring studies or credits. This 5-year curricula-s gives to the student the opportunity to transfer his/her studies to another university inside and outside the country and guarantee the recognition of the validity of the course's credits. Also, the agreements of student mobility offer mutual opportunities for a student with this formative plan to have more opportunities on integrating the realized courses to another University.

3. IAL with its logistical capacities and qualified academic staff and support staff guarantees a correct, coherent, professional, contemporary and qualitative implementation of the *curricula-s,* meeting all institutional, personal and professional expectations for each graduate. The establishment of structures such as *law clinics* provide a closer connection between IAL and the community making it more present and offering to the students new opportunities to develop their practical knowledge.

4. Ensuring curricular formative practices, the participation in Law Clinic activities and projects, the recognition of international experiences are some other opportunities for a student, to be ready for the job market.

4. CONCLUSIONS

The 5-year academic program in Law studies offers an innovation for the Albanian reality, preparing and qualifying students for the future as an European society, worthy of facing challenges. IAL-s demanded that, in accordance with law requirements, to guarantee the quality of studies on fulfilling their mission – to create elites starting by their education as future specialist, as devoted and visionary citizen, a respectful member in a democratic society.

The challenge on making real the five-year integrated program, offering to the student a deeper theoretical and practical education, is an important guarantee on taking further steps towards the design of new Executive Master's programs, which will complete the profile of a student projected for the labor market.

This new academic year will begin with reflections about capacity building of students but also of the academic staff. Such curricula will serve to increase the professional qualities of professors, paving the way for the establishment, building and representation of a *mature legal professional opinion* in various *law profiles*. This, will strengthen the law schools in itself and will promote directly the competition between universities.

Acknowledgements

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THE IMPACT OF HIGH SCHOOL CORE COURSES ON FIRST-YEAR STUDENT SUCCESS. CASE STUDY: BIOLOGY VS ENGINEERING

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Abstract

This study is based on the data collected from student questionnaires during 3-year period (2017-2020). It analyzes some engineering programs and Biology's, as well. It is found that the higher students rate who have attended the elective courses in high school, the smaller the difficulty rate they encounter during the first year of university. In the same way, the impact on repetitions in different courses was analyzed, as well as on the success of the first year student. By comparing the data between the two study periods, which represent two groups of students, those who have completed high school with the objective-based curriculum and students who have completed the new high school curriculum based on learning outcomes according to competencies, there appears to be a significant improvement on student success. The results show also that attending elective courses during the last year of high school has had a significant improving impact on student success. Based on these data, this study strongly recommends that university structures should cooperate closely with secondary education institutions. But at the same time, the universities must review their admission criteria and match them as well as possible with the secondary education program and its structure. There should also be an extended involvement of academic structures in reviewing and improving course content in the first year in line not only with the learning outcomes of the program but also in reflecting the level of achievement results of admitted students.

Key words: course, student, impact, engineering, biology.

1. INTRODUCTION

Admission of students to Higher Education Institutions (HEIs), represents a very important and complex process. In this complexity interacts at the same time many factors of different natures and dimensions. Today, special attention is paid to this process by the government policies on education as well as by the HEI itself. To ensure the quality of this process, special attention has been paid to the inclusion in the quality standards of a list of indicators that HEIs must meet to gain their accreditation both at the institutional level and at the program level (ESG, 2015, pp. 15). The quality standard for admissions defines the criteria and presents the way for their

implementation throughout the student life cycle from enrollment, the realization of the study program to the completion of university studies.

The problems that accompany the student admission process are a reality that constantly affects the experiences and decision-making of HEIs. Such are some of the recent cases in the USA, where in some prestigious HEIs abuses in admission processes have been found, which have been publicly denounced in the media and have been convicted (Park & Karim, 2019). Although these experiences are not always directly related to the academic quality of the student, they still affect the aspect of student motivation and beyond. One of the measures applied by governments or HEIs for student admission is the establishment of "threshold" criteria, which aim to affect the success of students in the first year.

Helnessen (2018, pp. 2) argues that admission conditions and the program chosen by the student, affect not only the student's success at the university, expressed through the grade point average, but they can also affect the student's learning outcomes when directed in the labor market.

Regardless of the form of organization of the student admission system in the university system, which means with or without preparatory courses, the process of transferring the student from high school to the University is the subject of many research papers aimed at its continuous improvement, as a prerequisite for student success at university.

Various scientific papers have identified different factors that act and affect different stages of the transition process from high school to the first year at the University, among which can be mentioned:

- College readiness
- Student motivation
- Course sequencing
- Curriculum alignment
- University environment etc.

Undoubtedly the student is one of the key factors to manage this process properly and well. Not only for the student, but for the whole society it should be clear that this process of transition from high school to HEI, more than a change of schooling cycles is a transition process where many factors operate, including the time factor. Mutch in his publication, (2005, pp. 158) provides a list of 20 tips for freshmen to get through this transition period more easily.

Siri & al. (2016) in their publication proved also data showing that the transition from high school to university has an important role in the dropout rate of first year students, thus representing a critical period in student's educational career. This transition period should be taken into account both during the collection of data for the evaluation of various aspects of the process of students transfer from high school to the University as well as during the analysis for the reform of study programs, both in high school and also at the University.

Among the factors that affect the success of the student in the first year of university, those related to the student's academic preparation, represent an important object for this study. Of particular interest is the level of academic preparation of the student for admission to the University. In the analysis made by us in this study, regarding the meaning of the term "College readiness", we have accepted the definition given by Venezia A. & Jaeger L, (2013, pp118):

"College readiness is commonly understood as the level of preparation a student needs to enroll and succeed in a college program (certificate, associate's degree, or (baccalaureate) without requiring remediation".

Curtis (2007, pp. 13-16) proved that one of the indicators used to assess the success of a first year student is the grade point average. Curtis points out that the grade point average at university has a dependence that is almost linear with the high school grade point average, regardless of the student level. Today in Albanian universities among the criteria for admission to the university is the average grade of high school as well as the average grade in scientific or social subjects, depending on the study program.

Ferrao & Almeida (2019, pp. 2) in their study where they analyzed 54 study programs in a Portuguese university with 20 000 students, prove that the results of the student entering the university expressed with the value of the average grade have different effects on student performance during the first year. They point out that this depends on both the program where students study and personal motivation.

Geiser & Santelices (2007, pp. 2) provuan qe rezultatet e testeve standarde te pranimit te studenteve pasqyrojne me mire karakteristikat social ekonomike te studenteve ne pranimin ne Universitet.

Subedil & Powell (2016, pp. 6) by analyzing the results obtained in Reading and Mathematics, for a sample of 12,554 students from 51 High schools, explained the effects of school and student in college readiness.

There are many studies that also prove the impact of the course content itself in College readiness. In these types of studies predominate mainly those that provide data on Mathematics and less on foreign language or other subjects of education.

Staats & Robertson in their 2017 study are focused on Math modeling. According to this model, the student in high school can attend a university level mathematics course.

Course sequencing is another factor that affects student success. Answering two research questions, Woosly Sh., Truell A. D., Alexander M.W., & Zhao J.J., (2010, pp. 3) examined this impact in 3 subgroups of students divided according to their results.

Various studies have also proven the existence of a gap between secondary education and university.

Conley (2007, pp. 3-6) recommends 4 strategies that can be undertaken by high school to increase the College readinees rate of students who will go to University, emphasizing among them the importance of:

- curriculum alignement between high school and University
- improving the content of the courses by adding the missing knowledge
- qualitative development of subjects
- strengthening the cooperation between the high school and the University.

These and other strategies become very important, especially in the case when reforms are undertaken in secondary and / or postsecondary education, as is the case of the experience of Albania, presented in this article.

No less important is the role of the Universities, for the support of the first year student. Rooij, Jansen & al. (2017) showed the importance of academic corrections in the first year, to measure student success through three indicators: grade point average, number of credits earned, and number of students enrolled in the following academic year.

From the mentioned studies and others, it is accepted that there is a connection between the average grade with which the student is evaluated in high school, as well as the grade in the admission test and the student's academic success expressed with the grades obtained during the first year of university studies. A good part of these studies is conducted in medical disciplines, but there are also studies focused on other areas, the results of which have shed light on specific but important aspects of the relationship that exists between these grades and student success as also shown in the publication of Sulphey, Al-Khatani & Syed. (2018, pp. 4).

Although there are already many conclusions and recommendations of important studies in this regard, there are still issues, which continue to be the subject of research work, given the fact that the conditions in which the student is transferred from high school to university are in constant change. These changes become even more evident and important especially in the case of carrying out educational reforms. From our experience, but also of many other publications, educational reforms seem to in most cases strongly influence the process of transition between these two educational systems.

In this article are considered only the academic experiences of students coming from 3 types of high schools operating in Albania, which are different from each other. They are:

- Gymnasium
- Professional high school
- Others.

The object of this study is the analysis of the impact of the academic level of students coming from high school at the University on student success. The study also focuses on assessing the impact of changing the curriculum of pre-university education in Albania in recent years by comparing the data for students in 2017-2018 with the first generation of students who have completed the new competency-based curriculum, who have completed their first university year in 2019-2020.

Although this analysis is done only in two disciplines engineering & biology, it can serve as a model for other disciplines, also highlighting the impact that the field of study has on student success in university studies.

2. MATERIALS AND METHODS

To analyze the impact of college readiness on teaching and student success, for three consecutive academic years (2017-2020) was organized the survey of first year students respectively in Engineering & Biology programs. The student questionnaire contained 13 questions in total, of which 5 were dedicated to academic preparation and student success. The number of students surveyed in both of these fields has met the requirements of statistical analysis for their size and random selection.

The following table shows the number of students in the sample taken in the study, for each

academic year for both Engineering and Biology programs.

Table 1. Students sample sizes and high school curriculum statues by year and discipline

Ac. year	Students' questionnaires completed by discipline and year		High School curriculum status
	Engineering	Biology	
2017-2018	516	100	Referent
2018-2019	537	100	Referent
2019-2020	510	86	Reformed/changed

Completion of questionnaires by students for the first two years of study (2017-2019), was done in class during the break between classes with random selection, while in the third year of study (2019-2020) was done online, due to the pandemic caused by Covid -19.

The number of questionnaires completed in each case is over 20% of the total number of first year students for the Engineering programs and over 80% for the study program in Biology. The difference, which does not affect the analysis of results is related to the fact that in the field of Biology there is 1 study program, while in the field of Engineering there are 12 study programs.

The average grades of the students in the examined subjects are taken by the teaching secretaries, respecting the procedures for the treatment of personal data, not including in the data obtained in the study the names of the students. The linear regression analysis method was used to examine the required functional relationship.

3. RESULTS AND DISCUSSIONS

The results of the study show a dominant weight of the gymnasium compared to other forms of high school education in Albania. The weight of students coming to university from the other two types of high school is not constant, but in some engineering study programs it is higher than in other study programs. Overall, the % of students admitted to the University by vocational school & other types of high school identified in the study with the term others is (0-6)% depending on the year and field of study. It should be noted that this% has increased especially for some Engineering programs. The presentation of the high school type for both study areas is given in Figure 1.

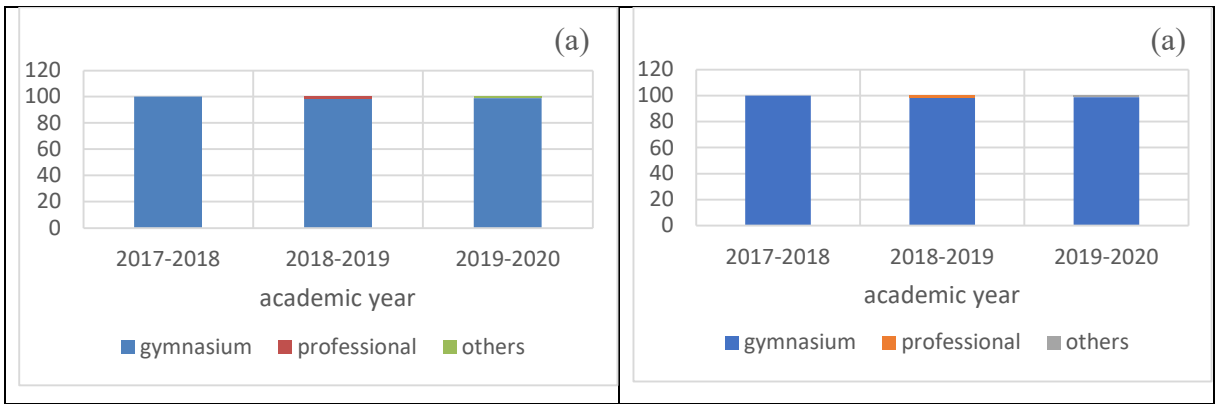

Figure 1. High School Sharing of first year students in: (a) Biology, (b) Engineering

To better understand the student's transition from high school to freshman year at the University, through the questionnaire, students were asked to identify the most important factors that influenced their choice of study program they would prefer to study at the University. The results, for both areas of study, are given in Figure 2.

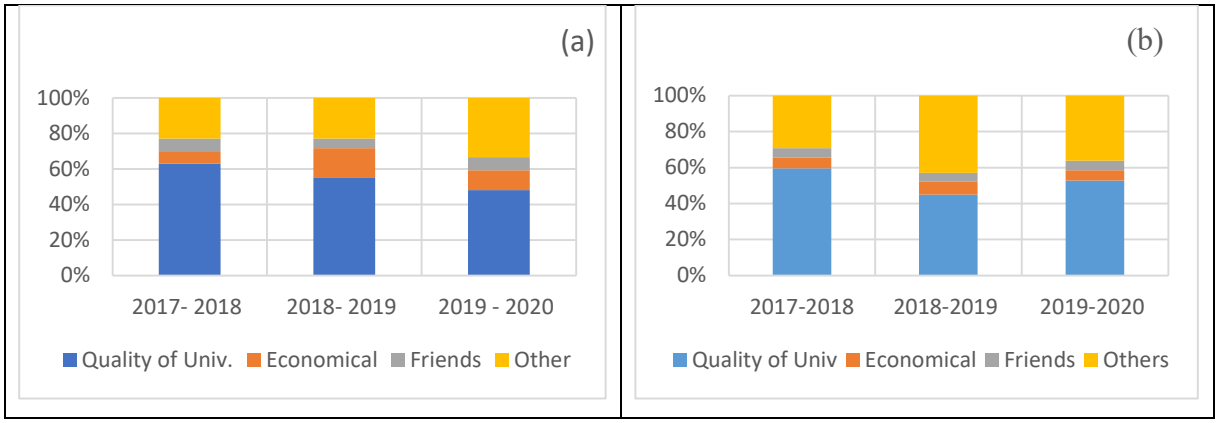

Figure 2. The most important factor which impacted on the selected study program: (a) Biology, (b) Engineering

The impact of students' academic preparation during their studies in high school in the teaching and learning process for the subjects selected from the study during the first year of university, is analyzed through the research question, which focuses on the relationship between the degree of difficulty and the level of repetition of concepts for university subjects under consideration. In this case the comparative analysis of data has taken into account the% of students who have developed the relevant subject in high school only as part of the core curriculum or who in addition have developed the same subject also in the form of advanced course

In this study, the term "advanced course student rate" means the ratio (%) between the numbers of students who have developed the advanced course (elective) in high school, with the total number of students who are enrolled in this course, in the first year of university.

The ratio of the number of students who answered "Yes" to the total number of students is accepted as the degree of difficulty or repetition, depending on which case it refers to.

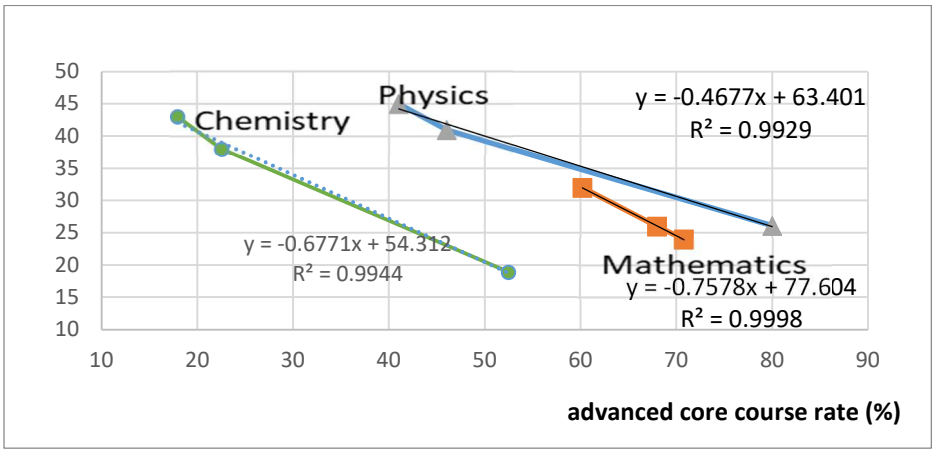

Figure 3. The course linear regression of difficulty rate vs. advanced core course rate in engineering programs

The results obtained for the degree of difficulty that students have encountered in the respective subject, depending on the% of students who have completed the "core course + advanced course" in high school, are presented graphically in Figure 3 for engineering programs only.

The same is done for the repetition rate, the results are presented graphically in Figure 4.

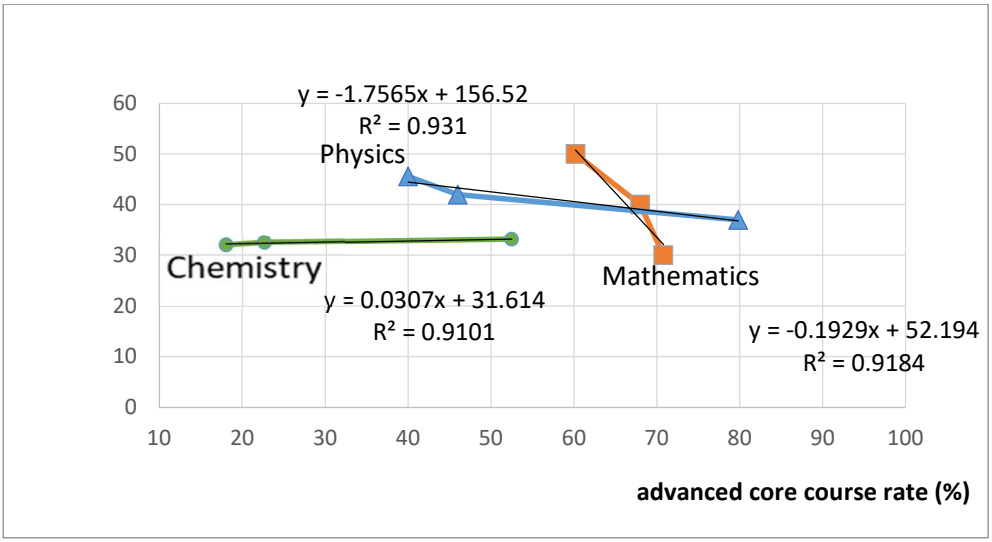

Figure 4. The course linear regression of repetition rate vs. advanced core course rate in engineering programs

We note that in Albania for the evaluation of students is used the system with a base of 10, where 5 is the lowest passing grade. The analysis of the success of the first year student is done based on the indicators of the average grade. In this case, the change of the average grade in the period (2017-2020) for the subjects taken into consideration is compared in function of the% of students who have completed the "core course + advanced course". The results, based on linear regression, are presented graphically in Figure 5.

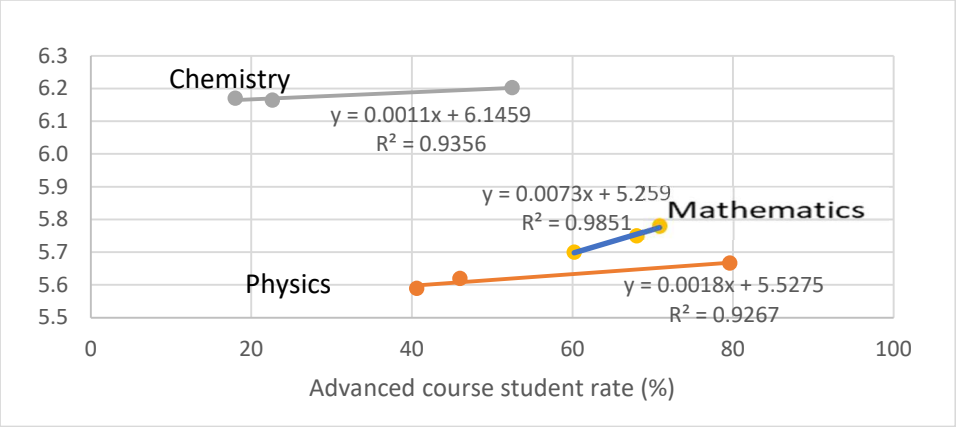

Figure 5. The linear regression of course average grade vs. adv. course student rate in engineering programs

For the evaluation of the success of the students, the average grade of the students was used, taken in the exams of the Winter season of the first year of the university for each of the subjects

taken into consideration. The change of this grade is presented graphically in Figure 6, for the two disciplines reviewed for the 3 academic years (2017-2020). It results that in the subject of Mathematics, it is found that the undertaken reform in the respective programs in the High school, have had an impact. By accepting the same gradient as in engineering, it is estimated that the impact of the reform, resulted in 1 grade improvement (in the graph there is given the total grade change in Mathematics 1.72).

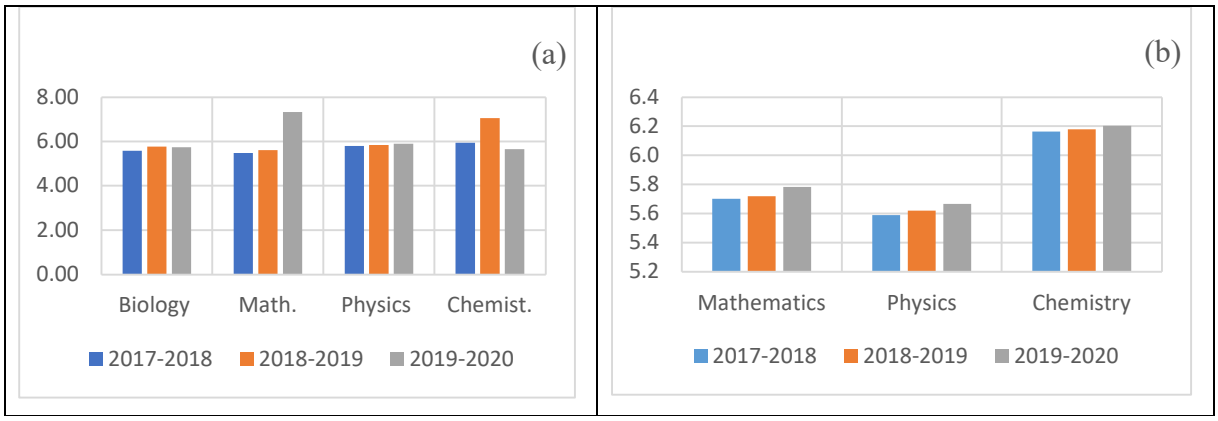

Figure 6. The average grade of core courses during (2017-2020): (a) Biology, (b) Engineering

In the opposite direction appears the impact on Chemistry, where there is a reduction of the average grade, which should be taken care of. Unchanged situation is observed in engineering programs. Anyway in every study program it is necessary to get results, at least for a longer time.

At the same time, the change of the average grade of the student in the university subjects under consideration was analyzed, compared to the average grade of the same subject in the High School. These results are given in Figure 7. If it is looking at this difference, it can be seen that this difference has been increased during this period, strengthening the demand for collaboration and improving the curriculum alignment between them.

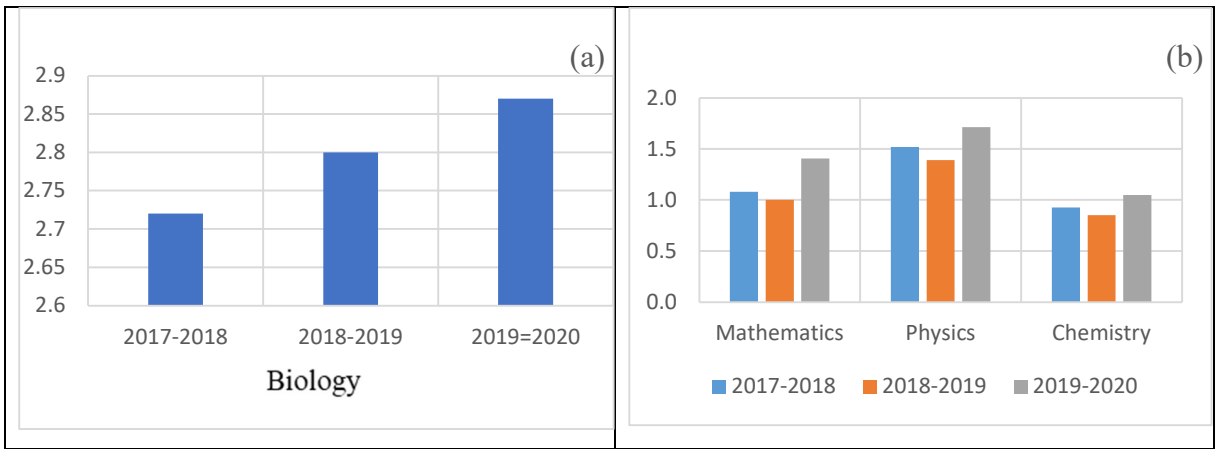

Figure 7. The change of course average grade between high school and university (2017-2020): (a) Biology (b) Engineering

So HEIs should undertake actions to strengthen academic collaboration, in order not only to reduce this gap, but also to achieve the required student success.

In this context they should examine the college readiness of students enrolling in their first year, initially distinguishing the type of High School where these students come from. For the case under consideration, as shown in Figure 1, "gymnasium" is the dominant high school, with at least 94% of the total number of students arriving at the university according to the data of this study for programs in the field of engineering and biology. Although the % of students coming to university in these fields of study from other types of high school is small, from the data collected by us it seems that this percentage is increasing. Currently the impact of the student population coming to university from other types of high school other than gymnasium is more sensitive to some engineering study programs, and negligible for Biology discipline.

After high school type analysis, HEIs should also monitor the economic factor. Given the trend of increasing education costs in both secondary and postsecondary education. In our opinion, it is of interest to consider the influence of the economic factor in choosing the program where the student enrolls. The ranking of 4 factors given in Figure 2, shows that the academic factor (quality of the selected University) is the dominant factor, while in low values is the economic one. The reduction of the weight of this factor in the academic year (2019-2020) for both disciplines, is argued / justified by the reduction of tuition fees of this year. However, in our opinion, based on these data, it remains an important factor that should be monitored and analyzed for its impact on student success.

Based on the different level of academic preparation, the body of first year students at the university consists of two subgroups:

a) students who have completed "core course + advanced course"
b) students who have completed only the "core course".

This composition expressed in the ratio of the number of students in subgroup (a) to the total number of students (a + b), affects the teaching process and the success of the first year student and beyond.

The impact on teaching is examined by analyzing two indicators. The linear regression analysis, the graphical representation of which is given in Figure 3 and Figure 4, has resulted in obtaining linear equations for all the subjects under consideration. This means that the increase in the number of students who complete the "core course + advanced course" leads to a reduction in both the degree of difficulty and the degree of repetition of knowledge obtained at university with those obtained from high school.

Although the linear reduction is observed in all subjects, the angular coefficients of these lines are different. The angular coefficient in absolute value is greater in Mathematics, then in Chemistry and finally in the subject of Physics.

We also note that the% of students who have completed the "core course + advanced course" (variable of these functions), is found at different intervals that seem to depend on the subject. The data prove that the reform undertaken in 2019 in secondary education, has led to an increase of this degree in Physics and Chemistry, and less in Mathematics. Of course, this increase is a premise for a better teaching in the corresponding university subject, as well as a greater success

of the student. Based on these results, HEIs have a good basis for improving their teaching strategies.

The evaluation of the student's success in this study was done through the analysis of the average grade achieved in the respective subjects. The impact of college readiness on this success was analyzed through the linear regression of the mean grade, against the% variable accepted. As can be seen from the graphic representations of these dependencies given in Figure 5, the increase in the number of students who complete the "core course + advanced course", leads to an increase in the average grade, regardless of the subject we refer to. Of course the angular coefficients of these linear dependencies are different in absolute value. This change comes starting with the subject of Mathematics and then for the Physics of Chemistry.

Student success in this study was examined by analyzing the difference in grade point average and the difference between the grade point average between the High School and the University in the respective subjects.

The results of the change of the average grade for the period under review (2017-2020), show that the average grade from one year to the next has increased, although with different sizes, for both disciplines. An exception is the subject of "Chemistry" in the Biology program, in which in the last year of study there is a decline. The cause of this decline can be related to the changes that occurred from the reform implemented in secondary education, a reform which was completed exactly in the school year 2018-2019. However, the impact of this reform on student success needs further study.

The analysis of the difference in the grade point average between secondary and post secondary education, in the subjects under consideration, as shown in Figure 7, shows the increase of this difference, the main cause of which comes from both the quality of the two systems and the curricular reform performed in secondary education. This means that academic cooperation between secondary and post-secondary education should be strengthened.

4. CONCLUSIONS

The analysis conducted in this study showed quantitatively and qualitatively the impact of College readiness on teaching and student success. Based on the results of this analysis, we reach some conclusions.

1. HEIs need to apply the admission policies not only to meet accreditation standards, but primarily to accomplish their mission before students and society. These policies should be based on detailed analysis and studies in order to optimize the complex processes needed to achieve a quality learning
2. College readiness is an important factor in student progress at the University. Increasing the number of students who have the knowledge of "core course + advanced course", leads to a reduction of the degree of difficulty that students encounter in the relevant subjects and also the degree of repetition that professors are required to include in the curriculum in the corresponding subjects university. Linear regression analysis shows that the greatest influence appears in the subject of Mathematics, while the absolute values of the angular coefficients result respectively 0.7578 (R^2 = 0.9998) and 0.1929 (R^2 = 0.9184).

3. Positive impact manifests college readiness in the values of the average grade in the university subjects of the first year compared to the number of students who have attended in high school not only core course, but also advanced course in the relevant subject. This is one of the indicators of student success. The study concluded that the increase in the number of students who have knowledge of "core course + advanced course", leads to an increase in the average grade of the student in the relevant subject, regardless of the study program. Linear regression analysis also shows that this influence is greater in the subject of Mathematics. In this case the angular coefficients for the examined subjects Mathematics, Physics and Chemistry result respectively: 0.0073, 0.0018, 0.0011.
4. The college readiness analysis helps the relevant institutions to improve their admission and support strategies for student success. In this context they should consider and monitor both the typology of the High School and the costs associated with education.
5. Considering the education system unique, it is necessary to strengthen the cooperation between secondary and post-secondary education, especially in the case when curricular reforms are undertaken. This collaboration leads to the creation of a synergy that will affect the further improvement of the quality of student preparation.
6. The difference of the average grade between the high school and the average grade in the exam of the respective subject of the first year of university is an important indicator that can be used to evaluate the success of the student, even in the case when curricular reforms are undertaken. When this difference between secondary and post-secondary education is calculated as a coefficient, it can serve as an important clue to judge the academic compatibility between these two systems in general and in particular for each subject of academic training taken into analysis. We emphasize that this change, among others, depends on the study discipline and the subject matter. In our study the values of this coefficient were found (2.72-2.87) in Biology, while in engineering it reaches a maximum in Physics (1.5-1.71).

Other more detailed analyzes that include the distribution of admitted student grades, tests for knowledge at the beginning of each course as well as a longer duration, can be undertaken in the future by better supporting the strategies for admissions and student success, at the level system or institution.

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CONTRADICTING VIEWS ON THE SOCIAL DIMENSION IN COOPERATIVES - A SOURCE OF TENSION?

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Abstract

Considering wine cooperatives in the current context, a declining number of cooperatives, members and a reduction of the cooperative vineyard area can be observed (DRV, 2017). So far, hardly any members of the cooperative or other internal stakeholders have been asked about their wishes, views and plans for the future (Fischer, 2011), which could possibly have an influence on remaining in or leaving the cooperative. Such an internal view with the expectations of the different interest groups is considered in this research. By conducting a complete survey in the form of case studies within two German wine cooperatives, a complete picture from all members and stakeholders (including all interest groups within the cooperative) should be obtained. A model, which represents the formation of the different perspectives, was created on the basis of theoretical assumptions and expert interviews. It serves as interpretation basis for drawing conclusions on the existing field of tensions within the cooperatives. The research suggests that a change in the view of the cooperative can be a reason for tensions and for the resignation of members.

Key words: Cooperatives, interest groups, case studies, point of view, wine cooperatives.

1. INTRODUCTION

In Germany, grape production is still dominated by small grape growers. More than 36,000 grape producers are members of cooperatives. In 2018 the German cooperative sector could be divided into 158 primary cooperatives and two secondary cooperatives. However, only 87 of the primary cooperatives possessed their own vinification facilities. Overall, members of cooperatives planted 25,200 ha of vines representing about 25 % of the total German area under cultivation (DRV, 2017, 2019, Gerke, 2020). In particular, in the regions of Baden, Württemberg, and Franken, where grape production is dominated by part-time viticulturists, membership in cooperatives is widespread (Hanf & Schweickert, 2014). In those regions, cooperatives hold a market share of nearly 70 % (ibid.). During the last years, the number of cooperatives, the number of members and a reduction of the vineyard area cultivated by the cooperatives could be observed (DRV, 2017, 2019).

According to their statutes, wine cooperatives are self-help organizations for grape growers[12]. Their aim is to improve the economic situation of their members. However, in order to achieve this aim, the general understanding of cooperatives has to be outlined. Two structural design schools have emerged in the literature of cooperative science which represent the extreme poles in a continuum. The first school has been based on Robotka (1947) and Phillips (1953). In their view, a cooperative can be understood as an extension of the farm (King et al. 2010). The second school of structural design schools is based on Helmberger & Hoos (1962). In their model the cooperative is a firm (King et al. 2010). The view on the cooperative of each member is shaped by the attributes of each member business. It can be assumed that the different views of the cooperative are accompanied by different, sometimes contradictory demands and expectations of the members and this can therefore lead to tensions, which could possibly lead to a decision of members to exit the cooperative.

Therefore, the internal view with possibly differing expectations of the interest groups is to be considered by means of a complete survey in the form of case studies within two cooperatives. The aim is to investigate whether diverging and conflicting expectations and views of the cooperative can be a reason for members to exit the cooperative. On the basis of theoretical assumptions and interviews of experts, a model was created which represents the formation of the perspective on the cooperative. Further, it allows drawing conclusions on the existing field of tension within the cooperatives.

2. COOPERATIVE THEORY – TENSIONS AND VIEWS

2.1 View on cooperatives

Philips (1953) describes the cooperative as an extended arm of the member businesses. This view is called "extension of the farm" (Cook et al., 2004) by the authors and represents a form of vertical integration. Member companies see the cooperative as belonging to their own business and feel a part of the entire community. In contrast to this is the view of the cooperative as an independent company: "cooperative as a firm" (ibid.). Here the member companies are regarded as suppliers who have a supplier-customer relationship with the cooperative and receive a monetary compensation for their product. If these two points of view are compared, they differ above all in terms of the place of decision-making power. If the cooperative is regarded as an independent enterprise, it is assumed that decisions and specifications are made by the cooperative (the enterprise as a whole). In opposition to this stands the cooperative as an extended arm of the member businesses, which is guided by the decisions of the individual members. It can be presumed that the different views of the cooperative are accompanied by different, sometimes contradictory demands and expectations of the cooperative and can thus lead to tensions that even cause members to resign. The two views can be regarded as contradictory and represent two extremes of a continuum. It can be assumed that there are views that fall between the extremes, which is why they can also be represented in the form of a spectrum.

[12] By law wine cooperatives are only allowed to produce wine from grapes that are produced by their members. They are not allowed to buy wines or grapes from other producers.

2.2 Attributes influencing the point of view

The field of tension is formed by the different views of all members of the cooperative. The formation of the individual points of view is influenced by various attributes, which are individual for each member and described below. Based on the literature research, five dimensions of influences could be defined, which lead to the formation of the perspectives. In their entirety, the influencing attributes determine the views and demands of the individual members and provide the member's personal view of the cooperative. In the following, the five dimensions are presented in detail with exemplarily selected influencing factors.

Environment. In the regional environment of a wine cooperative, there are some potential grape buyers other than the cooperative itself. These can be, for example, wineries or other cooperatives. In this respect, grape money is often the strongest binding factor (Becerra et al., 2016) to the cooperative. The amount of the latter is decisive for a decision to join, withdraw or switch to other better paying grape buyers (ibid.). In comparison with other grape buyers, the high degree of planning security is rated as motivator for accession. It guarantees regular payments and a low risk of failure, as well as the acceptance of the entire harvest, even in vintages of lower quality (ibid.). These advantages rather support the view of cooperative as the extension of the own member enterprise.

Member companies. Differences already exist at the level of the member enterprises, e.g. location, company size, but also the existence of an operational successor are significant differences between the businesses (Dentoni et al., 2012). Both Bijman (2005) and Cook (1995) emphasize the difference between part-time and full-time farmers as an important heterogeneity factor within a cooperative. Full-time farms have other objectives, as they are entirely economically dependent on their cooperative, whereas part-time viticulturists usually have other economic sources of income and their objectives are less influenced by their dependence. It can be assumed that this causes the tensions that influence the view of the cooperative.

Personality of the members. Various attributes influence the personality, e.g., age, gender, ethnic origin, values and goals, experience, educational level and the attitude to risk-taking in decisions (e.g. Höfer & Rommel, 2015). In this context, reference is often made to the horizon problem, which is primarily caused by existing age differences (Hanf & Schweickert, 2014). Regarding the age, for example, older members in particular perceive the original cooperative idea, the cooperative as the social pivotal point of the community as very important, whereas younger members increasingly perceive economic factors as important and regard the cooperative community rather as an "economic", i.e. independent enterprise and less as a "social association" (Hanf & Schweickert, 2014). In terms of values and goals the quality awareness of the members is another factor. Different contributions of individuals to the added value of raw materials due to their quality awareness necessarily leads to an area of tension within the cooperative (Kyriakopoulos et al. 2004) since a great heterogeneity of members leads to a lack of investment incentives, stagnation and indifference of members. This makes it difficult for the cooperative and its representatives to show that they work in the best sense of all members and this often leads to passivity on the part of the members (Österberg & Nilsson, 2009). Due to the increasing competition an ever-stronger customer orientation of the cooperatives must take place in order to survive in the market. As a result, the management is forced to run the cooperative as a company rather than as an expansion of member companies to meet the market conditions. This means, decision-making power is increasingly shifting to the managing director, which changes

the business policy and the view of the members on the cooperative (Hind, 1999) and the position of the members or suppliers becomes weaker. A great heterogeneity therefore leads to problems and influences on the perception within the cooperative.

Identification. In relation to the organization, a strong identification means that the organizational affiliation forms an important part of one's own self-concept. The values, norms and goals of oneself and the organization are perceived as congruent (Van Dick, 2004). The identity of the organization or group is determined by the self-concepts of all members. Therefore, identification describes the degree of attachment to an organization or group (Alvesson, 2015). In connection with the concept of identity, it can be assumed that a strong identification and thus a strong attachment to the cooperative promote the view of the cooperative as an extension of the member company, whereas a low degree of identification is linked to the view of the cooperative as an individual company. It can be assumed that members elected to committees have a stronger identification and thus see the cooperative more as an extension of their own company. Becerra et al (2016) even describe too little identification with the cooperative as a withdrawal factor. Current problems in the cooperative sector are in particular the estrangement of members, which is promoted by mergers, for example. An expansion of the cooperative also entails a greater distance between members and board members, which can lead to so-called agency problems (Chaddad and Iliopoulos, 2013).

Satisfaction. The degree of satisfaction plays an essential role because it is closely related to the influences mentioned. Conversely, a reduced degree of identification, possibly due to a pronounced agent problem, leads to lower satisfaction and declining member loyalty (Hakelius & Hansson, 2016). Also the satisfaction with the support of the own member company, through technical assistance, knowledge transfer and an appropriate payment of grape money, is a decisive criterion. The absolute amount of the service received is usually less important as long as the necessary costs are covered and the total amount of services received is higher than that of other existing competitors in the market. Becerra et al (2016) also consider a high degree of satisfaction with the aforementioned influencing factors to be decisive for a strong bond with the cooperative. It can therefore be concluded that the affinity to a cooperative is particularly high when there is a high degree of satisfaction. Especially when all areas of the cooperative are covered, the bond is sustainably strengthened. Internal communication, manufactured end products, public image, decision-making processes, duration and type of decisions, to name just a few, are either beneficial or detrimental in their form to the satisfaction of individual members. They also have an effect on the existing perspective and suggest that a low level of satisfaction reduces the sense of attachment and this has a reinforcing effect on a more distanced approach (cooperative as a company), just as a high level of satisfaction and attachment promotes the position of "cooperative as an extension of the member company". The following assumptions should be considered essential for the evaluation of the case studies and the creation of the field of tension:

- Company sizes of the member companies
- Forms of operation and the objectives and strategies of the members companies
- Age differences between members
- Different position of members within the cooperative
- Degree of commitment to the cooperative or identification
- Degree of satisfaction with the cooperative's remuneration prices and/or other services.

3. THE CASE STUDIES DESIGN AND THE MODEL

An investigation in the form of a case study always makes sense if the distinction between the observed phenomenon and the real-world context or the existing framework cannot be made clearly. The framework conditions are therefore not regarded as static, as in experiments for example, but as a changing factor related to the observed phenomenon (Dul & Hak, 2008). A case study represents an empirical research strategy that is flexibly adapted to the analysis and the research objective and is defined by research design, applied methods and analysis approaches (ibid.). In this paper a cooperative phenomenon (here the characteristic of each perspective) is to be analyzed, which is in direct contact with the existing framework conditions and is influenced by these or their change. Context and observable phenomenon also differ between cooperatives.

Due to the large number of members and the existing individual views in the cooperatives, a quantitative approach was chosen. A medium-sized cooperative was a prerequisite for not allowing any conclusions to be drawn about the company concerned after anonymous evaluation of the results. The largest number of cooperatives exist in southern Germany and this is where the results came from. The questionnaire included all influencing factors and dimensions. For case 1, 80 answers (30 online, 50 in writing) and for case 2, a total of 64 answers (15 online, 49 in writing) were generated. After checking the data for completeness and usability, a total of 5 cases were removed. This resulted in two data sets with 61 cases for Cooperative 2 and 78 cases for Cooperative 1. Analysis and Evaluation were carried out in two steps. First, a descriptive analysis of the collected data was carried out and secondly, the validity of the previously created model was checked, with the help of which the context or variable influence was displayed (Ringle et al., 2015).

The following model is a simplified representation. It shows the different aspects which constitute the individual views within a spectrum of the two opposite views according to Cook and Chaddad (2004). Level 1 shows the essential influencing attributes that form the influencing dimensions. Level 2 shows the positioning of the view from "cooperative as a company" to "cooperative as an extension of the member company" as extremes on a continuum.

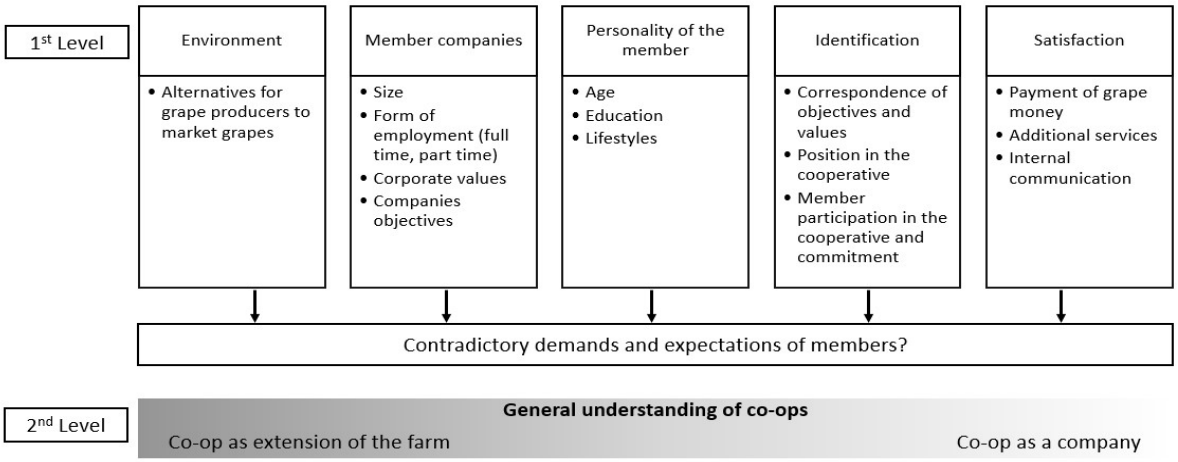

Figure 1. Layer model of views

Source: Own illustration

The model and the questionnaire were developed based on of theoretical assumptions and expert interviews with experts from the fields of science, business and politics. The theoretical categories were checked by the expert interviews.

4. RESULTS OF THE QUANTITATIVE STUDY

It can be concluded that the majority of the members surveyed in Case 1 consider the cooperative more as an extension of their own member company (46.7 %). In case 2, the figure was slightly lower at 39.6%, but fewer members (10.4%) see the cooperative as a company, with the overall view tending more towards the cooperative as an extension than for case 1. In case 1, more than a third of the surveyed were not clearly allocable to a specific orientation of the view (38.7%), and 14.6% regarded the cooperative as an independent company. The assumption that a strong perception of a "cooperative as a company" goes hand in hand with a lower sense of solidarity should be examined in this respect. For the existing case studies, the review reveals a connection between the prevailing viewpoint and the existing solidarity. With regard to assumptions already made, possible connections between the point of view and other attributes were examined. The results are compared below and the differences are identified.

In case study 1, it could be observed that the average values of the company sizes for the points of view are different. It can therefore be assumed that members who cultivate many areas regard the cooperative more as a company and less as an extension of their own business. A connection of the viewpoint with the forms of employment (secondary or full-time occupation) could not be recognized in this case study. Furthermore, it was noted that members who see their personal wishes and goals strongly represented by the cooperative increasingly tend towards the view: cooperative as an extension of the member company and less towards the view as an independent company. Here the assumption is obvious that in this case with stronger fulfilment of the desires and goals also a stronger solidarity to the cooperative exists. However, this assumption could not be confirmed.

In case study 1, the demand for higher or fairer payout prices became the most frequent. This desire was also indirectly mentioned several times by the demand for higher retail prices to make higher grape money possible. This makes it clear that (as the experts suspected) the grape money, or the amount of the payment price per hectare, is a key issue for the members of a cooperative. For case 2, the most common requests were for "marketing, products and image" followed by the payout price and requests for organization and administration. Due to the small number of entries in Case 2, it is not possible to make any more profound statements. In case study 1, the four most important groups of values were "honesty", "responsibility", "cohesion" and "economic security", which, like the wishes, were formed by categorizing the answers that were received. It can be seen that the values of the elected members were assigned to the categories "honesty", "responsibility", "cohesion" and "economic security". It can be assumed that most people prefer such values among people in leadership positions. For case 2, the values focused on the groups "honesty", "trust", "community" and "quality" were stated. For both case studies, there were hardly any differences in terms of wishes, personal values and goals between members of committees and other members of the cooperative.

The degree of satisfaction is another important factor of the model and was measured using various variables. The results for Case 1 showed a high degree of satisfaction with the

information and communication as well as with the work of the Supervisory Board. The other committees were also rated positively, but average satisfaction was somewhat lower. In case study 2, satisfaction in all categories was measured to be 4.4 or higher. Approval of the given statements also showed high median values and ranged on average from "relatively strong approval" to "very strong approval". This can be plausibly linked to the high average value of connectedness and it can be assumed that if there is a low satisfaction together with a low agreement of own and cooperative values and goals the overall connectedness is low due to less identification with the cooperative.

On average, there was a very strong connection with the cooperative in case study 1. Most members also saw their personal goals and values well represented by the cooperative and felt they were in good hands in this community. The internal cohesion of the cooperative community was assessed as less positive, but somewhat better than in regional comparison. Despite relatively strong ties, the members seemed to consider the importance of their membership in the cooperative to be less important. A high evaluation of the solidarity and at the same time a lower evaluation of the importance of the cooperative in one's own life could possibly be a reason for the existing development of the views. Differences in the case studies became particularly evident with regard to the size of the company and participation in committees as well as the age and influence on the behavior of the members. In case study 1, the connection between the size of the company and the position held in the cooperative was particularly striking. It turned out that members of the Management Board and Supervisory Board manage larger companies on average than members without a specific position or in other bodies. It can therefore be assumed that members with large companies are more frequently members of the Management Board or Supervisory Board than members with small company premises. This could not be shown in case study 2.

In case study 2, however, the following findings could be made with regard to the age groups of the members: There are significant differences between age groups in their satisfaction with the cooperative's quality improvement program. On average, older members are more satisfied with it than members under 36 years of age. Cooperative 2 also shows a positive correlation between the age groups and the active participation of members in meetings. On average, older members of the cooperative participate more actively in meetings than the younger ones. This could not be shown for case study 1.

5. DISCUSSION OF RESULTS AND ASSUMPTIONS

It should be noted that both case studies have clearly shown that the majority of members see the cooperative as "cooperative as an extension" and not as an "independent company". Having a closer look at the more detailed assumptions made at the beginning, the following evaluation of the assumptions with influence on the area of conflict becomes apparent:

Company sizes of the member companies & Forms of operation and the objectives and strategies of the members companies: Assumptions on the influence of the types of business (full time and sideline employment) and sizes could not be confirmed. However, it became apparent that for case study 1 other variables lead to divergent views. These concern the organized succession, the quality control of the delivered grapes, the amount of the harvest and the quality of the grapes in general. There are also differences with regard to various operating objectives and values,

which indicate a possible field of tension. In case study 2, no acceptance of the member company could be confirmed.

Age differences between members: Case 2 shows an existing influence of the age groups on the developing perspective, as well as existing satisfactions and activity at meetings. Younger members are less satisfied with the quality improvement program than older members are. Older members also participate more actively in cooperative meetings than younger members. It can therefore be confirmed for Cooperative 2 that possible tensions exist due to different views based on age, i.e. horizon. Case study 1, on the other hand, excludes age differences as reasons for areas of tension.

Different position of members within the cooperative: With regard to the different positions of the members within the cooperative, no divergent effects on the view could be determined in either case study. It is possible that the difference is overestimated or simply disappears due to the small share of the total sum of all members within the given model analysis.

Degree of commitment to the cooperative or identification: The assumptions were confirmed for both case studies. The connection and identification shows a strong influence on the point of view itself. Differences in the characteristics of the individual factors therefore also lead to a differentiated view, which creates a field of tension. Especially a low degree of identification and solidarity is disadvantageous to the view "cooperative as an extension" and tends towards the view "cooperative as a company". The fact that there are hardly any major differences in the degree of identification and connectedness within the two cooperatives creates a relatively low field of tension with regard to existing perspectives. A high degree of solidarity exists in particular when the cooperative's performance is assessed much better than other grape buyers in the economic environment of the region. In this context, the existing knowledge and information of members about payout prices and market of the (not exclusively regional) environment also proved to be favorable for a high degree of commitment.

Degree of satisfaction with the cooperative's remuneration prices and/or other services: The statistics showed that in both cases the payout price is an important satisfaction criterion - as assumed by the experts. The respondents seem to be all in favor of higher payouts, but are generally satisfied with the current level. The situation is similar with other services. Thus, no relation to the field of tension can be determined. Consequently, the assumption made cannot be confirmed.

6. CONCLUSION

The results show that every cooperative can have its own field of tension. This is constituted by the individual attributes of each member and influenced by the viewpoint and expectations of the members towards their cooperative. One main conclusion shows that many attributes and not just one constitute the view of the members on the role of their cooperative, which is why the two extreme views “cooperative as a company” and “cooperative as an extension” have to be regarded as the ends of a continuum. In between these extreme poles, many different natures of a cooperative are possible. However, our results indicate that there is a tendency towards the view “cooperative as an extension”. Assumingly, this is in contrast to the views of associations and management / managing directors, who rather treat the cooperative as a firm. These opposing positions between members and management / managing director within the cooperative can

lead to tensions that can even lead to members leaving the cooperative. The results were not identical for both cooperatives. Each cooperative has its own field of tension, which can be explained by the heterogeneous demands, the solidarity, identification and satisfaction of all members with their cooperative. The influencing attributes can have varyingly strong effects in different cooperatives (e.g. age). This shows that, despite the same structure and management system, cooperatives are rarely the same, but must always be measured by specific standards, which also include members and the environment.

Every cooperative must be aware of its own field of tension and know its different member groups as well as their demands and expectations. In any case, the cooperative has to decide on its own role to be able to reduce or even avoid tensions by open communication, by querying expectations or by restructuring cooperative processes in order to meet previously unfulfilled expectations and eventually avoid a resignation.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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THE NECESSITY OF UNIFICATION OF HISTORY PROGRAMS AND TEXTBOOKS IN ALBANIAN-SPEAKING AREAS

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Abstract

Nowadays, there is an urgency for the unification and the reforming of history programs and textbooks in terms of content considering the transitional time that Albanian speaking territories are experiencing with the aim to provide a more formative and efficient education to Albanian speaking youth. Today is the time to solve this problem in a serious way through a sincere collaboration of specialists, academics, professors, teachers who cover history programs. Deviations of historical events, deviations of special contributions of historical figures to great events of the Albanian nation are unacceptable. Therefore, it is necessary that the history of Albanians be written in texts by specialists in the field of history and not historical politics. Endeavoring to achieve this, the way the history is treated should converge in all the Albanian speaking territories in compliance with the demand for the creation of a democratic society as specified and welcomed by the international organizations. The increase in the society's interest shown towards the historical developments in the course of time closely associated with their right to provide their interpretations of the historical events demands for the unification of the history programs and textbooks, as well as an increased scientific and methodological level of the preparation of the teachers and an increased scientific and methodological level of the curricula and textbooks as recognized across the nation. The university programs should undergo unification by paying due respect to and establishing rightful connections and relations with the alternative interpretations, critical thinking and the future patriotic and contemporary formation of the generations to come. The research aims at promoting and establishing nationwide cooperation for designing unified university textbooks and programs for all the Albanian speaking territories.

Key-words: program, unification, interpretation, critical thinking, history, contemporary.

1. INTRODUCTION

The programs and textbooks of history and the different published books of history have posed a subject of great discussion and controversy among researchers at home and abroad in the period of time after 1990'. The programs and the textbooks used have not provided any solution for the achievement of unified programs and textbooks to be used in the public and private universities of the Albanian speaking territories. Therefore, this paper aims at laying the ground

for undertaking the following steps to unify the programs and the textbooks of history in the Albanian speaking territories.

The social and political changes in the 1990's in Albania brought about the needs and possibilities for profound changes in the university curricula[13] which had to be properly managed and therefore, ensuring productive achievements in all the phases of the learning process at the universities. The immediate issue raised for the higher education institutions was the recognition and application of the Bologna Charter in conformity with its demands at all the structures of the faculties and departments paying due respect to the specifics of a nation and the contemporary demands for the mobility of the students, the equivalence and recognition of the degrees and courses of the Albanian universities in Europe, America and worldwide and vice versa (Kraja M.,(2009), Pedagogjia", Mirgeralb, Tiranë, p.64) .

The designing of the new programs and textbooks had to successfully delineate the recommendations set forth by the international institutions. These institutions have been interested in rendering possible two most fundamental ideas in the treatment of history in South-Eastern Europe known as "disarmament of history" and "boundless history". The later insinuates the integration into the multicultural world by supporting the democratic values, civic responsibility, tolerance and opposing the chauvinistic, ethnic, religious, inhuman, anti-democratic and narrow-minded intolerant attitudes (ISP, 2003, Kurrikula dhe shkolla, Tiranë, nr.4. p.28.).

In the context of the development and application of the education reform after the 1990's and the autonomy of the universities that followed, the Faculties of History and their departments in all the public and private universities in the Albanian speaking territories undertook great changes in their daily work that had to do with:

- Changes in the programs and textbooks of history;
- Determining the pursuits of study and specialities in the field of history;
- Training and qualifying the academic staff;
- The establishment of the training and qualifying centres for the lecturers,
- Organizing the scientific conferences and symposiums,
- Establishing contacts and close connections in the twinning faculties,
- Engendering the conditions and spaces for professional experiences to be gained by the lecturers and students**.** (Arkiv,(2009) Universiteti i Tiranës, Fakulteti i Histori – Fillologjisë, Tiranë)

Despite the changes that have happened in the Albanian speaking territories such as the acquisition of the autonomy by the universities, the changes in the curricula, programs and textbooks in the higher education, I hold that after such hard academic work at the faculties and departments of history, there is an urgent need for the unification of the programs and textbooks of history in the whole higher educational system in the Albanian speaking territories, so that

[13] *Curriculum*,- a term of Latin origin meaning "a running, course, career, running towards an objective". The curriculum is described as a plan outlining all the strategies for the targeted objectives to be achieved. The program of the curriculum provides a complete system of knowledge and practices to have the whole learning process organized and planned. The designing of the curriculum is a way of conceiving the course, the content of it, its methodology, the didactics of it, the experiences and the activities of the professors and students so that clarity is ensured in covering and dwelling on a particular course.

there will be no obstacles to hamper the mobility of the students and lecturers from one faculty to another, which seems to have no longer existed in the European countries since the Dark Ages.

2. THE PROGRAMS AND TEXTBOOKS OF THE HISTORY COURSE BEFORE THE 1990'S.

The programs and textbooks of the history course aimed at equipping the young generation with contemporary historical knowledge, ensuring the most scientific exactness in the treatment of history, highlighting the most fundamental and controversial issues raised in terms of the historical development. The designing of these programs and textbooks was based on sound ideological, scientific and pedagogical criteria. The basic ideological criterion for the designing of the history program and textbook was the description of the historical events according to the ideological framework of Marxism and Leninism. The Marxist and Leninist philosophy constituted the theoretical and methodological foundation for the designing of the programs.

A thorough analysis of these programs and textbooks evidence the following:

- The programs of history were the basic documents for all the faculties and departments of history and geography,
- The programs of the history course determined the content quantitatively, as well as the arrangement of the issues to be covered, the time needed for its study and its involvement by the years of study.
- The programs and textbooks of history were unalterable and unchallengeable,
- The programs and textbooks of history were highly politicized at the service of the state party (their basic ideology was Marxism and Leninism and the teachings of Comrade Enver Hoxha).
- The programs of history equipped the new generation with contemporary knowledge and aimed at achieving scientific exactness in the subject matter (ISP, 1987, "Metodika e historisë", shtëpia botuese e librit shkollor, Tiranë, f.44)
- These programs and textbooks were not unified and were not equally treated in all the faculties and institutions of history and geography.

The programs and textbooks of history during the communist regime have undergone changes several times in terms of their philosophy and content. All the changes made in the programs and textbooks had to do with the orientations of the state party and there was no concern for the contemporary scientific changes. The changes in the usage and application of the programs and textbooks of history at the Faculty of History-Philology, University of Tirana, Institution of Shkodra, Gjirokastra, etc. had to do with the time framework of study (three and two years of study), the yearly or semestral study of a particular course, the provision of complete scientific information and historical sources, the professionalism of the lecturers to be chosen by the corresponding institutions. The scripts and textbooks of history were designed by academics and highly professional professors at the University of Tirana and constituted the basic material to be used by all the students. In addition, these textbooks were to be accompanied by the scientific bibliography which relied basically on the theoretical works and teachings of Marxism and Leninism. Therefore, the programs and textbooks encompassed the scientific

knowledge and the ideological content as well. The Marxist and Leninist philosophy pervaded and constituted the theoretical and methodological basis of the new programs and textbooks. Despite the efforts to design new programs and textbooks that were scientifically grounded as noticed in the changes made, they aimed at supporting the greater achievements in the historical science, but at the same time their politicization (ISP, 2003," Kurrikula dhe shkolla", nr.4, Tiranë, p.175.).

During the '80's (after the year 1982), there was established a specialization for the pursuits of study and better training and preparation of the new historians and geographers at the Faculty of History-Philology, University of Tirana was ensured (Arkiv, (2012) Universiteti i Tiranës, Fakulteti i Histori –Fillologjisë, Tiranë). The programs and textbooks were changed again. There was a wider gap established between the preparation of the specialized students at the faculty of History-Philosophy, University of Tirana and that of the students in the institutions of the other cities across Albania. The mobility of the academic staff from one faculty to another was very difficult to be achieved within Albania and the more so beyond its borders. The specialization for the pursuits of study deepened the gap and differentiation among the faculties of history, the programs and textbooks and the unification of the textbooks and programs of history could not even be conceived. The specialization for the pursuits of study rendered impossible even the mobility of the students and academic staff from one faculty into another. The mobility seemed unattainable due to the lack of the unification of the programs and textbooks and the policies of the state party, as well.

The specialization for the pursuits of study in the branch of history paved the way for the preparation of real, genuine historians and teachers of history. Academics, professors, lecturers, scientific and methodological workers, specialists in the branch of history showed great commitment and worked hard for the designing of the programs and textbooks of history, and later on they were involved in teaching at the corresponding faculties. For the first time, the Albanian students encountered the new interpretations and recent scientific knowledge for the different historical events of Albania and world history. Despite the changes incorporated in the corresponding faculties, the programs and the textbooks of history were enriched with new scientific information and bibliography that relied basically on the classical works of Marxism and Leninism and those of Enver Hoxha (Gani. A, Filo.Ll.,Tasellari.M., Dërguti. M.,Thëngjilli. P.,Kuri V., 1987 *"Metodika e Historisë",* SHBLSH, Tiranë, p.45.).

3. THE PROGRAMS AND TEXTBOOKS OF THE HISTORY COURSE AFTER THE 1990'S.

The threshold of the '90's was associated with a deep internal crisis that pervaded in the economic, social and political life of Albania. After the fall of the Berlin Wall that shook the political, social and ideological concepts and practices of that period of time infested with dictatorship and dogmatism and brought about the need for changes in the governmental system, there was an urgent need for changes to be made even at the educational system. At the different universities, the extreme politicization of the historical facts in the teaching process and the ideological dogmas, especially those that had penetrated deep in the educational system began to be relieved and liberalized, but quite obviously they did so at a slow, intolerable level.

There was a rapid growth of protest that started as an economic one, but precipitated into a political protest as a a rightful political movement. Hundreds of professors, academics, lecturers and teachers across the nation gave their support to the students and people at large and therefore had the dictatorship toppled and a new democratic order was established. The downfall of the communist system revealed that the philosophy of Marxism and Leninism and its ideological spin which had pervaded deep in the lives of Albanians and their country, their education, especially the higher education (aiming at the preparation of truthfull, worthy members of the party) could no longer hold and had thus failed. A new outlook was needed not only for the construction of the new state and government, but for the university programs and textbooks as well, especially for those that had a politicized treatment of history. The designing of the new programs and textbooks of history constituted a great help for the new lecturers who lacked proper preparation. The main actions to be taken were the preparation, adoption and approval of improved textbooks of history devoid of any particular ideologies or politicization and abundant in new contemporary information for which universities and history teachers were mostly in need of.

The transitional period provided many opportunities, but even paradoxes, that were often associated with the tensions emerging from the clash between the conservative, inherited concepts and practices and the new tendencies demanding for changes in the programs and textbooks of the history of Albania and world history.

In this context, the curricula of history underwent changes that had to do with:

- The structure,
- The content,
- Academically, the content was enriched with new historical information never treated before, up to the '90's,
- Scientifically, pedagogically and didactically, the content was enriched too (Arkiv, (1993) Universiteti i Tiranës, Fakulteti i Histori –Fillologjisë, Tiranë).

The profound changes in the organization of the educational system in Albania became the issues of concern and the focus of great discussions and debate at University of Tirana, the Institutes of Higher Education in Shkodra, Elbasani, Gjirokastra, Korça dhe Vlora aiming at the improvement of their structures. Soon, many institutes became universities (Arkiv i MASH, 1994, Fodi 21, d. 10,p. 23.). Universities became autonomous and private universities came in existence, etc. In addition to public universities, private ones emerged to meet the demands of the market. The universities became autonomous and started their reorganization in structure and study programs to meet the needs of the workmarket and daily life. There was an urgent need to change the curricula of history in the corresponding faculties that had to be stripped from the possible manipulations and be treated in an objective, scientific way.

The existing programs could not meet the new demands set forth in terms of their didactics and content. There was a need for the professional contribution of foreign professors and specialists of developed western European countries in order to have the programs and textbooks of history properly changed and improved.

The adoption of the new programs of history by the Ministry of Education and Science constitute the basic documents for the work done by the Faculties and Departments of History, for these documents determined the quantity and structural order of the material and content,

the time needed for its study according to the academic years of study. During these years of great endeavours for the qualitative improvement of the historical science, the academics and professors, researchers and scientists of history science were asked to consider that the new programs of history equip the new generation with the most contemporary knowledge and information, to obtain scientific exactness for the issues raised and have a thorough treatment of the fundamental controversies and issues of the historical development. The programs of history should provide a logical sequence of concepts, order and nomocracy and historical phenomena from one course into another (Gani. A Filo,Ll., Tasellari.M., Dërguti.M., Thëngjilli.P., Kuri V., 1987, *"Metodika e Historisë",* SHBLSH, Tiranë , p.44).

The new treatment of the historical content influenced in the improvement of the history programs. The programs and textbooks of history were further elaborated and improved and relied on sound scientific and pedagogical criteria. They contained concrete materials, facts, events and phenomena, clarifications and interpretations based on proper scientific criteria and grounded on abundant scientific bibliography. In the programs and textbooks of history, the underlying aim was to establish an organic link in the history of different countries according to the corresponding periods and stages, so that the common features of some of historical events were evidenced and some generalizations could be made, some of which have proved to hold true even nowadays.

In this context, the curricula of the study of history underwent some changes as follows:

Changes in the curricula structure and content. Within its structure, three specializations in the pursuits of study were established according to the needs that time set: a specialty in history, archeology and didactics and methodology (teaching) (ISP, 2003, Kurrikula dhe shkolla, histori-gjeografi, nr. 4, Tiranë p.198.). This was no slight change and it was not easy to be adopted. This change was most necessary, since it emerged as a consequence of the tasks posed by the state bodies of higher education for the designing of the new curricular structures specialized in certain fields of history study according to the needs that time set. This idea and initiative was crystallized in consultancy with the Albanian specialists and foreign ones (ISP, 2003, Kurrikula dhe shkolla, histori-gjeografi, nr. 4, Tiranë p.198.).

In academic terms, the curricular content was enriched with new historical events, facts and developments which were not treated up to that moment. The enriched content involved: the history of civilizations, the history of culture, the history of religions, the history of historical thought, the didactics and methodology of history, European integration, non-European civilizations, etc. The introduction and adoption of new courses brought changes in the plans and programs of the curricula, readjusting and re-evaluating the courses according to their importance. Some of the overloaded courses and programs were split into two, new, semestral courses; there were more optional and much more specialized courses; more practical learning activities were incorporated in the curricula, such as more seminar classes, course assignements, etc. It is important to highlight the fact that the new programs were adopted at the faculties of history during these years in Albania, but such a thing had existed in many universities of Western Europe for a long a period of time (ISP, 200, Kurrikula dhe shkolla, histori-gjeografi, nr. 4, Tiranë, p.198.

At the current stage of the implementation of the educational reform, many problems are encountered and many tasks to be carried out in addition to the positive achievements obtained

so far. We are quite aware that we should do much more fruitful work to arrange trainings for the academic staff dealing with the scientific and didactic treatment of the science of history. Lecturers need a didactic training to meet the demands of the teaching process at the universities. The teaching process still leaves much to be desired for the traditional lecturing seems to be a common and widespread practice. Few lecturers have incorporated changes in teaching a particular course in the most contemporary and dexterous way, involving students in discussions, making use of supplementary bibliography and didactic materials, presentations with the overhead projector, etc. Many lecturers involved in different projects have received the qualifications or the scientific content of the course for the methodology of teaching at universities.

Despite the recent progess in the published books, the textbooks used by the students are still lacking in the provision of alternative thoughts. Many important steps are set forth in the publishing of the university textbooks. The textbooks have qualitatively improved in terms of their didactic and scientific content. The authors of these textbooks are professors who hold scientific degrees and this makes the textbooks more credible for the professors have contributed in the realization of scientific exactness in the books' content.

At this historic moment when we are living and working in a time of great technological and cybernetic boom, abundant contemporary methods and technologies in the educational system, with such great historical knowledge and information being given, the very teaching process of history is facing the most urgent need to establish and apply high scientific and didactic standards for the scientific and professional training of the new generations of students in order to meet the mid-term and long-term demands of the programs and textbooks of history, the educational reforms, so that the mobility of the students and lecturers at the universities in the Albanian speaking territories is facilitated through the intergovernmental and ministerial aggrements achieved. A thing like this is not difficult to be obtained once we have achieved the unification of the programs and textbooks in the Albanian speaking territories, which would in turn do away with all the bureaucratic obstacles for the mobility of the academic staff and students and the recognition of the programs and diplomas in the corresponding faculties and universities.

The unification of the programs and textbooks was something that did not escape the concern of many European countries as a very important element for their civilization decades ago. By the XII-th century, Europeans understood that knowledge had to go out of the doors of the monasteries into the wider spaces of the cities. Many secular schools and universities were established such as: University of Bologna, Padova, Pizza, Perugia, Paris, Montpellier, Oxford, Cambridge, etc. In all these European universities, the unification of the programs and textbooks and the establishment of a common language to be used rendered the mobility of the students and lecturers from one university into another possible, creating thus a cultivated and unique culture of great admiration among many other universities. Quite likely, we aim the same thing, the unification of the programs and the textbooks of different disciplines of study, especially those of history in all the universities of Albanian speaking territories.

4. CONCLUSION

In order to achieve this unification and the establishment of a common language to be used, the mobility of the academic staff and students from one university to another, as Europeans did centuries ago, the most important steps to be taken today and in the future are:

- intergovernmental and ministerial involvement and commitment in the Albanian speaking territories,
- nationwide commitment of human resources: academics, professors, scientific and methodological workers, etc. specialized in the field of didactics and historical science, who have been successful in the designing of the programs and textbooks,
- the involvement of the associations of Albanian historians that have many historical resources in their countries and abroad,
- the participation and cooperation of all the faculties and departments of history in all the Albanian speaking territories,
- the cooperation with foreign experts, training for the contemporary developments in the historical science and research within the country and abroad,
- greater cooperation for twinning programs and study with European faculties, etc.

Unifications of history programs and textbooks in schools and universities solve several problems:

- Accurate scientific treatment of events and figures of national history.
- Encourage and facilitate the unimpeded free movement of pupils and students from one school and university to another without any problem.
- Influence the increase in the number of history students, integration with facilities and teaching load and communication.
- Unification of history programs and textbooks enable mutual recognition of diplomas and ease in communication and employment of history specialists.
- Scientific publications and work on the basis of common history curricula and textbooks serve to normalize the labor market.
- Working with joint programs and unified textbooks, with clear objectives, I am confident that our schools and universities will become genuine centers of creation of progressive elites and developments to realize and change the reality of our country.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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THE ROLE OF BASIC TERMS IN THE TERMINOLOGY OF THEORETICAL MECHANICS IN ALBANIAN LANGUAGE IN APPROACH TO ENGLISH

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Abstract

The base terms of this terminology have been viewed from the level of both languages, like in the Albanian language as well as in the English language, taken one by one, as well as compared with one another. It is important to emphasize that the English language has been seen with precedence as a language with an international extend, whereas the terminology of Mechanics in it as a special vocabulary that serves as a standardization sample not only for the Albanian language, but for other languages as well. The reliance on the base terms of the field of Mechanics, as well as on the illustrated terminological material, taken from two base technical subfields for the terminology of both languages, as are Theory of Mechanics (TM) and Applied Mechanics (AM), has enabled to extract a range of common sides in both languages (like the connection of this terminology with the vocabulary of the general language, like dhëmb (tooth), zinxhir (chain), kokë (head), the same structures, similar or different term creating on the word or word group level: nëngarkesë (undercharging), bilancier (rocker), bjellë (connecting rod) etc.

Key words: *basic terms, theoretical mechanics, Albanian language, English language, approach of two languages.*

1. INTRODUCTION

The basic terminology of mechanics, as terminology of a generally technical and applied field, is in function of the realization of a clear and precise communication in language, by being fully in the service of the agreement between the specialists, therefore it becomes a direct object of intervention from outside by specialists and linguists for its qualitatively standardization, regulation and systematization both in form and content. The realization of this task is related to the construction of a terminology as a system of forms and contents, where the system of forms (terms) must adequately respond to the system of contents (concepts). Therefore, the primary task for the terminology in question is, on the one hand, the elimination of synonymy and, on the other hand, the regulation of polysemy (homonymy) (Pllana, 2014:203-206) through the identification and differentiation of forms for each concept. This process is carried out on a sound basis, when approached with a language that serves as standardization cattle, such as English.

1.1 Object and purpose of the paper

This paper observes the basic terminological lexicon of mechanics in both languages (Albanian and English), reflected in two basic subfields, such as TM-Theoretical Mechanics and AM-Applied Mechanics, which constitute the genuine theoretical basis of all fields of other mechanics in both languages.

From a lexical point of view, the terminology of these two subfields consists of basic expressive units related to other fields, as broad-terms can be mentioned not only in this terminology, but also in related terminologies, as in Albanian: *hallkë, çift, zinxhir, mekanizëm, makinë, bosht, aks;* in English: *link, pair, chain, mechanism*. In both languages (Albanian and English) word terms of the autochthonous lexicon predominate as: *hallkë-link*, *lidhje-linkage*, *çift-pair*, *zinxhir-chain*, *bosht* (vehicle)-*shaft* (Shvarts, 1980:53).

The aim of the study is to observe at this terminology from two sides, in terms of form and content, as well as how this lexicon has developed, from simple forms to more complex ones as an organized, homogeneous and sustainable. A very important phenomenon is its enrichment with phrases, which is equally observed in both languages. Thus, parallel constructions can be presented in both languages: in Albainan *mekanizëm-mekanizëm katërhallkësh-mekanizëm katërhallkësh me çernierë* = in English: *mechanism-four-bar mechanism-joint four-bar mechanism*. This lexicon is presented in the plane of hierarchy and connection of terms in the system, according to fields, micro-fields, up to the conceptual nuclei (finite connections).

2. WORKING METHODS

To illustrate and argue the ideas in the paper we have relied on the material extracted from the literature of the two respective subfields, as well as from basic textbooks (Beer, 2004:220) and technical standards and basic works in both languages (Duro, 2009:175). We also relied on the collection and filing of the case, it's processing, as well as the connection with the problems that are treated.

In a special way, the lexical material extracted from the various terminological dictionaries (polytechnic, technical, field of mechanics, etc.) (Kurti, 1991) and non-terminological (explanatory (Fjalor, 1980), four-language (Fjalor, 1969), in which the relevant field terms meet.

Support in the inductive way (from examples to arguments and conclusions) and in the deductive way (from preconditions taken in concrete arguments and examples) prevails throughout the paper. This is especially noticeable during the analysis of phenomena, where confrontation serves as the basis for reaching a conclusion, such as *bjelë* (in Albanian), composed of one element corresponds in English to a two-element unit *connecting rod* (in English) or vice versa, a two-element unit in Albanian (*moment përdredhës*) corresponds to a one-element unit in English (*torque*). The structures of synonymous connections in both languages can also be confronted, such as in Albanian: *ingranim - ngërthim – ndërdhëmbëzim,* in English: *meshing - gearing.*

3. THE ROLE OF BASIC TERMS IN BOTH LANGUAGES

Basic terms are units with relatively broad conceptual content and some of them have a double connection with the lexicon of the language; due to their specific conceptual content they can also be used in other terminologies, close to the terminology in question or even distant, such as, for example, names of parts of apparatus in medicine as: *bulon, vidhë, kapak, kuti, rrotë (Eng. bolt* (Webster, 1961:110), *screw, cover, box, wheel*), as well as in general language, in ordinary discourse, when objects are used, their elements from the field of mechanics in everyday life as: *kushinetë*, *sustë, valvol* (Eng. *bearing, spring, valve*) (in an apparatus for ordinary household use, in the accompanying sheet of a apparatus, etc.). This means that in terms of the functional value of language use they approach this function with common words. As names of ordinary objects they enter the activity of the competence of the ordinary language of the Albanian speaker and as such they find a place in the explanatory dictionaries of the language in addition to the common words (Pllana, 2017:59).

3.1. The importance of the basic terms studying

Their studying according to their functional value in language is important to determine the extent in which their inclusion in an explanatory dictionary should go. This makes necessary in many cases the cooperation of lexicographers with terminologists (Kostallari, 2017:215), and even with specialists in the relevant field, to determine the range of terms used in the general language that should be included in an explanatory dictionary. Here the biggest problem may be the limit of their use in a medium type dictionary. However it should be said that the larger the vocabulary, the greater the degree of their representation in them. In their introduction, especially in medium type dictionaries (e.g. Dictionary.1980 and 2006) the proportion and symmetry in their representation in them are not always preserved. In some cases there are less frequently used terms that are included in the Dictionary and conversely there are missing terms with wider usage. Problems also arise in their definition, mixing boundaries with ordinary words, etc. Thus, for e.g. as we have mentioned before in the Dictionary 1980 term (*kushinetë-bearing)* (Fjalor, 1980:is given incomplete by definition, where features not characteristic of it are introduced as (*rreth*, *saçme- circle*, *ball)*, etc., while the conceptual content for the term chain (*zinxhir)* is missing, where it is known that this term is widely used in ordinary language (so we remember chain of bicycle - *zinxhir* biçiklete (, chain of tractor-*zinxhir* traktori, etc. Likewise for what is meant by *dado- screw* (like basic term in mechanics) in the Dictionary is given by definition to *kundërvidhë- screw-nut*, which as a term, is not known at all in the terminology of this field.

Remarks can also be made on some basic terms of mechanics, which in English (middle type) explanatory dictionaries are treated indefinitely in their definitions in dictionaries such as: *spring*, *chain*, *machine, mechanism, bearing*, etc. In some cases it is difficult to relate the meaning of the common word to the term.

Without being able to treat separately the representation of terms from the field of mechanics in the explanatory dictionaries of English, in terms of their inclusion in Albanian dictionaries, it can be stated that in this regard there are significant shortcomings. Without adding more value than is needed to the terminological lexicon of mechanics, we think that the terms introduced by this field, as a relatively broad field, should deserve identification through the symbol ***mek.*** (mekanikë)/ ***mech.*** (mechanics) rather than being replaced by ***tek.*** (teknikë)/ ***tech***. (technical).

This symbol should either be removed because it is too wide (and as such includes many other fields that have their own symbols) or given for wide fields. Here, some terms can be identified as terms of mechanics, when presented as a separate unit or when they occupy the first place in the semantic structure of the word (of the term), such as. *mekanikë (mek.), mekanizëm (mek.), manivelë (mek.), makara (mek.), kushinetë (mek.).* We would also suggest for the relevant English terms, as well *mechanics (mech.), mechanism (mech.), crank (mech.), block (mech.) bearing (mech.).* For cases where the general meaning is mixed with the special (mechanical) solutions can be subjective, but also depending on the size of the dictionary. Thus they can be marked as terms of mechanics in Albanian *bosht* and English *shaft,* Albanian- *hallkë* and English- *link.* Likewise can be identified *bashkësi (jonit), lidhje (linkage), zinxhir (chain).* Here we have in mind those units that have value as terms even in their use in the general language.

In addition, returning once again to the functioning of the basic terms, not only as denominations used in the basic fields, but also in the special ones, it can be stated that their value is extremely high, as they serve as basic construction materials for creating phrases at these two levels. For instance *hallkë (link)* (Fjalor, 2002:216) can construct phrases on two levels: as a lexicon in the basic field, as in AM: *hallkë* and *hallkë e udhëzuar*, *hallkë udhëzuese, hallkë e lëvizshme, hallkë e palëvizshme, hallkë e çernieruar* and as a lexicon in a special field as in the field of autotractors: *hallkë* dhe *hallkë traktori*, *hallkë pllakëzore,* etj. The same phenomenon is observed in English. The basic terms serve for the construction of multiple phrases at these two levels, as well *pair* in (AM): *driving pair, driven pair, moving pair, non-moving pair, hinged pair*, and in special field, like automobile: *track chain*, *plate track* etc.

4. CONCLUSION

The accomplishment of the aim of the study has become possible through relying on a sound theoretical base, argued and contemporary; which has got as a starting point the observation of terminology as a system of a field that is an identified and independent knowledge, which responds to the conceptual system of the respective field. The reliance on this idea, which on its base has got the relationship between concepts, has created the possibility to raise and to resolve a range of problems that connect with the respective terminology.

Of particular importance for the study of basic terms is their identification in other fields of mechanics, as well as construction from the point of view of term-formation.

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

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METHODICAL MODEL FOR TRAINING IN SUSTAINABLE WASTE MANAGEMENT: LIFE CYCLE OF WASTE IN THE ENVIRONMENT

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Abstract

Virtually every resident, organization, and human activity generates some type of waste. The amount of waste produced is influenced by economic activity, consumption, and population growth. Once generated, wastes must be managed through reuse, recycling, storage, treatment, and/or disposal. However, each of us has witnessed huge amounts of waste in the ocean, on the beach, in the soil, and so on. Training in the sustainable waste management should start at an earlier age aiming to develop the idea of the integrity of man and nature. The aim of this study is to explore the possibilities for the formation of environmental behaviour in students through a training course in sustainable waste management, based on a new-developed and experimentally tested methodological model using an activity approach. Here we demonstrate one of the themes entitled “Life cycle of waste in the environment” (for 10-12 years old scholars). By the active learning and activity approach, all scholars understand the key importance of each person in maintaining ecological balance. They significantly reduced the amount of daily generated waste ($p<0.05$), especially disposable plastics, and the majority became motivated to collect separately domestic waste. Training course effectively contribute to the formation of sustainable environmentally friendly behavior, personal attitude and social commitment to the protection of the planet.

Key words: pro-ecological behavior, education, active learning, activity approach.

1. INTRODUCTION

Environmental education has a priority and occupies a key place in the education system in many countries (Cebrián et al., 2020; Waltner et al., 2018). It is most often interpreted as a psychological and pedagogical process aimed at mastering a system of knowledge, skills and habits. It includes the awareness of the interrelationship and interdependence between living and non-living nature and the need to establish harmony between them, building environmentally friendly behavior and directing this behavior towards maintaining ecological balance between man and the environment (Vakleva, 2011).

Environmental education is a long-term process that aims at raising awareness of environmental issues, absorbing knowledge, forming attitudes, values, and a sense of responsibility for the rational use of natural resources, as well as encouraging action on nature conservation and sustainable development (Uzzel, 1999).

The formation of ecological consciousness includes the stages: acquisition of knowledge → formation of beliefs → building a new type of relationship to the natural environment → provoking positive changes in behavior → formation of ecological consciousness. The building of ecological consciousness is an important stage in the process of formation of ecological culture (Karagyozova-Dilkova, 2007).

The aim of this study is to explore the possibilities for the formation of environmental behaviour in students through a training course in sustainable waste management, based on a new-developed and experimentally tested methodological model using an activity approach. This model has been developped, constructed and validated through different activities related to a scientific project, listed below (Nikolov et al., 2020). Here we demonstrate one of the themes entitled "Life cycle of waste in the environment" (for 10-12 years old scholars).

Our hypothesis: If training in sustainable waste management is implemented through an activity approach, it will increase the environmental culture and environmental competence of students and will form a long-lasting pro-environmental behavior.

2. MATERIALS AND METHODS

Theoretical analysis and didactic experiment are applied as main methods in the present pedagogical research for testing the above-described working hypothesis. We use also the pedagogical observation and analysis of the practical experience, survey of the students and statistical processing of the results. All the listed methods used in the pedagogical research are interrelated and complementary (Killermann, 1998).

Modern theoretical formulations of psychology, pedagogy and didactics provide an opportunity to build a methodological model based on the theory of constructivism (Karagyozova-Dilkova, 2007). The constructivist approach to learning, which is applied in the didactic experiment, is based on the philosophy of constructivism, which has the following characteristics (Bada, 2015):

- In the educational process the student is a subject, i.e. the student is an active participant in the learning process;
- The knowledge is built on the basis of the personal experience of the student and already existing ideas about specific objects and phenomena;
- Knowledge is characterized by individual and social conditioning;
- The knowledge is acquired and applied by the student in his personal life;
- The student is actively looking for arguments, evidence and answers, i.e. independently finds the information he needs;
- The main methods used in the learning process are interactive, namely observation, active search and discovery in a real environment and practical work of the student;
- Joint work of students and dialogical nature of education;
- The individual, group and frontal organization of the educational activities are used;

- Group work is typical, which is based on cooperation and not on competition;
- The groups are heterogeneous.

An interactive technology has been developed for the study of sustainable waste management through an activity approach (Nikolov et al., 2020).

Almost 150 students of the 10-12 years' age were involved in the training in sustainable waste management: Life cycle of waste in the environment. They study in six different schools from three different settlements (by size) – the city of Plovdiv, the town of Kazanluk, and the village of Krumovo. The training in each one of selected six schools was realised by some Bachelors students from the Faculty of Biology at the Plovdiv University "Paisii Hilendarski" (Plovdiv, Bulgaria).

The process of cognitive activity takes place in the cycle of D. Kolb (Kolb, 1984) and is based on the previous experience of the learners. This methodological model is based on activity learning, including certain tasks that are performed in small groups (about 4-5 students). After solving the tasks, the results are communicated to the whole class, discussed and discussed between the students and the teacher, with the teacher having a leading role. The tasks set for the study of the basic concepts are divided into 4 stages, arranged in a system, which is based on the learning cycle of D. Kolb (experience, reflection, conceptualization of experience, application of acquired experience). Students work independently within the group and reach and construct knowledge and ideas, they have an active role in the learning process and do not passively receive information from the teacher, which determines the interactive and innovative nature of the learning process.

Two questionnaires, "My ecological footprint" with an equal number of questions (15), are used to account for the results of the training conducted on the innovative methodological model. The first questionnaire was made before the training in order to determine the level of knowledge and competence in the problem up to the time of the survey (pre-test). The second questionnaire was conducted after the training in order to take into account the effectiveness of the methodological model (post-test). The questions are designed in such a way that they allow analysing both the ecological competences of the students (knowledge construct), the attitudes (attitude construct), and behaviour (behaviour construct) of the students and their families towards separate waste collection (Vassileva, 2013).

All data have been processed using SPSS Ver. 19 Software in order to assess the effect of training.

3. RESULTS AND DISCUSSIONS

The lesson "Life cycle of waste in the environment" starts with a multimedia presentation (5 minutes) and pictures of different types of waste - household, construction, industrial, medical, agricultural waste, etc. The class is divided into groups, and each group is working with a specific type of waste. For example, the first group works with household waste, the second group with medical, etc. Each group must tell what they do with this type of waste in their daily lives, whether these actions are right or not and if they are not right, how we can improve our actions and deeds in order to protect the natural environment. Finally, after all the groups have presented their views, the teacher summarizes that the amount of waste generated in the modern

world is huge and that it must be managed by sustainable way to avoid a number of environmental problems.

Next step includes different activities following the Kolb's cycle (Fig. 1). We start with Concrete experience. At this stage, the method of discussion is applied - students are asked questions and they present their personal observations and impressions. For example: "After we dispose of various waste, they go to the landfill, but what happens to them there?", "What can we do with the accumulated waste in the landfill?". It also raises the question of whether anyone in the class has witnessed trash around the containers, whether they like the view. Students share their observations and express their dissatisfaction with such situations.

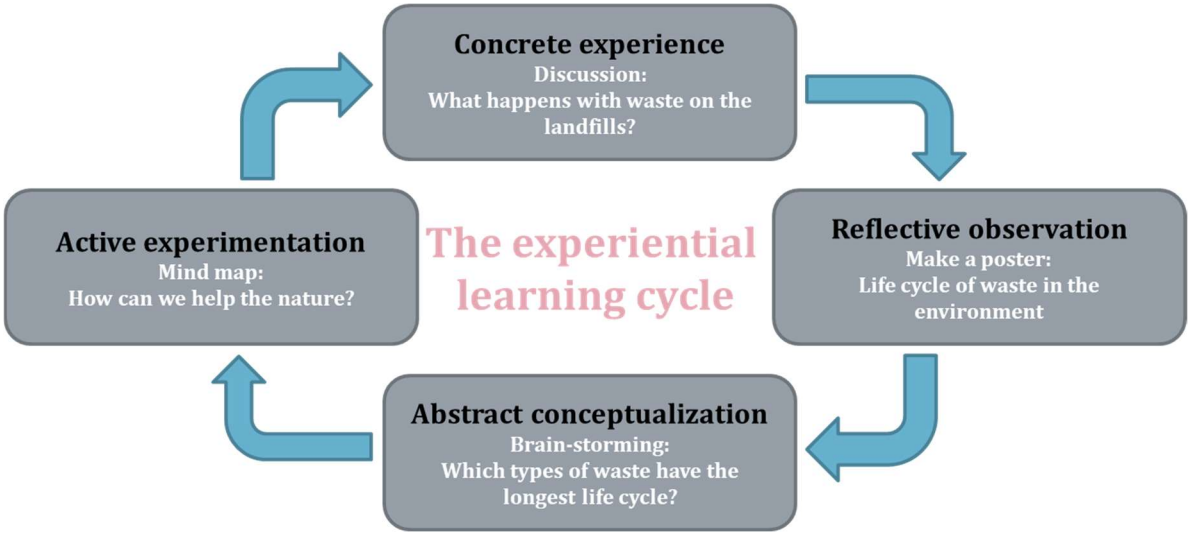

Figure 1. Model of the experiential learning cycle

Reflective observation is made through the project activity. It is carried out in two groups within a pre-set time (40 minutes). The theme of the project that the groups should create is "Life cycle of waste in the environment". Each group receive an Appendix which presents the life time of different type of waste in the sea, on the beach and in the soil, respectively. They have also small pictures of different wastes (Fig. 2). By looking at the Appendix, students understand that the lifespan of a waste is different in different environments. The participants of each group must carefully examine the pictures of waste handed out to them, on which their lifespan is written, and with the help of the Appendix to stick the respective picture in the respective environment (sea, beach or soil).

When the posters are ready, we move on to the Abstract conceptualization. The projects are presented and the results are commented, using brainstorming (Fig. 3). Questions are asked to the whole class, "Which types of waste have the longest life cycle in the environment?", "What could be the consequences for the environment if this type of waste stays there for so long?", "What can to do to prevent the negative consequences on the environment?". Students answer the questions, express their opinions, share ideas for addressing the problem. Finally, each student concludes that the conversion of a product into waste is not the final stage of the waste life cycle, then the waste "lives" in different environments for a long time and so they can cause serious environmental problems in nature.

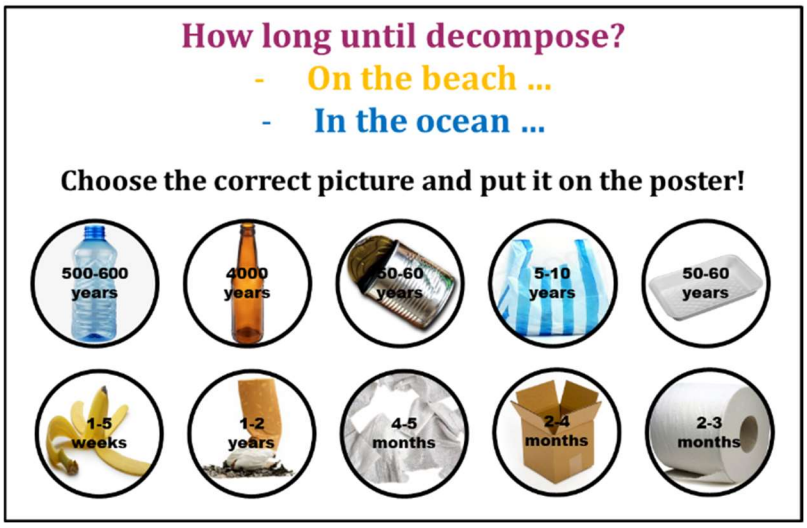

Figure 2. Model of some waste pictures and their lifespan

Figure 3. Presenting of a poster

As a conclusion, the Active experimentation use the mind map approach (Farrand et al., 2002) – "How we can help nature?". The students' answers are written on the board and so each student expresses his / her opinion and a mind map is created, which gives a clear idea of the actions that each of us must take to protect nature.

The analysis of the results from this training in sustainable waste management included a comparison between the students' knowledge, attitudes and behavior before and after the training course using the proposed didactic model. In these analyzes were taken into account not only the quantitative data from the initial level, but also the differences between before-after level in order to objectively assess the effectiveness of the training and test the experimental hypothesis.

In all studied groups we found a statistically significant increase in the level of knowledge ($p < 0.05$) - the working hypothesis was confirmed for 69% of the less knowledgeable students in Plovdiv ($\chi^2 = 1.792$), for 78% of the less familiar with the problem students from Krumovo (χ^2

= 0.964), and 82% of the students in the town of Kazanluk who showed a low level of knowledge (χ^2 = 0.773) ($p < 0.05$). The knowledge construct was found to be the most easily to upgrade with such a training.

When regarding the attitude construct, we found that the working hypothesis was confirmed for 66.7% of the students from the village of Krumovo, who had less involvement in the waste problem before the training (χ^2 = 2.941), for 73.3% of the students from the city of Plovdiv (χ^2 = 1.475) and for 88.9% of the students from the town of Kazanluk (χ^2 = 3.524), who showed less interest in sustainable waste management before training ($p < 0.05$). So, it could be summarized that this construct was also significantly stimulated by the training.

The behaviour construct was quite difficult to influence, since the working hypothesis was confirmed for nearly 15-20% of the students from all three settlements who had not had long-term habits for nature conservation and rational use of resources by the time of training (χ^2 = 2.069-4.702) ($p < 0.05$). This was the construct with the lowest positive change from the three studied.

As a summary of the statistical analysis conducted, we can point out that the students from Plovdiv had a higher background level of knowledge on sustainable waste management. Although after the training they gave the best results, the efficiency of our training (measured by attitude and behaviour constructs) was lower than in the smaller settlements Kazanlak and Krumovo. This fact underscores the need to target training, especially towards the enhancement of the ecological competences and building of the pro-ecological behaviour.

4. CONCLUSIONS

In conclusion, we can recommend the developed methodical model for training in sustainable waste management through an activity approach to be implemented in all school grades. It is open to be supplemented and enriched with planned at local and national level initiatives and campaigns. This will enable students to be actively involved in social life, in addressing community problems and subsequently this will lead to the formation of sustainable environmental behavior, which is essential for nature conservation for both current and future generations.

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

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INNOVATIVE EDUCATIONAL CONTENT FOR THE PURPOSE OF YOUTH EMPLOYMENT

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Abstract

Education is the basis of human life and development. General education meets the needs of each individual and refers to the acquisition of broader knowledge in various scientific fields. While vocational education meets professional human needs. Through it, training is performed for professional activity, transition from that activity to another, further training in the profession, etc. Since education is one of the most important tasks of any society, school systems must be at the service of young people so that they can use their intellectual, work and life needs in all their dimensions. Innovative changes in society impose a redefining of the goals and tasks of educational systems. With the existing demographic problem and the tendency of young people to leave the country, a new problem appears in society, employers have problems with the labor force. The economic and social transition has completely changed the economic structure, but almost nothing has changed in the education system, with the greatest resistance to change being shown by secondary vocational schools. This paper demonstrates the need to modernize continuing education in secondary vocational schools and to introduce current educational profiles to respond to labor market needs.

Key words: education, innovation, educational profiles, employment, labor market.

1. INTRODUCTION

Education is a basic part of all social activities. In a narrower sense, education can be defined as the process of acquiring knowledge, building skills and habits, developing abilities, adopting value systems and rules of conduct. In a broader sense, education is a constant process that lasts throughout life and consists of a constant permeation of the formal and the informal, the individual and the general, the spiritual and the material. Educated people are able not only to give their contribution, but also to be the initiators of all social activities. As a rule, only a person with the right education becomes a useful member of society.

In order to provide young people with the quality future they deserve, no one should be indifferent to education. Education is also important because it is a channel through which young people are passed on the experience that the entire complex society has reached so far.

In this regard, education is the basis of human acquisition, expansion and enrichment of experience, individual growth and development, acquisition of various skills.

An efficient education system prepares the individual for life and enables him / her further education and employment, thus contributing to the well-being of the entire community. In other words, the acquired qualification enables entering the labor market, continuing education or meeting personal and social needs that are not necessarily market-oriented. Recent trends in the labor market, globalization and the development of new technologies have led to changes in the labor market taking place faster and faster, and the Education System is expected to adapt appropriately to these changes. Although the purpose of education is much broader than training and preparation for entering the labor market, the problem of rising unemployment, especially of young people, indicates the need for closer harmonization of educational programs and the needs of the economy.

According to Eurostat data for 2017, the youth unemployment rate, in all countries where it was measured, is higher than the general unemployment rate. That rate is 16.8 percent of the total labor force for the EU-28 countries, while in Serbia it is more than 31.9 percent, which means that in the percentage of young people aged 15-24, slightly more than 3 out of 10 people are out of work (Eurostat, 2019).

Also, according to Eurostat data for 2017, the highest percentage of young people aged 16-29 at risk of poverty or social exclusion was recorded in Greece (45.9 percent) and Serbia (43.2 percent), while the lowest rates were in Slovenia (16.0 percent), Malta (15.3 percent) and the Czech Republic (12.1 percent). According to the Statistical Office of the Republic of Serbia, youth unemployment is twice as high as general unemployment, so the employment rate of the total population in 2019 is 49.6 percent, and the unemployment rate is 9.5 percent, while the youth population (15-24), the employment rate is twice lower (22.6 percent), and the unemployment rate is almost three times higher (26 percent) (Statistical Office of the Republic of Serbia, 2019). In addition to the general characteristics of the labor market in Serbia, a special problem for young people is the structural unemployment associated with deficiencies in the education system (Jandrić, Molnar, 2017, p. 18).

Data obtained from the labor market indicate that most of the inactive and unemployed, as well as discouraged job seekers, are high school graduates. This shows that the link between the labor market and secondary education, including vocational education, has weakened in the years of transition. There is a general belief that secondary education is too theoretical and does not enable the training of students when it comes to skills that are in demand in the labor market.

Linking education policy with employment policy has been recognized as a necessity at European, national and local levels. The subject of research in this paper is whether and in what way secondary vocational schools can, by introducing current educational profiles, influence the choice of educational profiles that are in demand on the labor market, and consequently increase the percentage of youth employment?

2. MATERIALS AND METHODS

The scientific method used to analyze the subject of this paper includes a case study in which we analyzed the current situation in a High School in northern Kosovo in terms of educational

profiles, their relevance and how to update and align them with labor market needs.

High School in northern Kosovo is engaged in education activities within the regular school system of the Republic of Serbia. In the 60 years of its existence and education, this school has delivered a large number of students who have been educated in different profiles and different fields of work. The fields of work for which it provided education to staff varied depending on the needs of the economy of the local community in which the school operates, as well as the needs of the economy of the entire region.

High School has: 11 standard classrooms, multimedia classroom for seminars and a gym with accompanying equipment. With regards to cabinet teaching, the school has offices for: computer science, economics, computer graphics, mathematics, physics, chemistry, biology, a set of subjects in electrical engineering and a set of subjects in mechanical engineering.

In the 2019/20 school year, this school enrolled students in three- or four-year majors in 4 areas of work: mechanical engineering and metalworking, electrical engineering, economics, law and administration and gymnasium. For the field of Mechanical Engineering and Metalworking, the school enrolled the profile Mechanical technician for computer construction, which lasts 4 years, for the field of Electrical engineering the school enrolled the following profiles: Computer Electrical Engineer - 4 years, Telecommunication Network Installer - 3 years and Electrical mechanic for Thermal and Refrigeration Devices - 3 years. In the field of Economics, law and administration, the school enrolled the profile Economic technician, and in the field of Gymnasium it enrolledthe natural-mathematical major for a period of 4 years.

a. Case study review / analysis

The principal of High School operating in the territory of northern Kosovo identified the problem of students leaving the territory after completing primary education, in order to continue their secondary education in the territory of central Serbia. Specificity of living conditions, low youth employment rates have forced students and their parents to think about sending their children to school away from their home in order to acquire the knowledge and skills required in the job market today. Accordingly, the principal of High School wanted to modernize teaching at his school and introduce current educational profiles in order to try to solve this problem.

The first step towards solving this problem was working with relevant services: representatives of the Ministry of Education, Science and Technological Development, the school administration in charge of this area, representatives of the local economy and the National Employment Service to determine the lack of specific educational profiles and the possibility of obtaining permission (accreditation) for training of new profiles in the next school year.

When changing the educational profiles of the school, attention should have been paid to the consolidation of school capacities, both in terms of space and staff. This means that, in line with the workload of teachers, educational profiles from some other areas of work were not allowed to be considered, only for the existing ones, because they already have appropriate staff.

With the representatives of the local economy, the possibility of introducing dual education enhance and build the knowledge, skills and abilities necessary to work effectively and productively in a certain profession or a group of professions. This type of education is suitable for educational profiles lasting three years: locksmith - welder, machinist, installer, electrician,

industrial mechanic, metalworking operator, machining operator, etc.

The possibility of introducing dual education was discussed with the representatives of the local economy, in which through theoretical classes and exercises in school and learning through work with the employer, they acquire, improve and build knowledge, skills and abilities necessary for efficient and productive work in an occupation or group of occupations. This type of education is suitable for educational profiles lasting three years: locksmith - welder, machinist, installer, electrician, industrial mechanic, metalworking operator, machining operator, etc.

In addition, great attention is paid to the introduction of educational profiles in the field of digitalization and information technology, because it is a sphere that is constantly increasing and which needs new staff. Information technologies through educational profiles are already present in high school, but they can always be updated and keep pace with the times and in line with market needs. These are mainly proposals for educational profiles for 4 years of education: Information technology electrical engineer, Multimedia electrical engineer, Heating and air conditioning technician, Telecommunications electrical engineer, Mechatronics technician, Robotics technician, Motor vehicle technician, etc.

New tendencies in programming were considered in the field of gymnasium as well as the introduction of the philological major of the gymnasium. This major would introduce learning new foreign languages, in addition to English and Russian, e.g. German, Italian, Spanish, maybe Turkish or some others in line with the needs of the market and investors investing in this area.

The field of Economics, Law and Administration could be updated with the following profiles: Customs technician, Legal technician, Trade technician, Hotel industry technician, Security technician, Business administrator, Financial administrator, Bank clerk, etc. The introduction of one-year specialist education also were considered as a new opportunity to address the issue of student departure. The educational profiles to be educated in this form are: Business secretary, Security business organizer, Insurance damage assessor, Sales manager, Accountant, Banking controller, etc.

This mode of education can also cover the field of electrical engineering in the following profiles: Electrical engineer for power plant installations, Electrical engineer for networks and installations, Electrical engineer for electrical installations, Electrical engineer for management and protection of power plants, Electrical engineer specialist for automation, etc.

3. RESULTS AND DISCUSSIONS

A High School in northern Kosovo has taken into account the considerations from the case study and implemented proposals to change educational profiles to bring them in line with labor market requirements. The novelties that were introduced were organized in such a way that when enrolling in the new school year (2020/21), novelties were introduced and the following educational profiles were offered to future students: for the field of Mechanical Engineering and Metalworking, the school enrolled the profile *Mechanical technician of motor vehicles*, which lasts 4 years, for the field of Electrical engineering the school enrolled the following profiles: Computer Electrical Engineer - 4 years, *Electrician of networks and plants* - 3 years and *Servicer of thermal and cooling devices* - 3 years. In the field of Economics, law and

administration, the school enrolled the profile *Customs technician*, and in the field of Gymnasium it enrolled the natural-mathematical major for a period of 4 years. Also, in order to improve enrollment in profiles for a period of three years, the school offered scholarships to students who enroll in these educational profiles.

At the end of enrollment in the new school year, we obtained the results shown in the following table. Please note that the names of educational profiles in the table are titled as they read in the new school year 2020/21.

Table 1. Overview of the number of enrolled students by school years and by educational profiles

School year	Educational profiles						Total sum
	Gymnasium	Computer Electrical Engineer	Customs technician	Mechanical technician of motor vehicles	Servicer of thermal and cooling devices	Electrician of networks and plants	
2017/18	23	17	16	11	7	5	79
2018/19	24	21	19	9	7	6	86
2019/20	27	16	15	10	6	7	81
2020/21	26	16	23	15	11	10	101

Based on the presented results, we can see an increase in the number of students in classes with new educational profiles. Thus, in the areas of Economics, Law and Administration, there was an increase of 8 students, which is 53.3% more than last school year, which is the largest increase in the number of enrolled students. In the total number of students there was an increase of 24.69% compared to last school year, which is a very large percentage. If this school introduces innovations in other educational profiles in the coming school years, it will have a very big impact on the education of profiles that are in demand on the labor market and thus on increasing employment opportunities for young people.

4. CONCLUSIONS

Education is the essential basis of life and the existential need of every human being. It is a process that takes place in educational institutions, but also outside them. Education is at the same time a social process and the best indicator of its success. It never reaches its full end, but represents the path to the realization of all values.

Therefore, it is not enough for schools to adopt certain levels of knowledge and educational profiles and thus complete their journey. They must be able to use all situations to enrich the knowledge and skills they offer to students, while adapting to a world that is also changing with them. As existing knowledge and skills become increasingly obsolete, it is necessary to continuously modernize the educational process.

Rapid changes in the labor market, but also in society, require not only new professional knowledge and skills but also the improvement of key competencies that will enable faster and easier adaptation to new development requirements and facilitate employability. Therefore, vocational secondary schools must be flexible and familiar with the new demands of the labor

market in order to be a bridge between the education of young people and their employment opportunities.

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ANALYSIS OF THE IMPACT OF SODIUM HYPOCHLORITE ON THE RIVER IBAR DURING THE COVID-19 PANDEMIC

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Abstract

The situation caused by Covid-19 pandemic has caused impact on environment, due to the limited human activities, and actions against Covid-19 spread. In this paper there will be presented the results of the experimental investigation of using sodium hypochlorite for disinfection purposes to the river Ibar water quality and aquatic organisms. The city streets and buildings were disinfected on daily basis, and the waste waters were collected into storm water pipelines, directed to the sewerage and discharged into the river. There is no waste water treatment facility involved, and the domestic sewage was mixed with storm water flow, entering the river at the same discharge point. For better understanding of this impact, the results from the physical, chemical and micro biological testing of the river water quality were compared to the pre-Covid time. The results have shown that the river is III class of water, and the values for Nitrate, Nitrite and BOD were exceeding the values for the III class. The concentration 0.1% of NaOCl is sufficient to eliminate Proteus mirabilis, Proteus vulgaris, Pseudomonas aeruginosa during the exposure time of 5 min. Since these microorganisms, which are often found in surface waters and are sensitive on low concentrations of disinfectants, were not isolated in the sample analysis, this can be contributed to sodium hypochlorite. As the river Ibar is natural recipient of all wastewater from the north part of this region, it is necessary to continuously monitor water quality and implement protection measures, in anticipation of the wastewater treatment plant construction.

Key words: physical-chemical parameters, microbiological parameters, sodium hypochlorite, pollution, the river Ibar analysis.

1. INTRODUCTION

The river Ibar is the greatest treasure of the north part of Kosovo. It springs on the slopes of mountain Hajla, with a total length of 272 km, passes through Mitrovica and separates it to the North and South. The river is known by its rapids but is not navigable. The river Ibar is dammed, creating Gazivode Lake, while several few hydro power plants were built along the river.

The importance of the Ibar is reflected in the great variety of fish, such as chub, brown trout, common nase, sunbleak, grayling and other species. The survival of these species is endangered, due to high water pollution. While "RMHK Trepča" was operating at full capacity the water of the Ibar was polluted with heavy metals from the plant; today, the emphasis is on other pollutants.

Wastewater of communal, industrial or agricultural origin are the greatest threat to water quality and thus to river flora and fauna. As there are no wastewater treatment facility in the region, the river Ibar is used as the natural collector (Nikolić,& al. 2014).

The lack of wastewater treatment plan is the main reason for more intensive monitoring of the river Ibar water quality, especially in specific condition, such as COVID-19 pandemic. In order to suppress the virus, the disinfection of streets, buildings and other surfaces have been conducted, while at the same time the population was appealed to intensify the disinfection of working and living space.

In March and April, Public Utility Company used 260 l of Domestos for disinfection of the premises, which contains 4.5 g of sodium hypochlorite in 100 g. According to PUC Standard, the chlorine was also used for the disinfection of streets and public surfaces.

This paper presents a comparative overview of analysed physico-chemical and microbiological parameters with the values of the same parameters before the COVID-19 pandemic. The aim of the paper is to determine the impact of NaOCl on the river Ibar.

2. PROPERTIES OF SODIUM HYPOCHLORITE

Sodium hypochlorite is the most commonly used substance in disinfection processes. The main reason for such increased application compared to others is because of it is easy available and convenient for use (Ebenezer & Ki, 2014). The leading position of sodium hypochlorite is justified by its broad antimicrobial range, relative stability in concentrated form and at dilution, controlled toxicity to humans, lack of poisonous substances and low cost (Rutala& Weber, 1997).

NaOCl disinfectants are most often 5% to 15% aqueous solutions, which manifest strong biocidal effect (Escudero-Oñate, 2014). pH value of chlorine-based disinfectant ranges from 11 to 13. Sodium-hypochlorite is very unstable compound, with the characteristic smell of chlorine, and light yellow in colour. During the disinfection process, when NaOCl is mixed with water, dissolution occurs, forming hypochlorous acid and hypochlorite ions (Rowe, 2013). Hypochlorous acid has strong disinfection impact, while hypochlorous is a weak disinfectant (Tubić, 2010).

$$NaOCl + H2O \rightarrow HOCl + NaOH$$

Cellular membranes of various microorganisms have hydrophobic and two lipid layers, through which hypochlorite ion does not penetrate, which explains its weak disinfectant property. Unlike the hypochlorite ions, hypochlorous acid penetrates the membrane of microbial cells and manifests germicidal effect both outside and inside the cell (Fukuzaki, 2006). Hypochlorite ions are characterised by extraordinary low photostability, that is, direct sunlight causes rearrangement and decomposition of ions resulting in the formation of chloride and oxygen. In

natural watercourses, hypochlorite ions are not stable and their half-life is less than two hours (Escudero-Oñate, 2015). pH value is very important for the relationship of hypochlorite ion and chlorine. In alkaline pH values, hypochlorite ion is predominant while chlorine is more intensive at pH values below 4. This implies that concentration of chlorine in solutions is expressed as the sum defined as free available chlorine.

$$Cl2 + HClO + ClO-$$

pH value defines the form of hypochlorite in solutions and, therefore, pH 10 is dominant anionic form (ClO-). However, due to the high alkalinity the neutral charge occurs, thus providing conditions for HClO to penetrate the cell and define its toxicity. If sodium hypochlorite is mixed with some acids or ammonia, the solution releases dangerous gases of chlorine or chloramines. In such cases, pH value is 4.5 or lower (Escudero-Oñate, 2015).

2.1. NaOCl as disinfectant

Disinfectants have a wide application. They contain various chlorine compounds such as sodium hypochlorite (NaOCl) and calcium hypochlorite (CaClO2). NaOCl has the greatest application in the food industry, water disinfection process, medicine, agriculture, but also in households.

In food industry, sodium hypochlorite is an indispensable means for cleaning and disinfection, because it destroys a large number of microorganisms. The ability of microorganisms to multiply easily and quickly under certain conditions imposes the use of disinfectants in food processing plants. In addition, hand hygiene of the employees is equally important, where disinfectants also play an important role (Fukuzaki, 2006).

In the process of potable water disinfection, the use of NaOCl must be in accordance with current regulations and standards. Apart from being a disinfectant, in the process of potable water purification, sodium hypochlorite is effective in removing ammonia compounds; it takes part in the oxidation of sulphides and iron. Different concentrations of NaOCl are used for potable water disinfection, especially taking care that in final water supply the concentration of chlorine is within the scope of prescribed limits. EN901 is a standard that refers to the properties of potable water disinfectants and defines certain parameters that must be met. Sodium hypochlorite that is used as disinfectant, according to standard EN901, should contain 160 g/l of active chlorine (Stanisavljev& Perić-Grujić, 2012).

Application of various disinfectants in medical facilities, which contain NaOCl is manifold. As patient care is a sensitive segment health care, the great importance is given to the sterilization of room and all objects within. In order to prevent microbial infection, different types of disinfectants are used in medical institutions. In terms of effectiveness, there are disinfectants that will manifest their germicidal properties after prolonged exposure times, from 6 to 10 h (chemical sterilants); agents that have exposure times less than 45 min and kill almost all microorganisms (high-level chemical sterilants); germicides that kill fungi and viruses, but are inefficient for certain bacteria, are intermediate-level disinfectants. There are also, low-level disinfectants that efficiently eliminate bacteria, some fungi and some viruses during the exposure times of 10 min (Rutala & Weber, 1997). Medical institutions also use antiseptics that affect the growth and action of microorganism. The use of antiseptics is very important for the disinfection of items and medical devices which are in direct contact with patient during the medical interventions (Rutala & Weber, 1997). Sodium hypochlorite is also used for the

disinfection of medical equipment that is used in treatment procedure and is in direct contact with the patient, such as hemodialysis machines. NaOCl solution at concentration of 500 to 750 ppm for 30 to 40 min can be used for disinfecting the hemodialysis machine. From the medical aspect, this is of great importance since hemodialysis units are high-risk areas for the transmission of hepatitis B and C. Sodium hypochlorite is also used to disinfect all other elements in these units (Rutala & Weber, 1997). In hospitals, sodium hypochlorite is widely used but at different concentrations, depending on the needs. Blood specimen containers are disinfected with NaOCl solution at 1:10 dilution of 5.25% sodium hypochlorite. Other hospital surfaces are disinfected with disinfectants at different concentration, depending on the potential infectious agent that can survive on their surfaces and its efficiency in regard to the pathogen. Solution containing 1.000 ppm hypochlorite effectively kills 99.9% corona virus and human parainfluenza virus. The use of NaOCl is also recommended for washing hospital bedsheets and uniforms of hospital staff, because besides the good decontamination results the energy saving is also achieved due to the low-temperature washing (Rutala & Weber, 1997).

Sodium hypochlorite is also used in dentistry. Prior to and during the surgical interventions in dentistry, root canals should be safe from pathogens. Research has shown that at concentrations safe for humans (concentrations of 1% and 5%) it is extremely effective in complete eliminating bacteria that are harmful for human health (S. aureus, F.nucleatum, E. coli i P. gingivalisat) (Sassone & al. 2003).

2.2. Destructive effect of NaClO on cell

Numerous scientific research investigating the impact of HOCl (hypochlorous acid) on cells, have led to the conclusion that the penetration of hypochlorous acid into the cell cause certain biochemical and physiological changes in organisms. The observed changes caused by HOCl can be effectively used for the control of algal blooms (Ebenezer & Ki, 2014). HOCl is very effective agent with a strong oxidizing effect. It penetrates the cell destructively, which may lead to mutagenic and carcinogenic deformations. Sodium hypochlorite toxicity is manifested acute and chronically, and causes the adverse reproductive outcomes (Fargašová, 2017). HOCl effect is based on powerful oxidative property which is manifested in the interaction with the great number of macromolecules in cells. Compounds containing S react more rapidly with hypochlorous acid. In the interaction with cysteine, HOCl forms sulfenyl chlorides, which with water form oxidized cysteine sulfenic acids. In proteins, HOCl interacts with amines thus forming chloramines. Chloramines manifest strong antimicrobial activity and are categorized as reactive type of chlorine. Hypochlorous acid and chloramines reacts with side chains of amino acids, lipids, nucleotides, however, amines from the DNA and RNA are the core of HOCl effect and during the aggressive impact of high concentrations of hypochlorous acid the DNA strand breakage occurs. Chlorination of lipids leads to the formation of chlorohydrins, which contribute to HOCl-mediated eukaryotic cells damage (Gray& al. 2013).

2.3. Impact of sodium hypochlorite on aquatic flora and fauna

Chlorine, as a chemical element, in the aquatic environment plays an important role in plant growth. Its presence is important in the process of photosynthesis and its efficiency in the plant disease suppression is also verified (Fargašová, 2017). Positive effect of chlorine presence is exclusively limited to small concentrations; in larger concentrations it may be rarely found in some watercourses, except at accidental spills during the transport or possible discharges of

unpurified wastewater into the watercourse. The Danish Environmental Protection Agency estimated that the hypochlorite used in the households will disappear in wastewater treatment plants and that small amount that enters the environment shall be annulled very rapidly due to the hypochlorite reactivity and instability. Therefore, the Danish Environmental Protection Agency has restricted the negative impact of NaOCl on local conditions (Escudero-Oñate, 2015).

Sodium hypochlorite in waters easily reacts with organic matters from the wastewaters and forms toxic, stable organochlorine compounds (Emmanuel & al. 2004). Due to the large application of sodium hypochlorite, scientists have conducted many researches trying to prove its phytotoxicity. According to research conducted by Ebenezer & Ki (2014), NaOCl impacts the photosynthesis processes at Cochlodinium polykrikoides algae and reduces the growth rate of the algae. When entering the aquatic environment, the sodium hypochlorite forms hypochlorous acid, which stimulates the glucose oxidation of water plants. Aerobic organisms, as side product of normal oxygen metabolism, form so-called reactive species O (ROS). In these organisms, ROS can manifest both positive and negative effects. Biocides stimulate ROS production thus initiating other oxidation processes, such as oxidation of proteins and peroxidation of lipids. Research has confirmed the oxidative damage of cells with no possibility for recovery, and thus the algicidal efficiency of NaOCl (Ebenezer & Ki, 2014).

It is confirmed that algicidal impact of sodium hypochlorite may be used for the reduction of harmful algae, however, NaOCl itself and its side products can have a negative impact on other non-toxic organisms in aquatic environment. Based on data from the Danish Environmental Protection Agency and database from ECHA (2011, according to Escudero-Oñate, 2015), the most sensitive on hypochlorite, is freshwater fish *Salmonidae* for which it was tested that at an exposure of 96h, the LC50 is from 0.02 to 0.06mg / l (LC50-Mean lethal concentration-the concentration that will cause in the external environment the mortality of the tested sample of a population by 50%).

When it comes to invertebrates, the most sensitive species is *Ceriodaphnia dubi* (water flea), living in freshwater lakes and ponds. *Ceriodaphnia dubi* has EC50 value of about 0.035 mg/l. The harmful effects of sodium hypochlorite, as stated in the report of the Danish Environmental Protection Agency, are also observed in the analysis of chronic toxicity. In a exposure of 133 days, the sodium hypochlorite had negative effect on fish growth, especially at *Ictalurus punctatus* (channel catfish) in which reduced growth was observed and the final weight of this species was 64% compared to control sample (Escudero-Oñate, 2014).

Toxic effect of sodium hypochlorite was also confirmed on Zebrafish *(Danio rerio),* a freshwater fish. Adult male and female Zebrafish weighing between 0.2 and 0.5 g and body length from 2.4 to 3.2 cm were treated with diluted sodium hypochlorite (1ml NaOCl in 1l in dechlorinated tap water). Test results have confirmed NaOCl toxicity. In addition, at 24h exposure test indicated LC50 of 48 mg/l. The research also indicated the increase in swimming activity of fish at low concentrations of NaOCl and decrease in activity at higher concentrations, which is also characterized as a detrimental effect of hypochlorite (Magalhães & al. 2007). Pitanga (2011) also conducted research on the effect of NaOCl on Danio rerio (Zebrafish). The research investigated the impact of disinfectants on fish embryos and adults. The results obtained for adult fish are in accordance with previous results presented elsewhere, and indicate the effect of sodium hypochlorite on decrease in the Zebrafish weight, after 7 days of exposure

to NaOCl solution of 0.5 g/l. In addition to weight reduction, changes in glutathione-S-tranferase (GST) enzyme activity were also observed in Zebrafish gills. Decreased ChE enzyme activity was observed in embryo, indicating a neurotoxic effect of NaOC (Pitanga, 2011).

2.4. The impact of sodium hypochlorite on microorganisms

Sodium hypochlorite in an agent that manifests strong disinfection properties. It is used in all forms of the society, from industry, agriculture, medicine to mass use in household. This is the basis for investigating the impact of NaOCl on the environment. Intense biocidal properties include, but are not limited to, the action of sodium hypochlorite on bacteria and viruses. The mechanisms of impact of the disinfectants on microorganisms are based on contact when the disinfectant penetrates the cell thus inactivating them (Pitanga, 2011). Studies have shown that hypochlorite solutions in various concentrations are extremely effective in killing the viruses. Hypochlorite solution of 1.000 ppm is confirmed to kill 99.9% human parainfluenza virus, as well as corona virus in 1m time. It is also confirmed that a 5,000 ppm hypochlorite solution applied for 1 min killed 99.9% of coxsackie B virus and adenovirus type 5. Long-term studies investigating the ways for eliminating the viruses that are a threat to human health, have led to important and useful results. It was found that a solution of approximately 5,000 ppm hypochlorite applied for 1 min produced a 99.9% reduction in hepatitis A virus, and a solution of 800 ppm hypochlorite applied for 10 min produced a 99.7% reduction of rhinovirus type 14 (Rutala & Weber, 1997).

In addition to the virus, a large number of bacteria are sensitive to sodium hypochlorite solution. The largest number of research studies has been conducted on bacteria that occur in hospital conditions and which can significantly endanger human health. Some of the pathogenic bacteria for which sensitivity to NaOCl has been confirmed are Pseudomonas aeruginosa, Acinetobacter spp. and Klebsiella spp., especially in the reduced presence of organic matter (Köhler& al. 2018). Legionella spp. bacteria also present in health-care facilities (water distribution system), and one of the ways to eliminate this bacteria from the water is hyperchlorination, even some studies have shown that in some cases Legionella spp. were much more resistant to chlorine than were coliform bacteria (Rutala & Weber, 1997).

Antimicrobial efficiency of 1% and 5% sodium hypochlorite was also confirmed at Staphilococcus aureus, Enterococcus faecalis, Escherichia coli, Porphiromonas gingivalis and Fusobacterium nucleatum, bacteria commonly encountered in dentistry (Sassone & al. 2003). Kukanur & al. (2018) have conducted a study in order to determine the minimum effective dose of sodium hypochlorite and minimum exposure time to disinfect common aerobic bacteria. Their research showed that 0.1% of NaOCl is sufficient to kill Citrobacterspp, Staphylococcus aureus, MRSA, CONS, MR CONS, Enterococcus spp, Escherichia coli, Klebsiella oxytoca, Klebsiella pneumonia, NF GNB, Proteus mirabilis, Proteus vulgaris, Pseudomonas aeruginosa, Pseudomonas spp. with a exposure time of 5 minutes (Kukanur& al. 2018).

3. RESEARCH METHODS

Water samples for testing the river Ibar were taken in the city centre, at the place of inflow of atmospheric and sewage waters, Figure 1. Microbiological and physical-chemical analysis was performed. Sampling was made on 06.05.2020, at 8:52 h AM.

Figure 1. *Sampling point "Three Towers"*

On February 25th 2020, at the measuring point " *Three Towers* ", the water flow of the river Ibar, was measured. Water flow measurement was performed using a digital meter OTT Z400, which automatically records the speed of the propeller by counting the pulses. OTT Z400 meter provides the flow rate immediately after measurement. The time period for measuring the water flow of the river Ibar, near *Three Towers*, was from 10.00 to 13.30 h. In order to obtain accurate results of measuring the water flow, it was necessary to measure the width of the riverbed, which was 23.9 m. Apart from that, depth of the river was also a required parameter, which is different at 19 measuring points due to the configuration of the terrain (Table 1).

Table 1. Depth of the Ibar riverbed at measuring points

Point no.	Depth		Point no.	Depth	
1	12cm		10	34cm	
2	20cm		11	28cm	
3	33cm		12	27cm	
4	25cm		13	26cm	
5	35cm		15	25cm	
6	44cm		16	20cm	
7	41cm		17	18cm	
8	40cm		18	16cm	
9	38cm		19	15cm	

After determining the width and depth, the riverbed was divided into 20 sections, 119.5 cm in width (Figure 2). In order to obtain accurate values of water flow measurements, it was necessary to take two measurements of flows (on the surface and at the bottom), in sections deeper than 20 cm, and then to calculate the average value of the measurements. The measured water flow of the river Ibar, near Three towers, was 10,112 m^3 / s, or approximately 10 m^3 per second.

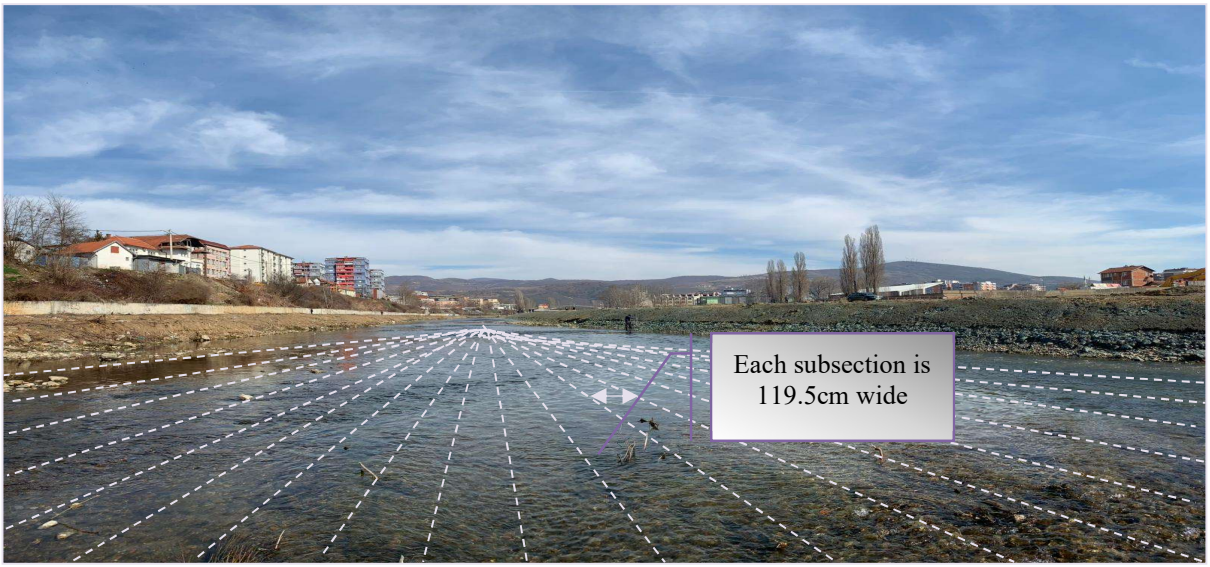

Figure 2. Appearance of the Ibar riverbed divided into sections

4. RESULTS AND DISCUSSION

4.1. Physical-chemical analysis

In order to investigate the impact of the large application of sodium hypochlorite from disinfectants during COVID-19 pandemic, sampling and testing of the Ibar River was performed. Some13 physical-chemical parameters that assess the quality of the river were analyzed. The analyzed parameters and the obtained values are shown in Table 2.

Table 2. The results of physical-chemical analysis of water at the measuring point "Three towers" on April, 26th 2020

No.	Testing parameters	M. Unit	Results
1.	Turbidity	NTU	36,4
2.	Concentration of hydrogen ion (ph)	pH	8,00
3.	Oxidizability ($KmnO_4$)	mg/L	46,8
4.	Chlorides (Cl)	mg/L	17,7
5.	Nitrites (NO_2)	mg/L	0,21
6.	Nitrates (NO_3)	mg/L	14,2
7.	Sulphates	mg/L	10,5
8.	Phenols	mg/L	<0,001
9.	Hardness (total)	dH^0	8,96
10.	Alkalinity	m mol/L	4,0
11.	HPK	mgO_2/L	11,8
12.	Oxygen	mgO_2/l	3,1
13.	Biological oxygen demand -5	mgO_2/l	7,7

The obtained data were compared with the results obtained at the same season for 2019.

Table 3. The results of physical-chemical analysis of water at the measuring point "Three Towers" on April 2019

No.	Testing parameters	M. Unit	Results
1.	Turbidity	NTU	1,35
2.	Concentration of hydrogen ion (ph)	pH	7,4
3.	Oxidizability ($KmnO_4$)	mg/L	10,9
4.	Chlorides (Cl)	mg/L	15,9
5.	Nitrites (NO_2)	mg/L	0,008
6.	Nitrates (NO_3)	mg/L	15,9
7.	Sulphates	mg/L	9,9
8.	Phenols	mg/L	0,0005
9.	Hardness (total)	dH^0	8,4
10.	Alkalinity	0,1 NHCa/l	P=1 M=32
11.	HPK	mgO_2/L	9,3
12.	Oxygen	mgO_2/l	16,0
13.	Biological oxygen demand -5	mgO_2/l	2,7

The analysis showed significantly increased values of water turbidity compared to the previous one. In addition to drastic increase in turbidity, among other things, is a large amount of rain that fell a few days before sampling. Based on the concentration of $CaCO_3$ in the sample (water hardness), the category of the river Ibar water was determined. Water hardness is expressed in dH°. The measured hardness of the sample is 8.96 dH°. As the hardness of water is characterized by the content of $CaCO_3$, its concentration was calculated. One dH° has the water that contains 10 mg of $CaCO_3$ in 1 l (Korać, 1962), and accordingly, the content of $CaCO_3$ in the sample is 89.6 mg / l. Based on Directive 2008/105 / EC, the value of calcium carbonate from 50 to <100, determines the sampled water as III category, and thus other parameters are compared to the values for the same category.

pH sample value at the measuring point "Three towers" is 8, while previously tested sample had pH value of 7.4. Both samples are within the proposed range of European Quality Standards (Directive 78/659/EEC). Alkaline pH values express the hypochlorite ion, while chlorite is more intensive at pH values below 4 and since the aggressiveness of hypochlorite ion is weak, the negative impact of sodium hypochlorite would be minimal. Obtained pH values indicate the low concentrations of NaOCl, which in contact with water builds hypochlorous acid that can acidify the environment.

The nitrate (NO_3) content declines compared to the previously analyzed sample, however, the measured value of 14.2 mg / l exceeds the standard of the third class- 5.6 mg / l (OECD, 2007, page 34). Comparing the value of nitrite, an increase in the concentration of NO_2 is observed in relation to the previously measured value, which leads to the conclusion on the presence of a large number of bacteria in water, that is, weak disinfection, and we cannot talk about the influence of sodium hypochlorite. The concentration of chloride and sulphate is increased compared to the previous measurement, but both values are below 350 mg / l, which is the recommended value for the third class of surface waters (OECD, 2007, page 34). Increased values of chloride, compared to the previous ones, may indicate the presence of NaOCl, because under the influence of sunlight, hypochlorous ions (dominant in an alkaline environment), due to photoinstability, decompose into chlorides and oxygen. As the obtained values were slightly

increased, it cannot be claimed that this was caused by sodium hypochlorite used for disinfection due to the virus pandemic.

BOD_5 measured at measuring point “Three towers” is significantly increased compared to previous measurements and indicates the presence of aerobic bacteria. Obtained value of 7.7 mg O_2/l defines the conditions where fish population is endangered. According to EU recommendations, the value of BOD_5 should be less or equal to 3 mg/l O_2 (Directive 78/659/EEC). The value of HPK is also grater compared to previous measurements (9,3 mg O_2/l), and is 11,8 mg O_2/l. Dissolved oxygen is one of the most important parameters for the assessment of water quality. In the sample from the measuring point “Tri solitera” oxygen saturation is 3,1 mg O_2/l, which is significantly lower compared to previous measurements when the oxygen value was 16,0 mg O_2/l. The comparison of the results indicates a high level of river pollution and on the basis of European standards, according to which the limit value of dissolved oxygen is 6 mg / l, the fish population is endangered (Directive 78/659 / EEC).

In addition to BOD and HPH, the oxidation capacity is an important parameter that indicates the organic pollution of water. At the measuring point “Three towers”, oxidation capacity is 46,8 mg/l, which is multiple increment compared to previous measurement (10,9 mg/l). The analysis of both samples was conducted applying permanganate method with recommended value of 15 mg / l (OECD, 2007, page 34). Despite the fact that the analysis of these parameters proved the presence of organic impurities, due to the low concentration of chlorine, the formation of toxic organochlorine compounds is insignificant.

4.2. Microbiological analysis

Microbiological analysis of the river Ibar, at the measuring point "Tri solitera", indicated extreme water pollution. Water sampling was performed at the point of inflow of municipal wastewater into the river Ibar, without prior treatment. The defined microbiological parameters of the analysis are: total number of coliform bacteria, number of coliform bacteria of faecal origin, number of streptococci of faecal origin (intestinal enterococci), number of live bacteria in 1 ml of sample at 37 ° C after 48 h, number of Pseudomonas aeruginosa in 100 ml and Proteus species in 100 ml of the sample.

In the examined sample, the total number of coliform bacteria in 100 ml of the sample is 240,000, as well as the number of coliform bacteria of faecal origin, which is also 240,000 in 100 ml, which indicates that the primary pollution of the river is faecal contamination. This is supported by the number of streptococci of faecal origin, which numbered 240,000 in 100 ml of the sample. Surface water quality regulation in Moldova, gives the recommended standard of surface water quality in relation to microbiological parameters: total coliform 10,000 in 100 ml; faecal coliform 10,000 in 100 ml and faecal streptococci 5,000 in 100 ml (OECD, 2007, page 34).

The number of live bacteria in 1 ml of sample after 48 h at 37 ° C is 4,000. Pathogens such as Pseudomonas aeruginosa and Proteus have not been isolated.

Kukanur & al. (2018) have proven that 0.1% of NaOCl is sufficient to eliminate *Proteus mirabilis, Proteus vulgaris, Pseudomonas aeruginosa* during the exposure time of 5 min. Since these microorganisms, which are often found in surface waters and are sensitive on low concentrations of disinfectants, were not isolated in the sample analysis, this can be contributed

to sodium hypochlorite. Extremely high numbers of coliform bacteria, which are also sensitive to NaOCl, manifest its low concentration in water.

The results of the microbiological analysis of the Ibar vary from place to place. As there is no wastewater treatment system in the area and the river is used as a collector, the obtained results are expected. Variations exist depending on the place of sampling, precipitation, self-purification of the river, season. However, the quality of the water always indicates high pollution. This is supported by the results of an earlier analysis of the river Ibar, based on which: the total number of coliform bacteria in 100 ml of the sample was 24,000 and the number of coliform bacteria of faecal origin, in 100 ml is 24,000.

The obtained results of microbiological analysis do not show the presence of sodium hypochlorite in higher concentrations in the river Ibar.

In order to determine the impact of NaOCl, used in disinfection of streets, public areas, households, business premises, etc., during the COVID-19 virus pandemic, in addition to the analysis of the Ibar River, an analysis of air and soil in the region is also planned.

5. CONCLUSION

By comparing the obtained results of physico-chemical and microbiological analysis of the water of the river Ibar at the measuring point "Three towers" and the previously obtained results of the analysis of the Ibar, it was not found that high concentrations of sodium hypochlorite, used as a primary disinfectant during the COVID-19 virus pandemic, have entered the river Ibar.

Accordingly, it is not possible to talk about the negative impact of NaOCl on the river, but also its positive effect is not evident. This may be due to the high instability of the compound and the short half-life, which is less than 2 h.

The analysis of the water identified the increase in the river pollution compared to previous period, which explicitly indicates the necessity for waste water treatment plant.

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HOW TO UNDERSTAND THE RAPID SPREAD OF SARS-COV-2 INFECTIONS AND THE OUTBREAK OF COVID-19: WHAT CAN WE LEARN FROM SPATIAL AND MEDICAL-GEOGRAPHICAL PERSPECTIVES – THE CASES OF ITALY, AUSTRIA, SLOVENIA, AND CROATIA

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Abstract

A harsh public debate evolves in connection with the proclamation of very restrictive measures, followed by further austerity in the field of free movement, physical contacts restrictions and quarantine. However, according to most epidemiologists, these measures are essential to slow down the spread of the infection (i.e. to flatten down the curve) and thus gradually reduce the number of patients in need of intensive care for a longer period due to a more difficult progression of the disease. In addition to hospitals, care- and nursing homes along with their staff are at the most risk of spreading the infection. This is widely confirmed by the acquired data from Italy, Austria, Slovenia, and Croatia. However, there are significant spatial, micro-regional, and age-specific disparities in the uptake of the disease. The article seeks to explore the main differences in the mortality to age-specific ratios impacting the death toll of the disease across the four countries, along with the regional disparities, and the general national pathways in dealing with the epidemics. Applying the combined analysis of statistical and demographic indicators, the contribution sheds new light on the systemic restrictions on the population travelling abroad, elderly in nursing homes, youngsters in schools and kindergartens, and patients in hospitals. The quadruple comparison reveals the ways employed in restricting the spread of infection and the most vulnerable groups affected as well as it calls for a systematically interdisciplinary research approach.

Key words: CoViD-19, comparative analysis, interdisciplinary research, medical geography, mortality rates.

1. INTRODUCTION

For some time now, the public debate is heightening in connection with the proclamation of very restrictive measures, followed by further austerity in the field of free movement, physical contacts restrictions and quarantine. However, according to most epidemiologists, these measures are essential to slow down the spread of the ominous infection and thus gradually reduce the number of patients in need of intensive care for longer period due to a more difficult

progression of the disease. This "flattening down the curve", as it was dubbed in the early stage of the first wave of the epidemic first thought as seasonal, is primarily oriented towards an ever-degrading healthcare systems in many countries. OECD data shows decreasing numbers of overall and acute hospital beds ever since "the golden 1970's". The oil shock of 1973 rendered a situation of first cuts in public expenditure (cf. Harvey, 2005; 2011), and the hospital facilities were the first to undergo the "optimization" plans. An increasing trend towards further optimization and privatizing the former renewed after the last financial and economic crisis of 2008 (Humphries et al., 2019). Dismantling the public health sector inevitably decreased the preparedness to deal with a large-scale inflow of patients to health premises as shown especially in Italy, but in Slovenia as well.

In Slovenia's first wave, the time of hospitalisation increased from 7 to almost 10 days after the first month of epidemic, indicating a higher number of harsher disease scenarios and increasing the number of deaths. The latter occasionally reached nearly 20 per cent of those in intensive care daily, while the average for the first week of April was around 13 per cent. This is important for Slovenia as it has almost a fifth (19.1 per cent)[14] of the population over 65 years of age and all of the intensive care (acute) beds number less than 200. In the second wave the alarming scenario initializes after 50 intensive care beds are full (NIJZ, 2020), notwithstanding the increasing share of elderly population. Back in 1980, Slovenia had almost 7 acute hospital beds at its disposal, nowadays only about 4.2 per 1,000 inhabitants. Japan, as the most equipped country in the world yet with the world's oldest population – 27 per cent over the age of 65 – has almost twice as many beds (7.8 per 1,000 inhabitants). Italy drastically worsened its position. As the second country with the oldest population in the world (23 per cent over 65 years), it has only 2.6 acute beds, while in 1980 it had as much as 9.3 beds per 1,000 inhabitants – more than Slovenia (OECD, 2020, last available data for 2017). Let us remind that in 1980, the compared countries had much lower shares of elderly: Slovenia 11.4 per cent, Croatia 11.5 per cent, Italy 13.3 per cent, and Austria 15.1 per cent (OECD, 1980).

The current data also show that in addition to hospitals care- and nursing homes, along with their staff, are at the most risk of spreading the infection. There, apart of overcrowding, they also face the problem of ventilation systems, which can with higher humidity and temperature helps in spreading all sorts of viruses in virtually every room. But based on which data should we co-decide on the prevalence of the disease, on restrictive measures and on the need for hospitalisations? Already the brisk comparison between the four countries shows that due to the difference in approaches to testing (which still is a problem), we are receiving markedly deviating mortality indicators, which are easily misinterpreted. The Slovenian National Institute of Public Health (NIJZ), for instance, initially published data on the number of people tested and infected in oversized age groups, which was initially acceptable due to the low numbers. This error was soon corrected, and the data are displayed mostly by 10-year age groups, but the unfriendly form of publishing data remains.

Contrary to Slovenia, the Italian statistics of the Covid-19 epidemic are much more detailed, which is not surprising given the number of cases, the size of the country, the spatial organisation and regional distribution. After the first month of the outbreak there, we can apply

[14] Austria had 19.2 per cent, and Croatia 19.7 per cent of population 65+ in 2017 (OECD 2020)

a demogeographical analysis to identify many hidden characteristics not visible in the data for Slovenia with a certain predictive value for other countries.

2. METHODOLOGY: THE "FIRST WAVE" IN NORTHERN ITALY

The initial research goal for the present research was to determine the nature of rapid spread of CoViD-19, primarily comparing Italy and Slovenia. It was based on and upgraded from the expert article published "in the heat of the first wave" on 18 April 2020 (Josipovič, 2020) where we discussed the problem of collected data and its suitability for ex-post-facto analyses. The methodological differences between the two countries back in March and April could be surpassed only by implementing the assessments based on the specific indices developed from datasets for previous years. With the hiatus of new infections in May, the room opened for new data acquirements and subsequent analyses.

In the delayed prolonged spread of the first wave it turned out as very fruitful for the analysis to compare the situation in Austria and Croatia, as the neighbouring countries to Slovenia (except for Hungary, which was at that point excluded from the analysis due to a different type of initial spread of the new infection. With the addition of Austria and Croatia we were able to assess the lessons from the early Italian and Slovenian cases.

We may summarize the quadruple comparative perspective into the analytical goals:

- we wanted to explore the possibilities of demographical and regional-geographic analysis within the scope of medical geography,
- using the available medical, statistical, regional, and geographical data we sought for patterns emerging from the individual outbreak districts,
- in order to produce a more comprehensive framework of explaining and understanding this pandemic we retreated to Närman's (1997) underused approach of bridging the gap between theory and practice and developmental thinking.

There were multiple issues in the joint interdisciplinary analytical framework which had to be overcome with suitable methodological ameliorations. First of all, the question arose how to treat and understand the relation between:

- The number of tests vs. the number of confirmed infections
- Issues in PCR testing procedure
- Symptomatic and asymptomatic infections and related problems of susceptibility
- Data on the occupancy and availability of health-care premises.

Another burning issue was, and still is, the arbitrarily set threshold of 40 infections per 100.000 inhabitants per month regardless of myriad of relativization factors, such as:

- Geographical pattern of the spread (dispersed, concentrated)
- Health-care institutions density (hospitals, nursing homes, other premises)
- Ethnic background of a region (minority population areas)
- Geographical position (peripheral regions, border- and cross-border areas)
- Age and gender (demographic structure, socio-economic activity)
- Health issues (general public health in the regional perspective).

Moreover, the main question with indiscrete social and economic effects was and still is: On

the basis of what kind and what sort of data should we co-decide on the perception of the prevalence of the disease, on restrictive measures to be imposed, and on the need for hospitalizations being approved and forecasted? Already, the comparison between Italy and Germany, where infections are in the tens and hundreds of thousands, shows that due to the difference in approach to testing (which is still a problem in Slovenia, Croatia and Austria), we are receiving markedly deviating mortality indicators, which are easily misinterpreted. All these retreats us from using such highly volatile indicators directly.

As for the data analysis, we applied several conditions:

- All data collections are open-source and made publicly available,
- We designed the model for approaching to mortality and morbidity counts by interdisciplinary and multidisciplinary approach,
- We normalized the distributions across the selected year-spans,
- A comparative month-specific death rates were reproduced across countries with low absolute (–0,12 / +0,21 per cent), and relative variability (–3,54 / +3,85 per cent).

3. RESULTS AND DISCUSSIONS

The country-wide regional analysis for Italy does not show such a terrible picture as reported, given the size of the total population (60.551 million inhabitants). Though this is only the first impression. Second, a one-year number of all deaths (633,000 in 2018) includes 25 per cent of 90+ population of those who died – a new total of 160,000. Out of these, 15 percent (almost 25,000) were from Lombardy, where the province of Bergamo with about 2,400 deaths in this age group, accounted for 9.8 per cent. So, these are the verified national data on the number of deaths per country, region, and province in Italy (ISTAT, 2020).

These data are a methodological key to understanding the relationship between the number of deaths and deaths because of CoViD-19 or the infections with one of the four strains of SARS-CoV-2 (in addition to potentially escorting chronic conditions). By 26 March 2020 – 30 days after the outbreak – the total death toll was 8,165, representing 1.29 per cent on an annual basis, but at the same time representing a conditional increase of 15 per cent of excess deaths compared to the previous inter-year monthly level. This monthly surplus does not constitute an unexpectedly severe deviation, though. For example, the January mortality rate in Slovenia in 2017 exceeded the multi-year average by 32 per cent – the number of monthly deaths was as many as 2,400 deaths instead of the usual 1800 for few years' average (SURS, 2020). Of course, with a smaller population, data and derived indicators are also more volatile. Nevertheless, Italy and Slovenia have otherwise a convergent picture of the monthly death schedule, therefore similar starting points for assessing potential developments can be applied to both. The average monthly distribution of deaths in Italy and Slovenia in the 2011–2017 period (fig.1).

The highest number of deaths after the first month of the epidemic was recorded in Lombardy, with as much as 60 per cent of all deaths (also) with covid-19 in Italy. This was unusual especially when comparing the secondary, "post-Chinese" spread elsewhere. However, demographic analysis shows that the average annual death rate in Lombardy was higher only by 4.9 per cent – again, assuming all deaths are attributed to SARS-CoV-2 and Covid-19 as a terminal cause of death. But, on a monthly basis, that number would rose to 58 per cent and

cause pretimed deaths which would occur in the last month of the year. Additionally, this is almost twice as much as the contribution of influenza and other causes to increased mortality in Slovenia in 2017 keeping in mind that in 2018 and 2019 Slovenia had about 150 deaths attributed to the flu.

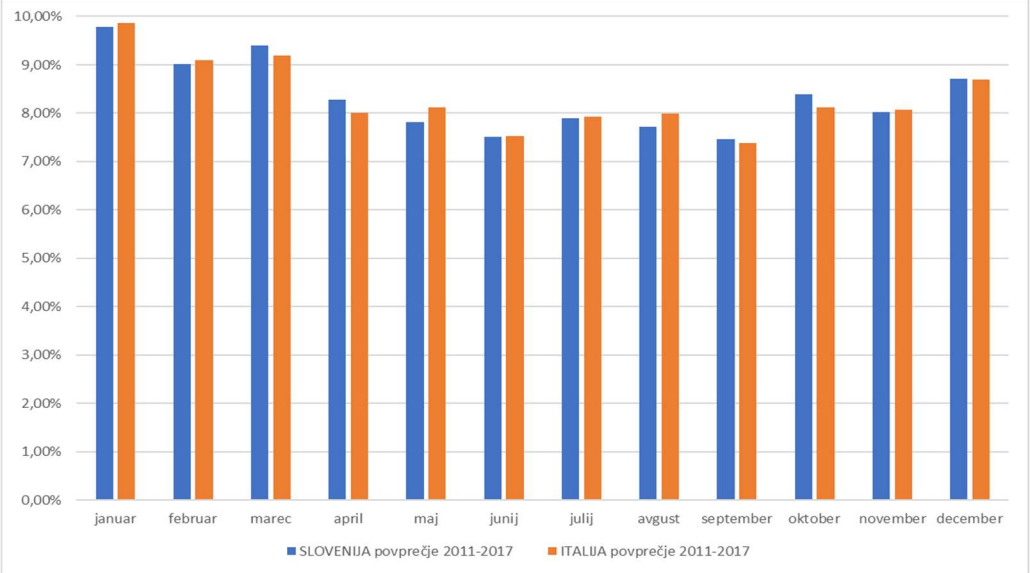

Figure 1. Average monthly distribution of deaths in Slovenia and Italy

This comparison is important for a five times more populated Lombardy (10 million inhabitants compared to 2.1 million in Slovenia) has dealt with an increased mortality, which cannot be explained simply as a result of the fluctuation of data. A closer mezzo-regional glance furthermore shows that Bergamo was the worst off among all the provinces of Lombardy. This province, with a population of 1.1 million (half of Slovenia), already accounts for 10.4 per cent of the "normal" annual number of deaths, according to the official number of deaths attributed to SARS-CoV-2 infection. At the monthly level the number of deaths from covid-19 has already exceeded the usual monthly number of deaths (+125 per cent) which was quite remarkable. In some counties, mortality after the first month was tripled compared to normal at that time. This was a sign of markedly altered and increased mortality rates that are yet to be evaluated, for which we do not have the appropriate data, except the forerunning September and October data.

Interestingly, in one of the hypotheses, the media blamed the football matches between Atalanta Bergamo and Valencia for the rapid spread of infection in the region of Bergamo and Lombardy, and later Spain. Regardless of the age structure of the game's viewers, it is becoming more than obvious that the first wave of transmission of infections took place within the group of frequent travellers, especially those by planes, and later the transmission of infections concentrates at elderly population with immune deficiencies receiving care mostly from the middle-aged as an infection trader. But as pointed out, it is the Italian case that exemplified the picture of an overburdened health workers and the health system itself due to a deficit in both hospital infrastructure and nursing homes for the elderly, as the most deprived population.

Another important comparison that is used for forecasting is between mortality of people of specific age. We compared the deaths due to covid-19 and other mortality in the 90+ age group. In the province of Bergamo, an average of at least 214 people of this age group were expected

to pass away on average in March. This is just under 249 people who would potentially die given the 24 per cent mortality rate of covid-19 patients compared to a total of 11,300 people aged 90 or over in Bergamo province. However, given the escalation in the number of infected and deceased, this scenario is unlikely to last and the deviations in April were expected to be more pronounced than in March. It is, for sure, not possible to speculate on how many deaths would have occurred from other health complications, so it is also difficult to speculate at which point the trend will break, but the winter months – especially March – are marked by an overall higher mortality rate, which decreases significantly towards the summer.

Yet another burning methodological issue is the age structure of the infected, which represents the biggest difference between Italy and Slovenia. The Covid-19 mortality in Slovenia cannot be compared to Italy due to low numbers, but we can already confirm that the proportion of victims entering intensive care is exceedingly high – more than one-third. The bulk (65 per cent) of infected persons tested are in the 25-64 age group. If the age group 30–49 was the most infected during the first phase in spring, the centre of the infections had already been moved towards the age group 45–54 (NIJZ, 2020). The proportion of infected aged 60+ has risen from 15 per cent to 30 per cent and is still rising. This population should be given a particular attention as 96 per cent of them are among the victims in Italy. Moreover, not just that one out of four dies in this age group, the central concern should go to the population aged 80–89 with as much as one third of all dead mortality (31 per cent) and the age group 70–79 catching up with the 90+ with close to one fourth chance of dying (23 per cent). The issue of diagnostics was based on the sources NIJZ for Slovenia and the Ministry of Health in Italy (sources: NIJZ; SALUTE). CoViD-19 infections and the number of attributed deaths in Slovenia and Italy in the first wave is shown on Figure 2.

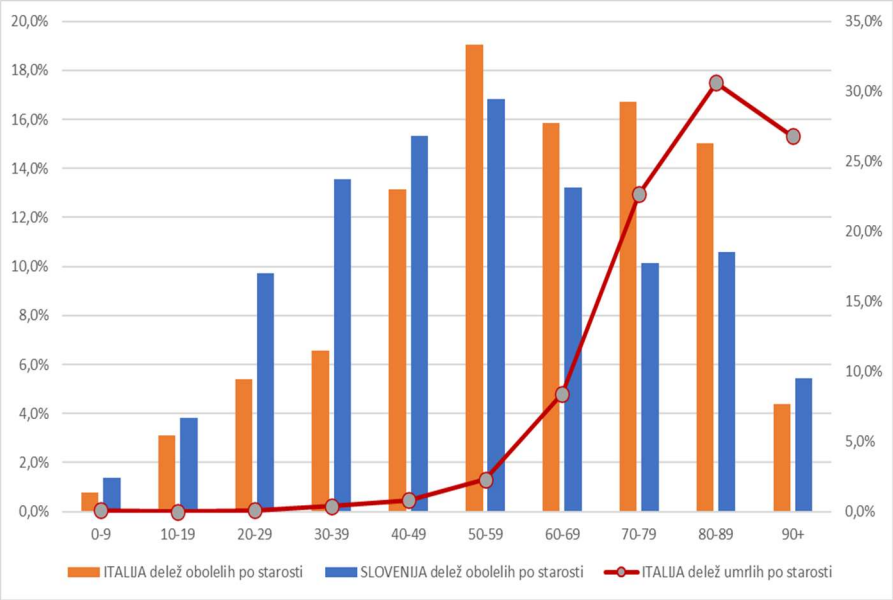

Figure 2. CoViD-19 patients and age-specific structure of deaths (NIJZ; SALUTE)

The geographical sequence in the spread of the infections by countries show a very slow process, possibly through the lockdown in Spring. The Croatian case is illustrious since it confirms the slightly delayed spread of infections from Italy and/or Austria (or vice versa), first to Slovenia, and then to Croatia (figs. 3 and 4).

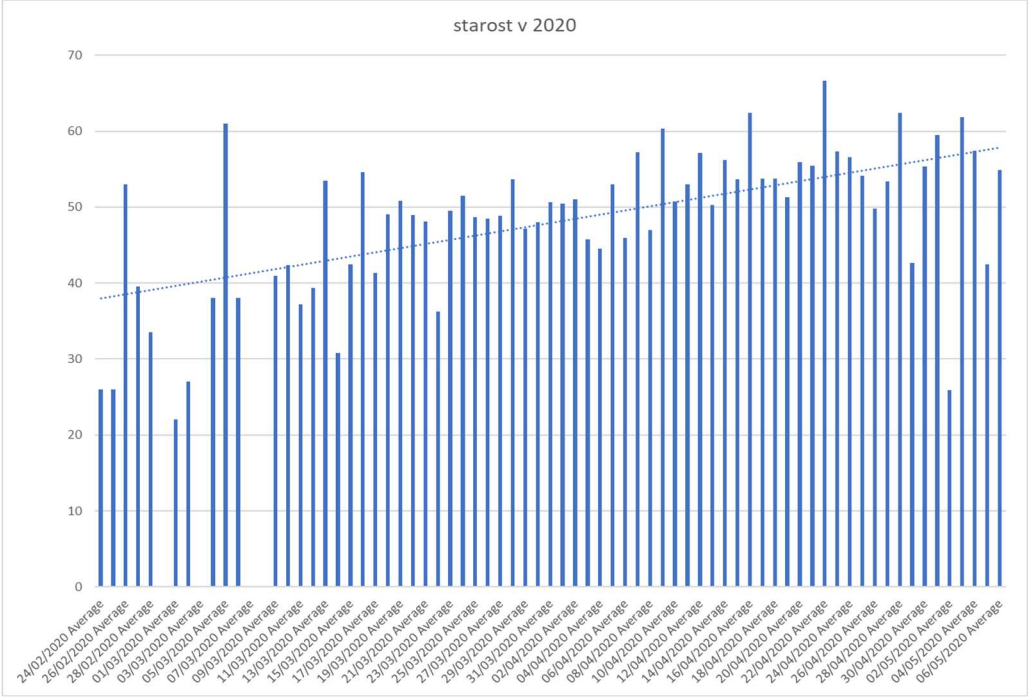

Figure 3. Average number of CoViD-19 infected in Croatia from 24 February to 6 May 2020

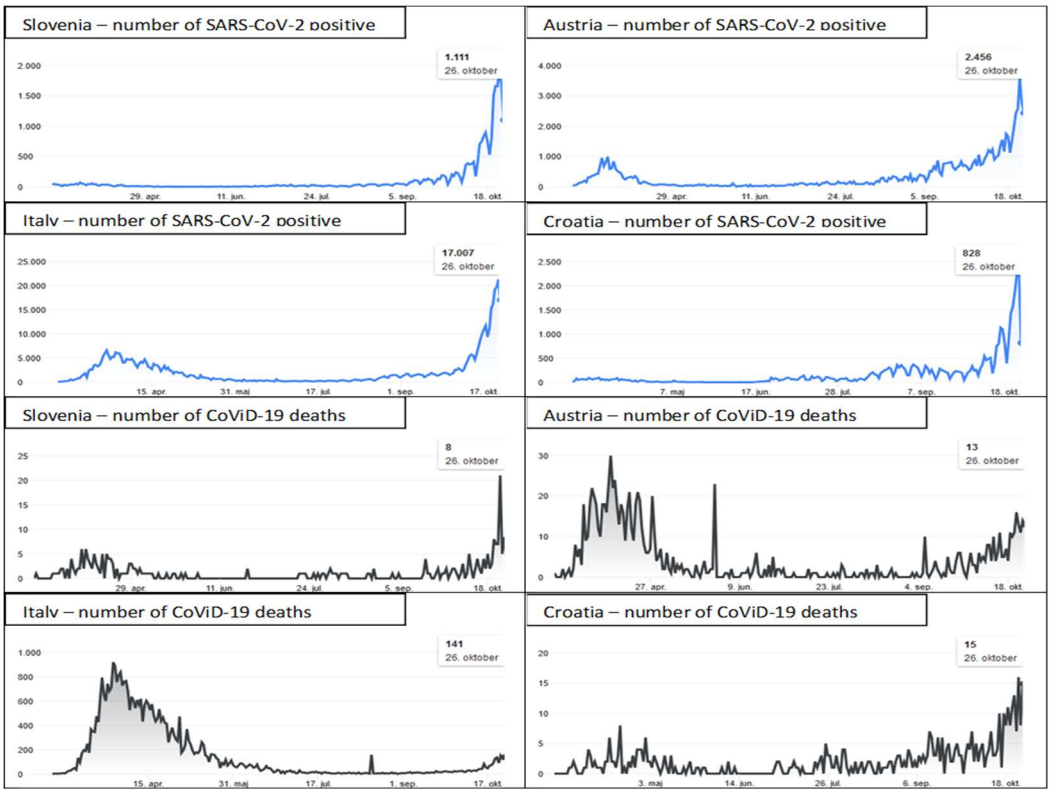

Figure 4. Number of SARS-CoV-2 positive (above) and number of CoVid-19 deaths (below) by countries, Slovenia, Austria, Italy, and Croatia (NIJZ, SALUTE, GÖG, MZH)

The Figure 4 brings the comparison between the four countries on an absolute scale. It clearly shows that the earlier developments took place in Austria and Italy (Bad Ischgl, Bergamo) resulting in the first peak (1st wave) of confirmed cases and in deaths. While both Slovenia and Croatia resonated the developments in the former countries with a significant delay, the figure also reveals the delayed deaths in October due to a sharp weather change from hot September to unusually cold October (source: ARSO, 2020). On the contrary, despite the similar weather developments in Austria and Italy, both countries have not developed the echo from the 1st wave since the number of deaths was already consumed. Moreover, it is still to be studied, how the common state of social fear and uncertainty influence the spread of infections and the disease. Dramatic developments in northern Italian hospitals during the 1st wave brings to the fore the underestimated role of panic among the medical staff and employees and the pertinent outbreaks of infections within medical facilities. As it was pointed out, the panic was that who triggered the breakdown, not just the unpreparedness and lowered number of beds and the degraded facilities (Klipšteter, 2020).

On the other hand, it is quite interesting that the number of confirmed positive cases in the 2nd wave show strikingly different picture compared to that of late winter and early spring, though the responses of countries were more loosened. Is that a consequence of flaws in accuracy of PCR tests and consequently higher number of confirmed cases which call for additional number of CoViD-19 assisted deaths?

To present this problem, we once again retreated to the NIJZ database. In the first half of October 2020, the ratio of tested positive among all tested for SARS-CoV-2 peaked at 8 per cent, while the same ratio soared at 30 per cent in the last triade of October. Apart of this, it reveals another remarkable feature. The hospitalized persons were only about 20 per cent tested positive compared to the number of overall hospitalized persons. Moreover, it seems that there are certain strains of other respiratory complication-causing agencies which contribute to the largest numbers of hospitalized population. This is at the core of understanding the last wave of unusual respiratory diseases. Nevertheless, such an augmentation of the hospitalized persons due to unknown or atypical respiratory diseases may have its triggering counterpart in an everlasting pollution of cities, depriving of movement, synthesis of vitamins, exposure to fresh air and sunlight, rising fear, uncertainty, precariousness etc. (fig. 5).

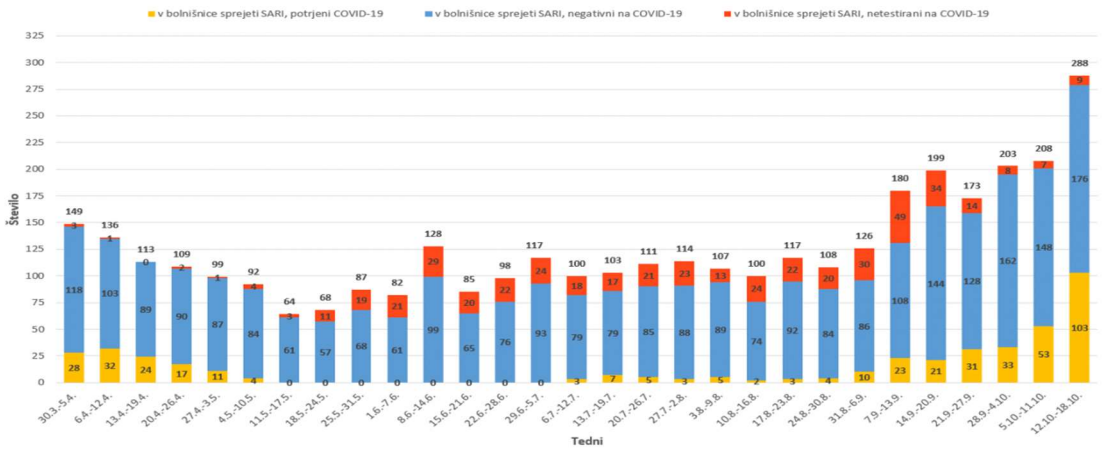

Figure 5. The breakdown of SARI cases and the relation towards SARS-CoV-2 positive (NIJZ)

While the share of CoViD-19 positive was 7.9 per cent in the first week of September 2020 (10 out of 126) as much as 86 persons with SARI status (severe acute respiratory infection not to be confused with the CoViD-19 disease) were tested negative, and additional 30 persons were not tested at all. The second, third, and fourth weeks of September brought slightly higher numbers (180, 199, and 173 respectively). The stress caused by the beginning of the new school year resonated in the slight increase toward the second week, but subsequently quickly decreased due to a fine weather. With the advent of weather change in October, we may explain the rise to 203 and 208 hospitalized persons respectively until the 10 October, but we cannot explain a rapid rise to 288 hospitalized persons between 12–18 October.

While the percentage of CoViD-19 positive rose from 7.9 per cent in the first September week to 12.8 per cent in the second week, and 10.6 per cent in the third week, in the fourth week that percentage rose to 17.9 per cent, making the September average at 12.5 per cent of hospitalized with confirmed CoViD-19. The first week of October rendered comparable 16.3 per cent, but the second week of October blasted the share of tested positive among hospirtalized to as much as 25.5 per cent, or one fourth of all hospitalizations, but still a minority. On top of it, the last measured week in October rendered all time highest share of 35.8 per cent tested positive among hospitalized. Here, it cannot be bluntly explained why the share was rising exponentially, thus providing another task for future research.

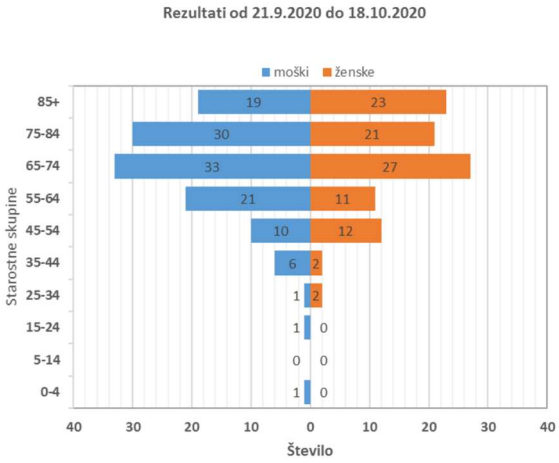

Figure 6. Age structure of hospitalized with SARI status, 21 Sep – 18 Oct 2020 (NIJZ)

The Slovenian case is instructive. Out of 220 hospitalized persons in the last month (21 September – 18 October 2020) only 5.9 per cent were those of age below 45. So, one can derive a logical conclusion that the lockdowns of schools, kindergartens and universities are less productive or of minor impact in preventing the spread of SARS-CoV-2 unless the same one secure the evidence that precisely those aging below 45 transfer the infection to elderly population (Figure 6). Such evidence was up to date not presented.

But the breakdown of data per weeks show another interesting feature. Namely, the sum of all hospitalized persons in the last four weeks equal, again, at 220, whereas it does not distinct between the length of stay. Given that majority of patients stay in hospital for more than a week, it is important do distinguish persons who are apparent in two or more weeks. In other words, we ought to exclude repetitive cases. One way or the other, from figure 6 we can observe the

number of hospitalized in the week between 12–18 October at 103 persons. Among them, only 9.7 per cent are below the age of 50, and only 0.97 per cent below 25 years of age (fig. 7).

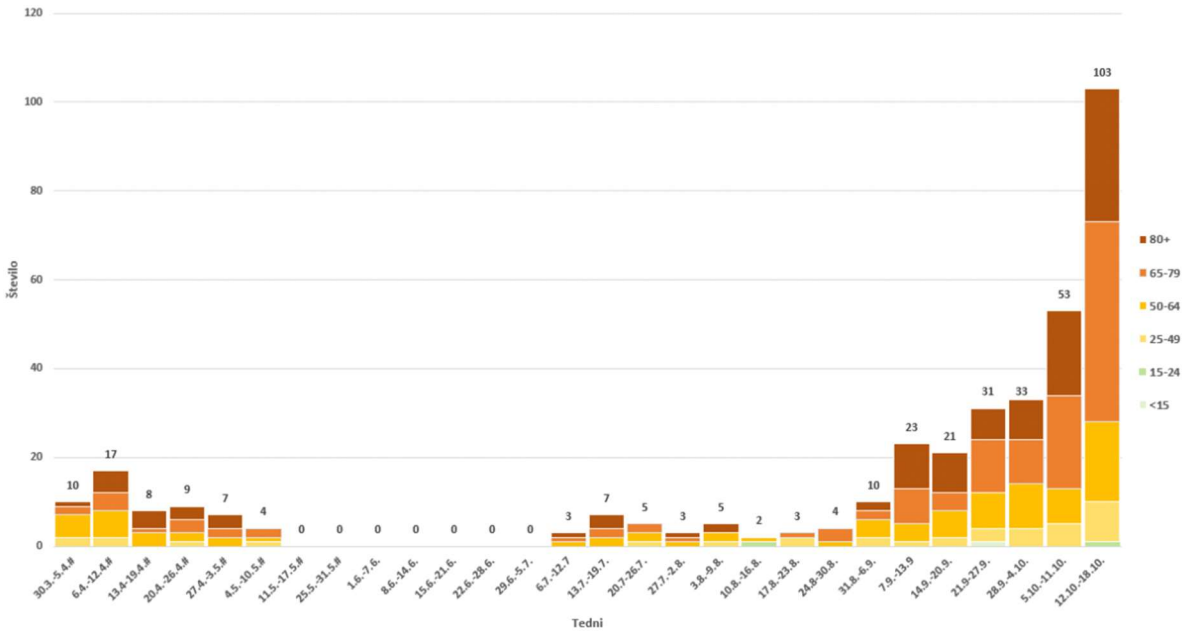

Figure 7. Age structure of hospitalized with SARI status by weeks, March–April 2020 (NIJZ)

4. CONCLUSIONS

The interdisciplinary analysis shows that there are significant spatial, micro-regional, and age-specific disparities in the uptake of the disease across the analyzed countries. Applying the combined analysis of statistical and demographic indicators, the contribution sheds new light on the systemic restrictions on the population travelling abroad, elderly in nursing homes, youngsters in schools and kindergartens, and patients in hospitals.

As we witness the rising animosities between the governments‘ top-down approach and the perceptions of common people, it seems necessary to introduce methodologically sound approaches in analyzing the global spread of SARS-CoV-2 and consequently CoViD-19. While having all the measures primarily concentrating at preventing the health system from breakdown, in countries like Slovenia and Italy started to delay or postpone indefinitely all the unnecessary operations and medical procedures in indefinite future. This way of approaching to the problem of rising numbers of hospitalized SARI patients, as in the case of Slovenia, reveals other strains of degradation of the public health system which should be dealt with immediately. Slovenia and Italy share a worse degree of preparedness in comparison with Croatia and Austria.

Another important outcome of this crisis of medical system aims at preventing the fake news to the so-called digital generation of youth. The relevant new lessons learned from the pandemic should be translated into the education process to equip the young with relevant knowledge and empower them to be able to distinguish grain from weeds in practice of everyday life.

Though the possible complications in the course of the disease may raise significant concerns, especially with immunity deficient population, resulting in the over-occupied acute hospital beds, it is the first obligation of the research community to share its insights transparently.

Today's situations in the four juxtaposed countries show a diverging picture of the degraded and dismantled public health system as a consequence of austerity aiming at, among other things, systematic cutting costs and gradual privatisation. Henceforth many countries need to resort to such measures of slowing the spread of covid-19, which "flatten the curve of infections" so much as to preserve the remains of the system to survive instead of taking instant steps towards its resilience.

Acknowledgements

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

17th -18th September 2020, Mitrovica, Kosovo

ASSESSMENT OF THERMAL WATER QUALITY IN THE ELBASAN AREA

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Abstract

Elbasan's thermal waters are a great asset of the village of Tregan, as most of the people's income comes from the use of these waters in balneological centers built mainly privately by residents of the nearby area. After the 1990s period, there was chaos and unplanned constructions and a disrespect to the minimal rules of environmental protection and thermal springs. Thermal waters generally are in the development of the area in curative, economic, and social terms. This research aimed to evaluate the role of natural and mineral resources in health, environment, and recreation, tourism, etc. Also, the quality and characteristics of thermal waters have assessed, referring to the indicators used for irrigation water use, according to national and international standards. The Elbasan area sampling springs for the collection of thermal water samples obtained, allowing for analysis of physical-chemical parameters and comparing the results found. The results of the analysis showed that the average temperature value in two springs of thermal water was up to 58.3 ºC, which is very high for the flora and fauna where these waters discharged. Estimated values of H2S, CO, sulfates, calcium, nitrates, magnesium, and phosphates are statistically significantly different in sampling. These resources had very high levels of parameters as seen in the conducted analyzes for the period April 2019, but compared to the average value of 1995 analysis in two samples shows lower value. The effect on the biological environment can divide into two parts, flora and fauna.

Key words: Thermal water, Elbasan area, Physical-chemical parameters, Sulfate, Curative values.

1. INTRODUCTION

The water used to supply the population, which can get from underground springs, is fortunately not insufficient for the plot of needs at the population level (Kullaj, 2014). Geothermal water springs are waters that originate from the underground, at a temperature significantly higher than the air temperature of the surrounding region. Most of the hot springs are discharged from groundwater that temperatures go upper from magmatic activity and rocks in the volcanic area.

However, some thermal springs are not related to volcanic activity. In this study case, water heated by the circulation of groundwater flowing down to the underground and reaching depths of one kilometer or more.

The rock temperature is higher due to the gradient of Earth crust temperatures, about 30 ° C (54 ° F) per kilometer for the first 10 km (Britannica, 2017). The terms "water" are a great asset that gives us one by one area in terms of curative, economic, social, and political (Cox, 1986).

The standards for each indicator depend on the purpose of water use (Sandoyin, 1991). The parameters analyzed in this study were temperatures, amount and types of salts, amount and types of gases, radioactivity, etc. The thermal water used for heating the houses does not go directly from the source to the consumer but is stored in the warehouse. In Albania, geothermal resources such as thermal waters are used only for the curative effect and tourist effect. Although, these waters have potential in energy produce and heat. Albania has many springs of thermal waters, sources known since antiquity. The entered temperature of the thermal waters is up to 60 ° C. The spas of Elbasan are a great asset to the village of Tregani. Most of the income pollution comes from the use of water in the balneological centers built mainly privately by the inhabitants of the area near the springs. The Administrative Unit of Tregan consists of 12 villages and reaches a population of 4530 inhabitants (Census 2011, INSTAT).

The area is frequented almost all year round by many vacationers, which goes to hotels or private houses where various services are provided. Their number reaches about 30 thousand a year. The population in these villages is mainly engaged in agriculture. Tregan Administrative Unit is located 12 kilometers away from the city of Elbasan and has been declared a Tourist Zone by Decision of the Council of Ministers No. 88, dated 01.03.1993 defines two tourist zones: 1) Llixha Center area with an area of 54 hectares. 2) Llixha- Hidraj area with an area of 9.5 hectares.The most prominent geomorphological phenomenon of the area is the range of hills located on the western side of the springs of Llixha.

The hilly relief has a height of up to 350 m and built of limestone, surrounded by flysch formations. There are a total of 20 sources their grouping according to the description of (Avgustinski VL, 1957). The total flow of Spa resources is about 15 l / s and this flow seems to be maintained even today. The natural state of the springs could be observed, until about 1998, and later numerous and uncontrolled constructions completely changed the state.

Nowadays, it is almost impossible to find most of the sources according to Augustinski's initial description; everything hidden inside the catchments is placed without planning. They are consecutive and technically controversial. Hydra's resources are a total of three; they emerge on the southern slope of the Kyçyka peak to the Banja stream. The total flow of Hydraj springs today is about 13-14 l / s versus about 28 l / s given by Avgustinski. The natural state of Hydraj's resources was preserved until about 1997 is now completely altered. Their presence in the natural landscape of the Spas, together with the thermo-mineral springs, constitute two separate and inseparable elements of it.

The hills faithfully testify to the chemical composition and geological history of the thermo-mineral waters and remind all visitors of the presence of thermal waters with chemical qualities. The most suitable temperature for curative baths is 34 to 38 ° C. The springs of the Spas of Elbasan and Hidraj have a higher temperature. They cooled before use in some open tanks where the water temperature drops from 50 ° C to 38-36 ° C.

During the cooling of the water, a part of the hydrogen sulfide gas content decreases from about 350-400 mg / l to about 150-200 mg / l, an amount that is very optimal for curative baths. According to the data of the Curative Spa Center of Elbasan, several thousand patients are treated in a controlled manner every year (Bojadgieva K., 2002).

2. MATERIALS AND METHODS

This study evaluates the role of natural resources such as thermal waters in tourism, health, and recreation, based on the case of spas in Elbasan through the evaluation of physical-chemical parameters and comparison of these indicators with international standards. The water samples are taken in sterilized glasses, so as not to be affected by the holding material. The method of water sampling in the zone is based on APHA 2005 and USEPA 2001 standards. The samples are transported overnight in a thermal box at a temperature of 4°C, in the laboratory. The results obtained are compared with the norms of indicators set by FAO 1989, for the assessment of thermal water quality.

Figure 1. Sampling place in the area of Elbasan spa

Geothermal energy is a source that can direct heating or the production of electricity. The areas of its use in the following figur*Corresponding author e-mail:* e (Steingrímsson, 2007) shows how we use thermal water in different ways such as in health, environment, and tourism.

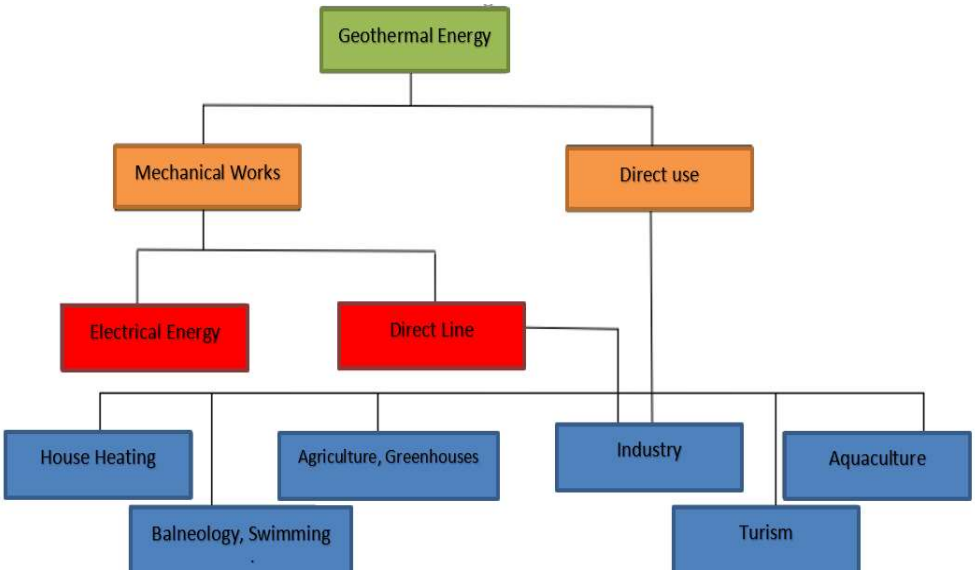

Figure 2. Alternative ways of using thermal waters

The following diagram presents the alternatives of using geothermal resources depending on the temperature, figure 2 (Lìndal, 1993).

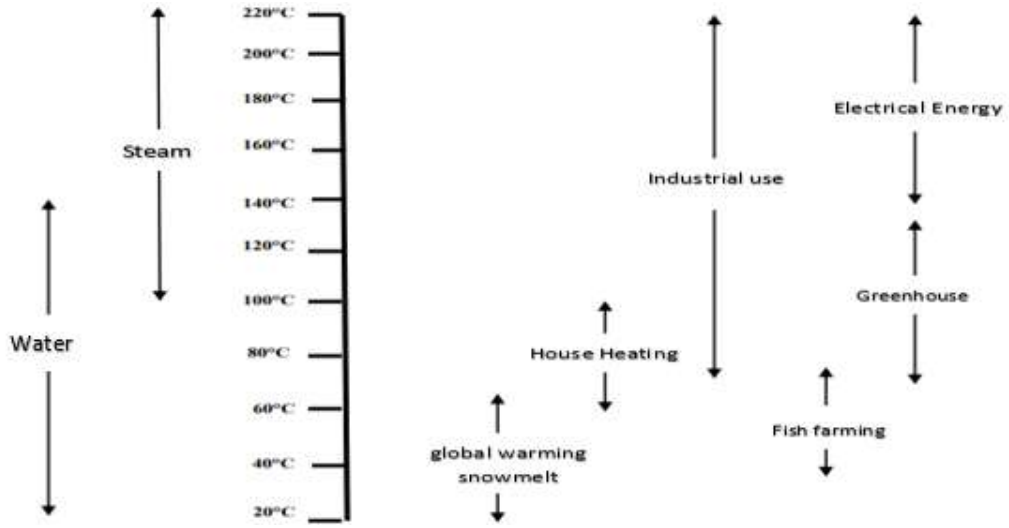

Figure 3. Areas of use of geothermal energy depending on temperature (Lìndal, 1993)

3. RESULTS

The achieved results are compared with the standards set in the study. In water, temperature directly affects all metabolic and physiological processes of organisms as nutrition, reproduction, movement, and distribution of organisms (Swami & Udhayakumar, 2007). During the study, changes in atmospheric temperatures ranged from 16.8 °C while the temperature of the thermal water samples resulted in average values for both stations 58.3 °C. Water samples with such high temperatures presented, shows in figure nr 2, flow directly into surface waters affecting in flora and fauna of the zone. From the balneological point of view,

the thermo-mineral waters of the Spas of Elbasan are part of the hyperthermia group. Hyperthermia is a group of waters, whose temperature is above the temperature of the human body. From a geothermal point of view, this water belongs to the springs of low enthalpy (fluid temp is <100 ° C).

Thermal waters have a high level of conductivity due to the salts contained in water. Conductivity values are above 3 DSS / m, which means that the content of salts dissolved in them is above the allowed norms. High conductivity affects negatively the growth of plants because it is closely related to the salt content in water (Israeli et al., 2008). In the analysis of thermal waters in the samples, the conductivity varies in the values 9780 µS / cm - 10070 µS / cm. The achievement results are compared with the studies and analyzes of the years 1995-2010-2019 and it seems that the values do not have a significant change. The electrical conductivity depending on heavy rainfall during the winter-spring period, coming from the melting of snow. The amount of water that comes, causes the number of dissolved salts to decrease.

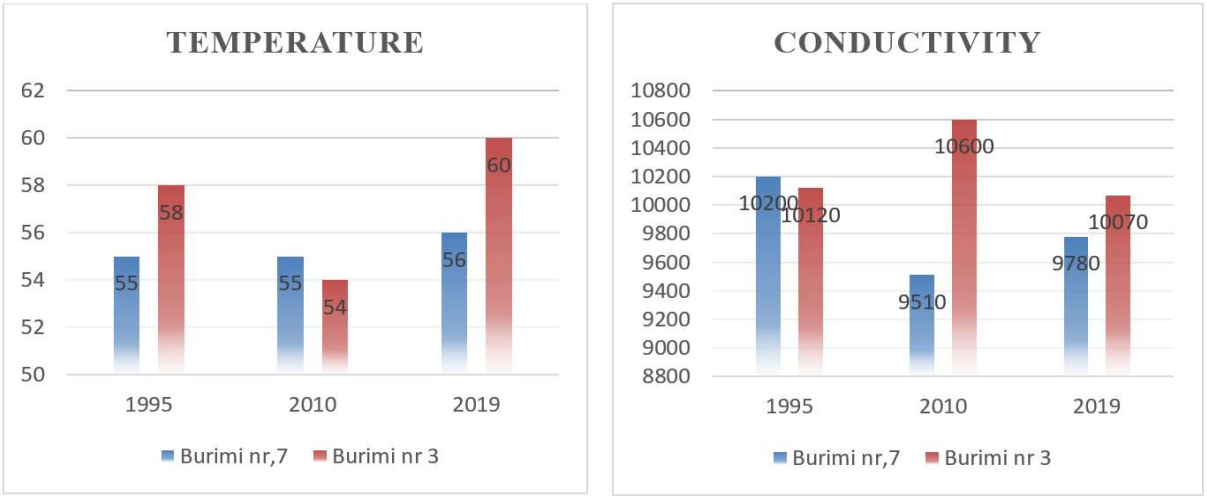

Figure 4. Temperature and Conductivity content in the period June 2018- April 2019, (compared to the values studied in 1995, 2010)

The pH analyzed in two samples taken in the field at two predetermined springs varies from 6.7 - 6.84. Therefore, these waters are neutral thermal waters. The pH in the thermal waters of Elbasan is balanced as the salts dissolved in these waters are considerable and the balance of anions and cations makes these waters more balanced (Chaplin et al., 1987). The pH is within the norms of irrigation water, according to FAO standards. If we compare the analyzes of the years 1995-2010-2019, we see that we have no changes in the Ph of water during these years. Usually, solid waste is found in nature in a dissolved form, then decomposes into positively and negatively charged ions. The presence of these dissolved solids directly increases the value of salinity and conductivity as salinity is a measure of the number of salt and conductivity in water is the ability of water to conduct an electric current with dissolved ions as conductors. The dry matter content in the thermal waters of Elbasan ranges from 7135.7 mg / l to 7134.6 mg / l. According to the change during the years 1995-2019, its values range from 6805mg / l to 7135.7 mg / l in the spas "Park Nosi" and from 6745 mg / l to 7134.6 mg / l in the spas "Hydra". We notice an increase in values in terms of dry waste in the waters of the spas of Elbasan.

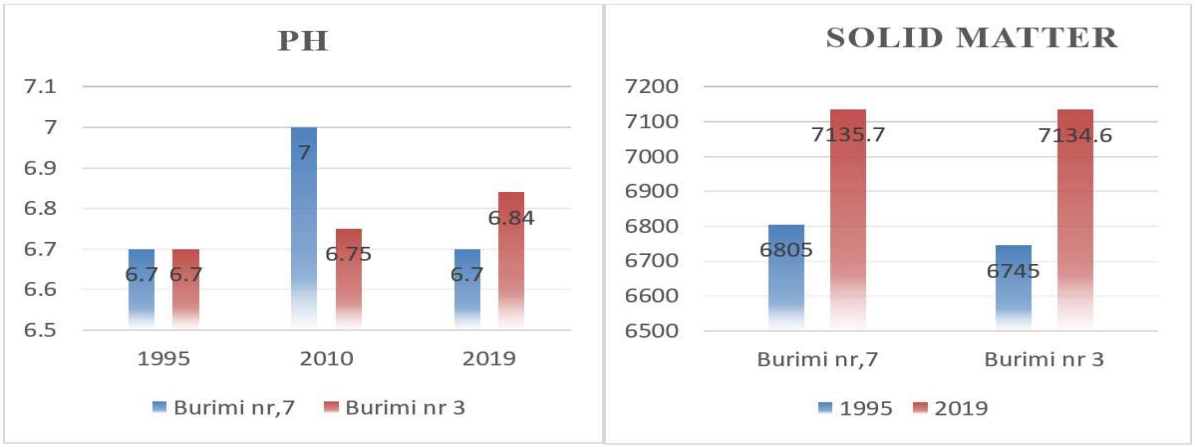

Figure 5. pH and solid matter content in the period June 2018- April 2019, (compared to the values studied in 1995, 2010)

In terms of H_2S content, we have no changes over the years, both springs have less than 1g / l H2S. Figure 6, shows that the average values of H_2S go below the value of 410 mg / l, resulting in the limit allowed according to the standards obtained in the study. However, it is always an environmental concern when allowed to accumulate in water bodies. In industrial processes, the corrosive effects of H_2S on the water often require control at much lower concentrations to protect equipment. The water sulphate content of thermal springs varies between 835.75 mg / l and 826 mg / l. These springs were noted for very high sulfur levels seen in the analyzes performed. In the first analyzes carried out by Avguinski in 1995, the values in the two sulfate sites ranged from 1778.3 mg / l to 1752.8 mg / l. As can be seen in figure 6, we have a decrease in sulfate content during the years 1995-2019.

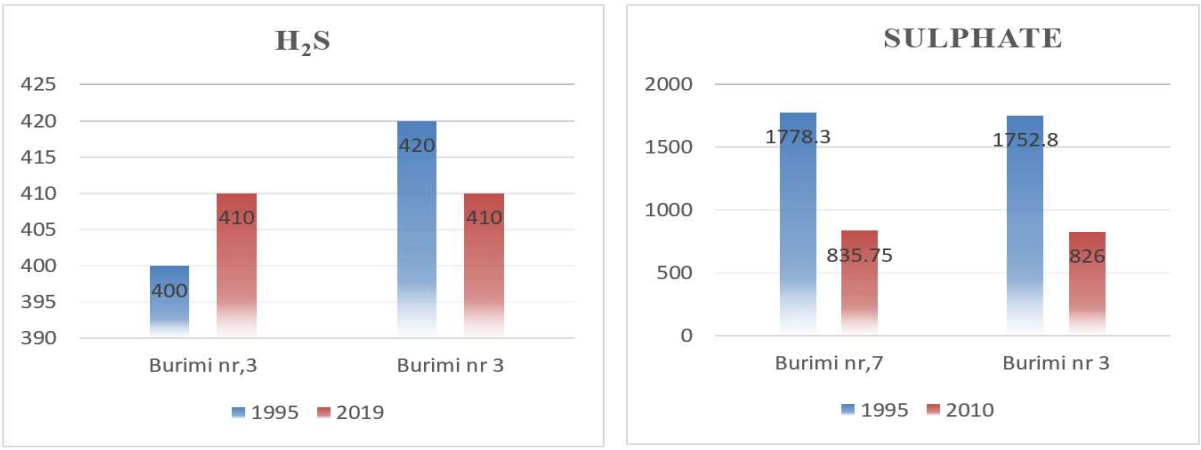

Figure 6. Hydrogen sulphide and sulphate content in the period June 2018- April 2019, (compared to the values studied in 1995)

Calcium is an important element in assessing water quality as it is closely related to water hardness. From the results achieved in the study, it has been observed that calcium is among the elements found at very high levels in the thermal waters of Elbasan. Values range from 889 mg / l to 928 mg / l in 2019 in the analyzes performed. In the years 1995, in the analyzes made the values in the springs "Park nosi" and "Hydraj" the values vary from 403.4 mg / l to 408.3

mg / l. The Ca content in the thermal waters of Elbasan has been decreasing. Magnesium is another important element, which is valued and affects the quality of thermal waters. The performance of its content in thermal waters during the years 1995-2019 is presented in figure 7. There are no changes in the composition of water in terms of magnesium content over the years. The level of magnesium content is higher in source no. 3 in "Hydraj" spas. The analyzed values range from 186 mg / l to 196 mg / l.

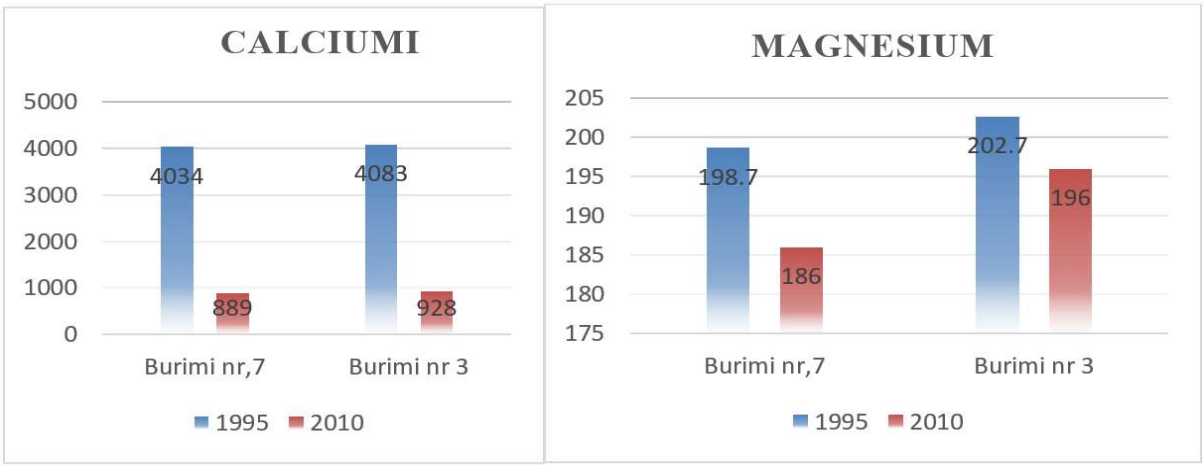

Figure 7. Calcium and magnesium content in the period June 2018- April 2019, (compared to the values studied in 1995)

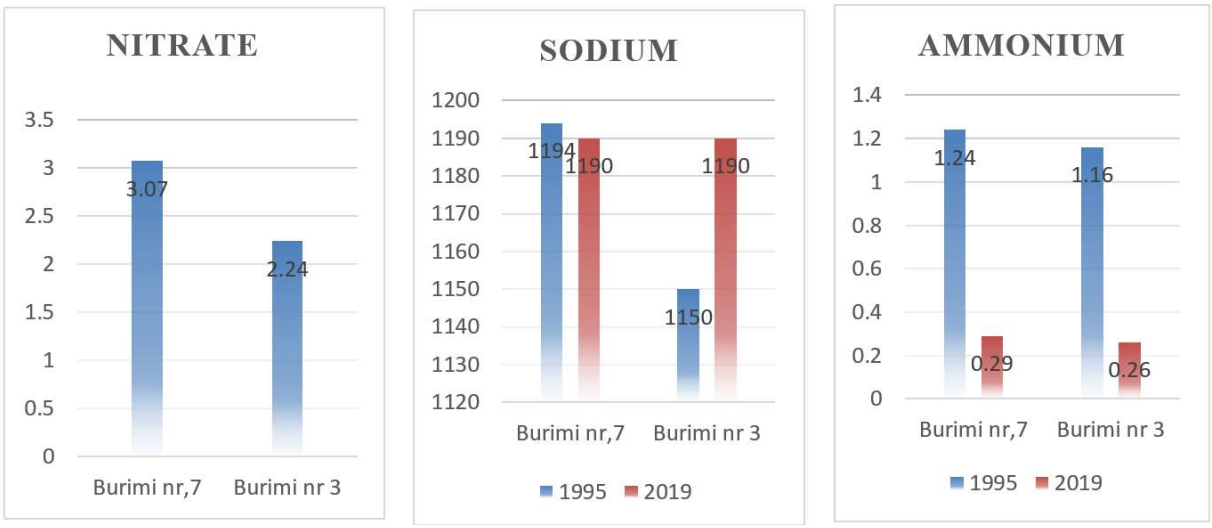

Figure 8. Nitrate, Sodium and ammonium content in the period June 2018- April 2019, (compared to the values studied in 1995)

From figure 8, it is clear that sodium is found in very high content, many times above the allowed norms in the thermal waters of Elbasan. Its content in the average values for both stations goes 1190 mg / l. Based on the results found in the study, we estimate that sodium during the study period has resulted above the allowed norms go tens of times more. This fact shows that the thermal waters of Elbasan are classified as waters with very high sodium content, making these waters very dangerous when used for irrigation or for flora and fauna of surface

waters where they are discharged. The study shows that the nitrate content is at low intervals compared to the allowed values. The average values of nitrates for the study period in both springs of water samples taken in the analysis go to 2.67 mg / l. The ammoniacal nitrogen content for the years under study is shown in the graph below. For the study period, the average values of the two sampling sites were 0.275 mg / l, thus indicating that the result obtained was within the allowed norms (below 5 mg / l). In 2019 have a decrease in ammonia in water.

The use of thermal waters is also related to the problems of protection and preservation of the environment. In the study area, thermal waters flow in nature, on the surface, and in the streams around the springs and Lake Tregan, polluting other surface waters, drinking water, industrial water, etc. Pollution of air with hydrogen sulphide and carbon dioxide, giving the unpleasant smell of rotten eggs. High water temperatures make possible the impoverishment of biodiversity in the area.

In the study area, thermal waters contain an average of 7.1 g / l of solid matter. It has an approximately high average encryption that affects plants in various ways as specific toxicity by a particular ion and higher pressure in the area around the roots, impeding the effective absorption of water by plants. Different plant species are more sensitive to high values of electrical conductivity.

4. DISCUSSIONS

Based on the above results we conclude that thermal waters have an impact on quality indicators of water use in health but also in irrigation. The temperature of the main thermal springs ranges from 50 to 60 °C, which classifies them as very hot. Water has a slightly acidic reaction or is neutral. The pH fluctuates around the value of 6.7 to 6.8. The springs of the Spas of Elbasan are classified with average salinization as the dry residue in most of the springs fluctuates around 7135.7 mg / l. The hydrochemical type of water according to the predominant compositions according to the analyzes performed is chloride - sodium sulfate - calcium. According to the sulfide content, the thermo-mineral springs of the spas are classified as very strong sulfides. The content of free carbon dioxide (CO2) fluctuates around 160-180 mg / l. Thermo-mineral waters are classified as weak carbon dioxide. The carbonate ions that are not dominant in thermo-mineral waters, caused by the stable pH value. These waters according to the TDS analyzed are named slightly salty waters. They are part of the sulfur springs as they hold a large amount of sulfur. The most significant of all the gases in the thermo-mineral waters of the area is hydrogen sulfide. Its healing amount is caused by the content of hydrogen sulfide ions and free hydrosulfide. Sulfur thermal springs offer health benefits when used in balneology and cure skin diseases, kidney, respiratory problems, gastritis, rheumatism, eczema and have to calm, relaxing, and stress-reducing effects. The thermal waters of Elbasan have a very high content of calcium and magnesium and are also classified as "dangerous" and for the high content of sodium. Sulfates and bicarbonates are found in very high contents in thermal waters. Since carbonates form insoluble salts in the soil, they negatively affect flora and fauna from the discharge of these waters to the surface ones.

5. CONCLUSIONS

Elbasan thermal springs are used only in the health tourism sector. The potential of these springs is not fully exploited as they meet all the necessary parameters (temperature, pressure, etc.) for other uses such as home heating.

Elbasan spas are the main economic resource in the administrative unit of Tregan as about half of the population deals with the activities of hotels and spa centers, therefore it is necessary a better tourism planning in European standards. Sulfates also make thermal waters dangerous, affecting plants and humans when (humans) are exposed for a long time to sulfur vapors in the environment around the thermal water source. Based on the values found in the study, thermal waters are not dangerous in terms of nitrate and ammonia content. The thermal waters of Elbasan spas have a very high salt content and are classified as high-risk waters.

Albania's geothermal springs are classified as low to medium enthalpy springs and have only one surface steam source. Identification, analysis, and assessment of the state of thermal water quality in the study area allow us to give some suggestions or recommendations for ensuring the best possible water quality, increasing their use and impact on healthy humans. This study recommends an integrated water resources management plan, which will require the involvement of all actors who will follow together with the path to better functioning for the use of these waters in improving health. Their regular monitoring should aim at implementing the criteria and achieving the standard parameters set by the national and international bodies. Initially, I recommend that these natural resources, of hot thermal waters, be returned to protected places, where more importance is paid to their maintenance or proper functioning in health, welfare, tourism, etc.

These waters must be treated before being sent to the drainage system and streams, rivers and lakes or to penetrate underground into geothermal reservoirs. The sensitivity of plants to high values of electrical conductivity (high values of water-soluble salts) is particularly high when plants are at a young age. It is therefore important to plant special species around these areas.

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

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EVALUATION OF THE BIOAVAILABILITY, TRANSLOCATION AND ENRICHMENT OF SELECTED HEAVY METALS BY SALIX PURPUREA GROWING IN MITROVICA MINING REGION, KOSOVO

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Abstract

Human activities such as metals mining and processing operations provide one of the most important sources of contamination in the environment. The aim of this study was to assess total concentration of potentially toxic metals (As, Cd, Co, Cr, Cu, Ni, Pb, and Zn) in the soil and plant samples of *Salix purpurea* collected form Mitrovica mining region, Kosovo. Results demonstrate that metal concentrations in soils are in general above the Kosovo average limits. The bioaccumulation, translocation and enrichment factors were used to examine uptake and accumulation patterns of selected metals. Two years period study showed heavy metals upgrade in roots, leaves and stems uptake from the mining damps and surrounding areas of the in Mitrovica Industrial Park. Observed interactions affect the uptake of metals by Salix purpurea as well as the degree of accumulation was presented using the Minitab 19 Statistical Software and the statistical analysis of response surface plots concentration characteristics and principal components analysis. The results indicate that there is an increasing need for further research mainly focused on the mechanisms of remediation whereby the *Salix purpurea* is able to survive in mining areas and contaminated soils.

Key words: Heavy metals, environmental assessment, bioaccumulation, translocation factors.

1. INTRODUCTION

The presence of mining waste, originating from the zinc extraction industry in Kosovo, is considered hazardous due to the presence and the mobility of toxic metals that it contains (Kerolli et al., 2015). Its open disposal in many tailing damps close to the urban areas has become a major environmental concern. Contamination of urban lands and other natural habitats by heavy metals has become a severe hazard to the environments (Huszar et al., 2020) Among various heavy metal contaminants, cadmium (Cd), lead (Pb), zink (Zn) and arsenic (As) are identified as one of the most significant pollutants due to its strong bio-toxicity and high transfer risk (Houri et al., 2020)

The dependence between metal concentrations in the soil and plants was observed in individual plant species due to the different degrees of absorption observed in individual plant species.

The case of willow material was mainly used to assess the levels of heavy metal pollution (Mleczek et al., 2009). Most studies concerning the evaluation of the bioavailability of heavy metals by plant take into the account the use of bioaccumulation, translocation and enrichment factor to present the potential environmental impacts and understand its potential as a challenge for the development of positive "green" image environmental protection. The presence of metals in soil depends on the chemical forms and the affinity to influence their reactivity and mobility (Caporale, & Violante, 2016). Thus, the presence of metals in the soil also defines their possible transfer into water or plants, known as "bioavailability". Therefore, plants remain an important indicator in determining the bioavailability of heavy metals and pollution in a *particular area*. According to Rosseli et al., different genotypes of the same species uptake different amounts of heavy metals (Rosselli, Keller, & Boschi, 2003). If plants accumulate >1000 or >10000 mg kg^{-1} of metals are categorized as metals hyperaccumulators (Yoon et al., 2006). Researchers report that metal and plant interact in a very specific way that is linked with soil type, plant, growth conditions and the presence of other ions (Houri et al., 2020; Mleczek et al., 2009; Caporale, & Violante, 2016; Rosselli, Keller, & Boschi, 2003; Yoon et al., 2006). Several methods such as bioaccumulation, translocation, Principal component analysis and correlation matrix have been used to assess soil and plant contamination levels with heavy metals (Kerolli et al., 2015).

The purpose of this study is to assess the heavy metal pollution levels of soil and plants in the vicinity of mining area in Mitrovica, Kosovo by applying the following methods such as the Bioconcentration factor (*BCF*), translocation factor (*TF*), Principal Component Analysis and to make a comparison of the obtained result with reference limited values and other research outcomes (Yoon et al., 2006; Kerolli et al., 2015; Sijakova-Ivanova et al., 2017).

2. MATERIALS AND METHODS

2.1 Sample preparation and chemical analysis

In the laboratory, soil samples were air-dried at room temperature, sieved through 2 mm size sieve, mixed and homogenized using coning and quartering method and stored in polyethene containers until analyzed. Determination of elements (As, Cd, Co, Cr, Cu, Ni, Pb, and Zn) in samples was developed with the use of assisted microwave digestion method ($HCl/HF/HNO_3/H_3BO_3$) and dissolution in aqua regia (HCl: HNO_3=3:1). A triacid wet digestion method was used to analyse the heavy metal content in plants. The procedure was following guidelines from the ICARDA's manual and Sijakova et al (Sijakova-Ivanova et al., 2017). In a 0.5 g of dry plant material was added 30 mL of tri acid mixture (nitric, sulfuric, perchloric acids – 10:1:4 ratio). Digestion was maintained under 250 ° C during 120 min. The filtrate solutions were used for analysing the heavy metals in roots, leaves and stem. The means of element content in soil and plant samples were determined using inductively coupled plasma - optical emission spectrometry (ICP–OES Optima 2100 DV). Certified reference materials (S JR-3 and S Jsy-1) for soil and the NIST 1575a (Pine Needles) and NCS DC 73350 (Leaves of Poplar) for plants were analyzed to test the accuracy of the applied method for determination of total metal concentrations in investigated soil and plants samples. The means and standard deviations (*SD*) were calculated using Microsoft Office Excel 2019 in a computer. The pH value in soil samples was measured following ISO 10390 standard (ISO 10390, 2005).

The background values and thresholds for heavy metals are used from *Administrative Instruction No. 11/2018 from Kosovo, w*hile the Vamerali et al. and Yanitch et al are used for heavy metals thresholds in plants (Administrative Instruction GRK No. 11, 2018; Vamerali, Banidiera, & Mosca, 2010; Yanitch et al., 2017).

2.2 Metal accumulation efficiency

To evaluate the metal accumulation efficiency in plants the Bioconcentration factor (*BCF*) and Translocation factor (*TF*) were calculated. The *BCF* is the ratio of the metal concentration in the shoots to the roots to that in soil:

BCF = metal concentration in plant shots (mg kg^{-1})/metal concentration in soil (mg kg^{-1}).

The ratio of stem/soil and leaves/soil was also calculated for all samples.

The *TF* is the ration of metal concentration in the shoots to the roots:

TF = metal concentration in plant shots (mg kg^{-1}) / metal concentration in plant roots (mg kg^{-1})

In addition to stem/roots, the ratio leaves/roots were also calculated.

Both factors *BCF* and *TF* as per Wu et al., have to be considered while evaluating whether a particular plant is a metal hyperaccumulator (Wu, Guan, & Zhan, 2008). Therefore, if plants have *BCF* and *TF* greater than one they have the potential to be used for phytoextraction. In the case when the *BCF* in Both factors *BCF* and *TF* as per Wu et al., have to be considered while evaluating whether a particular plant is a metal hyperaccumulator (Wu, Guan, & Zhan, 2008). Therefore, if plants have *BCF* and *TF* greater than one they have the potential to be used for phytoextraction. In the case when the *BCF* in plants is greater than one and the *TF* is less than one they still have the potential for phytostabilization. A hyperaccumulator plant is considered the plant that has to have *BCF*>1 or *TF*>1.

2.3 Statistical Analysis

The data were subjected to analysis of response surface plots concentration characteristics and principal components analysis using Minitab 19 Statistical Software.

A principal components analysis (*PCA*) is used as exploratory data analysis to study the correlations among a large number of interrelated variables by grouping the variables into a few factors. *PCA* interprets each factor according to the meaning of the variables and summarizes many variables by a few factors (Kerolli et al., 2015). In this study, *PCA* was used to elucidate the data to find the relationships between heavy metals in soil, roots, leaves, stem from the Mitrovica Region.

3. RESULTS AND DISCUSSIONS

The results of heavy metal concentration in soil and plant bioconcentration and translocation factors present the uptake and accumulation patterns of selected metals (As, Cd, Co, Cr, Cu, Ni, Pb, and Zn). Mostly, the higher uptake of metals from the soil and plant *Salix purpurea* was recorded in the area close to mining flotation and Mitrovica Industrial Park.

The mean of total contents of eight heavy metals in all six soil samples were found in the range of: As 48.91 – 881.26 $mgkg^{-1}$, Cd 5.48-238.57 $mgkg^{-1}$, Co 17.83-31.25 $mgkg^{-1}$, Cr 34.98-168.56 $mgkg^{-1}$, Cu 58.93-943.8 $mgkg^{-1}$, Ni 82.86-282.33 $mgkg^{-1}$, Pb 359.26-4662.22 $mgkg^{-1}$ and Zn 386.21-4482.26 $mgkg^{-1}$. As can be seen from Table 1, the concentrations of metals in sample 5 were higher than the concentrations of metals in all other samples.

By comparing the results with the limited values (Administrative Instruction GRK No. 11/2018), the obtained *results* showed to be quite high and above the limits in the areas close to mining and industrial zones. As it can be seen by the results of Samples 1 and 2 (Close to Trepca Mining Flotation) and Sample 5 (close to Mitrovica Industrial Park) the concentration of heavy metals in soil is higher and it decreases with the increase of the distance toward urban and vegetation area. The industrial activities and opened tailing damps in Mitrovica, Kosovo presents a serious threat to the environment and human health of the population in that area.

The mobility of heavy metals from mining solid waste including to urban and vegetation areas originate from multiple sources, including weathering, mining, metallurgy, manufacturing of metal-containing product and vehicle emissions (Rydergren & Montelius, 2005). Another source of contamination in the region is also coming from the presence of open tailing dump of mining waste situated very close to an urban area and very close to the main road frequented by numerous cars (Kerolli et al., 2015). As reported in other publications Mitrovica Industrial Park is also 3 km away from the lead smelter and the largest lead tailing in the country, it is also characterised with the influence of strong winds which have an important effect on the increase of heavy metal concentration in the area (Kerolli et al., 2015; Frese, Eske, & Pedersen, 2003/2004; Brininstool, 2010; Wu, Guan, & Zhan, 2008; Wahsha et. al., 2012).

The similar trend is also in the samples for *Salix purpurea*. The roots, stem and leaves of *Salix purpurea* have been analysed in six identified locations. The means of total metal content in all six *Salix purpure* samples for roots/stem/leaves were found in the range of As 1.09/0.04/0.06 – 25.89/16.97/17.75 $mgkg^{-1}$, Cd 6.36/2.67/2.29-37.2/10.8/17.7 $mgkg^{-1}$, Co 6.58/3.37/4.06-17.54/8.63/5.69 $mgkg^{-1}$, Cr 5.74/1.95/2.39-9.67/4.56/2.44 $mgkg^{-1}$, Cu 17.9/5.95/8.24-32.9/14.87/20.63 $mgkg^{-1}$, Ni 17.85/4.74/6.98-61.25/17.46/7.49 $mgkg^{-1}$, Pb 21.9/5.98/9.54-1986/387.28/598.96 $mgkg^{-1}$ and Zn 3045.65/1095.86/2950.9 $mgkg^{-1}$.

The results in Table1 shows a very high concentration of As, Cd, Pb and Zn in Sample 5 which is located close to Mitrovica Industrial Park and S2 located close to mining flotation area in Tuneli i Pare. *These results* are consistent with *other* studies that demonstrate substantial levels of heavy metals in soil and air in this area (Kerolli et al., 2015; Kerolli et al., 2015; Deconta. 2009; Rydergren, & Montelius, 2005; Frese, Eske, & Pedersen, 2004; Brininstool, 2010).

Table 1. The average concentrations of heavy metal in soil and Salix purpurea samples from Mitrovica region, ± se (range) and limited values (concentration unit is in $mgkg^{-1}$ dry weight)

	Sample ($mgkg^{-1}$)	As	Cd	Co	Cr	Cu	Ni	Pb	Zn
	Soil	351.69±1.5	29.36±2.1	27.29±0.4	42.39±2.1	187.34±1.4	94.52±2.4	388.38±2.4	658.73±2.3
1	Roots	12.63±0.1	6.36±0.7	8.68±0.02	9.67±0.53	22.91±1.3	61.25±2.1	30.92±2.6	546.13±0.02
	Stem	5.22±1.2	2.67±0.5	3.73±0.4	4.56±0.12	5.2±0.4	17.46±1.7	12.68±0.7	395.52±0.3
	Leaves	0.35±0.05	2.29±0.02	4.07±0.6	2.44±0.3	16.3±0.3	7.49±0.13	30.79±0.06	886.99±0.05
	Soil	640.05±1.3	76.65±0.5	17.83±0.9	58.23±0.9	148.1±2.6	195.24±1.5	4692.22±1.5	2867.78±2.1
2	Roots	25.89±0.06	13.67±0.5	8.73±0.7	5.98±0.05	32.90±0.8	32.87±0.07	1986±2.5	3045.65±1.6
	Stem	16.97±0.9	7.98±0.01	4.32±0.6	3.76±0.8	14.87±0.6	18.65±1.8	387.28±0.4	1095.86±2.6
	Leaves	17.75±0.06	10.93±0.5	6.45±1.7	2.95±0.12	20.63±0.16	27.72±0.19	598.96±0.25	2950.9±0.02
	Soil	452.21±1.9	21.73±1.8	18.32±1.9	34.98±1.4	116.66±1.8	82.86±1.2	1985.64±2.1	387.35±2.8
3	Roots	2.09±0.07	19.98±0.09	17.54±2.3	5.74±1.75	21.98±0.09	17.85±2.1	28.92±0.09	221.54±0.06
	Stem	0.98±0.4	8.65±1.5	8.63±0.06	1.95±0.32	5.87±1.01	4.74±0.07	7.98±1.4	108.98±2.7
	Leaves	0.18±0.05	15.21±0.8	5.69±0.2	2.39±0.17	10.97±0.17	6.98±0.03	19.94±0.14	194.95±0.21
	Soil	48.91±1.2	5.45±2.1	16.53±1.4	94.67±1.9	58.93±1.8	154.90±2.1	428.85±2.3	586.21±2.4
4	Roots	1.09±0.04	6.54±1.6	6.58±1.6	5.74±2.8	17.9±0.06	18.9±0.07	21.9±0.06	376.2±0.08
	Stem	0.04±0.9	4.39±1.09	3.87±0.08	3.74±0.04	5.95±0.5	6.98±1.8	5.98±0.5	196.8±0.05
	Leaves	0.06±0.05	3.82±0.21	4.06±0.3	2.26±0.03	8.24±0.03	8.52±0.36	9.54±0.27	238.39±0.17
	Soil	881.26±0.9	238.57±1.3	31.25±1.2	168.56±0.15	943.8±0.4	282.33±2.8	2091.74±2.6	4482.26±2.5
5	Roots	13.9±0.06	37.2±2.5	8.76±0.05	6.87±0.09	31.8±1.5	53.9±2.6	296.98±0.08	4747.8±2.4
	Stem	5.64±0.18	10.8±0.04	3.87±0.54	1.98±0.23	9.09±2.8	23.9±0.08	108.9±2.6	1876.4±0.5
	Leaves	8.82±0.3	17.7±0.25	4.32±0.4	2.56±0.03	18.54±0.21	31.36±0.25	197.38±0.18	2043.07±0.19
	Soil	320.17±0.6	14.26±1.4	21.98±0.5	67.9±1.3	98.95±1.5	124.59±2.1	259.26±2.6	2956.23±3.1
6	Roots	2.87±0.08	12.9±0.05	7.98±0.4	6.54±0.98	27.18±0.45	16.4±2.3	27.9±0.65	2794.9±0.05
	Stem	1.09±1.7	17.8±0.4	2.89±0.18	1.95±0.5	10.83±0.09	4.98±0.67	3.98±2.6	886.8±1.8
	Leaves	0.08±0.25	10.39±0.06	4.39±0.2	2.45±0.12	18.53±0.18	9.92±0.32	9.74±0.28	1559.75±0.5
	No. 11/2018 A-B*	30-55	3-12	20-240	300-600	200-300	300-600	200-300	300-500
	HM Threshold in plants ***	<5	2	15	2	40	30	20	150

Three - dimensional surfaces were plotted for the results of soil and *Salix purpurea* (roots, stem and leaves) for all six locations in the Mitrovica region in Kosovo (Figure 1). When comparing the plot of the results of soil with that obtained for the results of roots, stem and leaves of *Salix Purpurea*, it is possible to visualize that the region where the concentration of heavy metals is maximized is not the same in all graphs for each analyzed elements. The plotting of a function of all variables such as As, Cd, Co, Cr, Cu, Ni, Pb, and Zn are shown in Figure 1.

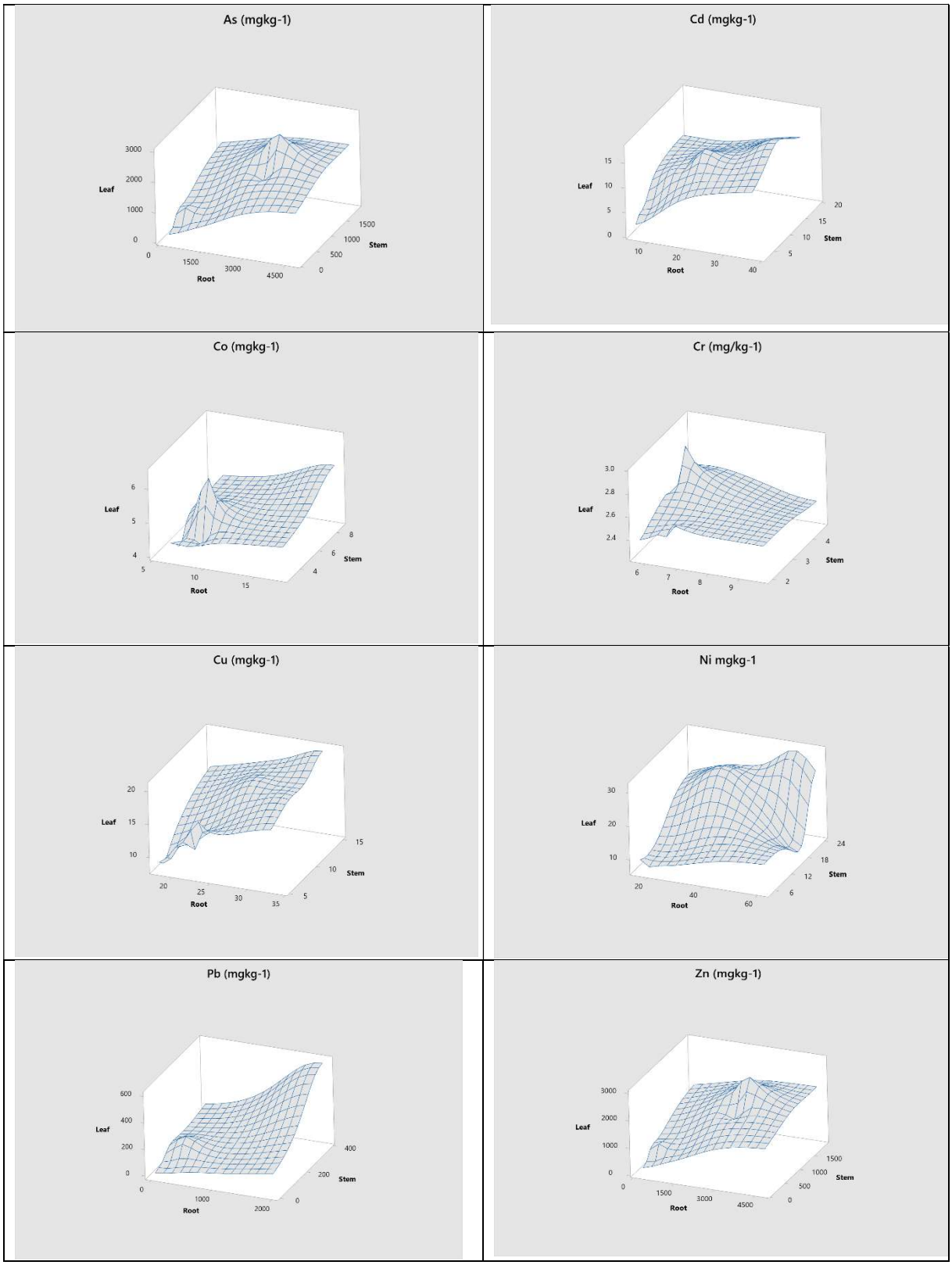

Figure 1. Response surface plots of the concentration characteristics of the heavy metals in roots, steam and leaves

Researchers report that the uptake of metals from the soil depends on different factors such as their soluble content, soil pH, plant growth stages, types of plants, etc (Wu, Guan, & Zhan, 2008; Rengel, 2015). Also, different plant parts accumulate different levels of heavy metals. This was confirmed in the case of *Salix purpurea* grown close to the mining area in the Mitrovica region in Kosovo. The pH values of soil range between 3.4 to 7.2 which present a suitable condition for the mobility of metals around the mining complex Trepca where acidity is low. Also, the bioconcentration factor (*BCF*) and translocation factor (*TF*) values >1 have been used to evaluate the potential of plant species for phytoextraction and phytostabilization of metals in soil (Sijakova-Ivanova et. al., 2019).

By comparing *BCF*and *TF* we can observe the ability of *Salix purpurea* grown close to the mining area in taking up metals from soils and translocating them into other parts of the plant. The results for the bioconcentration factor (*BCF*) for the ratio roots/soil, stem/soil and leaves/soil are presented in Table 2. While the results for the translocation factor (*TF*) for the ratio of stem/roots and leaves/roots are presented in Table 3.

Table 2. BCF for Salix purpurea from the Mitrovica locality

Samples	BCF	As	Cd	Co	Cr	Cu	Ni	Pb	Zn
1	Roots/soil	0.036	0.21	0.31	0.22	0.12	0.65	0.08	0.82
	Stem/soil	0.01	0.09	0.14	0.1	0.02	0.19	0.032	0.6
	Leaves/soil	0.5	0.08	0.15	0.06	0.08	0.08	0.08	1.34
2	Roots/soil	0.04	0.17	0.49	0.1	0.22	0.17	0.42	1.1
	Stem/soil	0.02	0.1	0.24	0.07	0.1	0.01	0.39	0.4
	Leaves/soil	0.02	0.15	0.36	0.05	0.14	0.15	0.13	1.03
3	Roots/soil	0.004	0.91	0.95	0.16	0.18	0.21	0.015	0.58
	Stem/soil	0.002	0.4	0.5	0.06	0.05	0.06	0.28	0.3
	Leaves/soil	0.0003	0.7	0.32	0.06	0.09	0.09	0.01	0.5
4	Roots/soil	0.022	1.2	0.39	0.06	0.3	0.12	0.05	0.64
	Stem/soil	0.0008	0.23	0.23	0.04	0.1	0.05	0.33	0.3
	Leaves/soil	0.001	0.7	0.25	0.03	0.14	0.06	0.03	0.4
5	Roots/soil	0.015	0.15	0.28	0.04	0.03	0.2	0.14	1.06
	Stem/soil	0.006	0.12	0.12	0.02	0.001	0.09	0.41	0.4
	Leaves/soil	0.01	0.07	0.14	0.02	0.01	0.11	0.01	0.45
6	Roots/soil	0.0089	0.9	0.9	0.09	0.27	0.13	0.1	0.95
	Stem/soil	0.003	0.13	0.13	0.03	0.1	0.04	0.3	0.3
	Leaves/soil	0.0002	0.7	0.2	0.03	0.19	0.08	0.04	0.52

Table 3. TF for Salix purpurea from the Mitrovica locality

Samples	TF	As	Cd	Co	Cr	Cu	Ni	Pb	Zn
1	Stem/roots	0.41	0.41	0.43	0.47	0.23	0.28	0.41	0.72
	Leaves/roots	0.027	0.36	0.47	0.25	0.71	0.12	1	1.62
2	Stem/roots	0.64	0.58	0.5	0.62	0.43	0.56	0.19	0.35
	Leaves/roots	0.68	0.78	0.73	0.5	0.62	0.84	0.3	1
3	Stem/roots	0.47	0.43	0.5	0.33	0.26	0.26	0.27	0.5
	Leaves/roots	0.086	0.76	0.32	0.41	0.5	0.4	0.69	0.87
4	Stem/roots	0.03	0.67	0.58	0.65	0.33	0.36	0.27	0.52
	Leaves/roots	0.55	0.58	0.61	0.4	0.46	0.45	0.43	0.63
5	Stem/roots	0.4	0.3	0.45	0.29	0.28	0.44	0.37	0.39
	Leaves/roots	0.63	0.48	0.49	0.37	0.58	0.58	0.66	0.43
6	Stem/roots	0.37	1.37	0.36	0.3	0.4	0.3	0.14	0.31
	Leaves/roots	0.02	0.8	0.55	0.37	0.69	0.6	0.35	0.55

The highest increase of *BCF* value was observed for zinc followed by cadmium and other selected metals for ratio Roots/ Soil, Stem/Soil and Leaves/Soil: Zn 1.1/0.6/1.34) Cd 1.2/0.2/0.7, Co 0.95/0.5/0.32, Ni 0.65/0.19/0.08, Cu 0.27/0.1/0.19, Pb 0.42/0.39/0.13 As 0.04/0.02/0.02 and Cr 0.22/0.1/0.06. The translocation factor (*TF*) results show the similar trend that this factor increases for the stem/roots ratio for As, Pb, Cd, Cr and Zn (Figure 2). The highest value of *TF* factor was observed for sample 2 for Zn and other selected heavy metals in leaves/roots ratio apart from Cr and Pb. The lowest value of the translocation factor (0.02) was calculated for As in samples 6 (Figure 3).

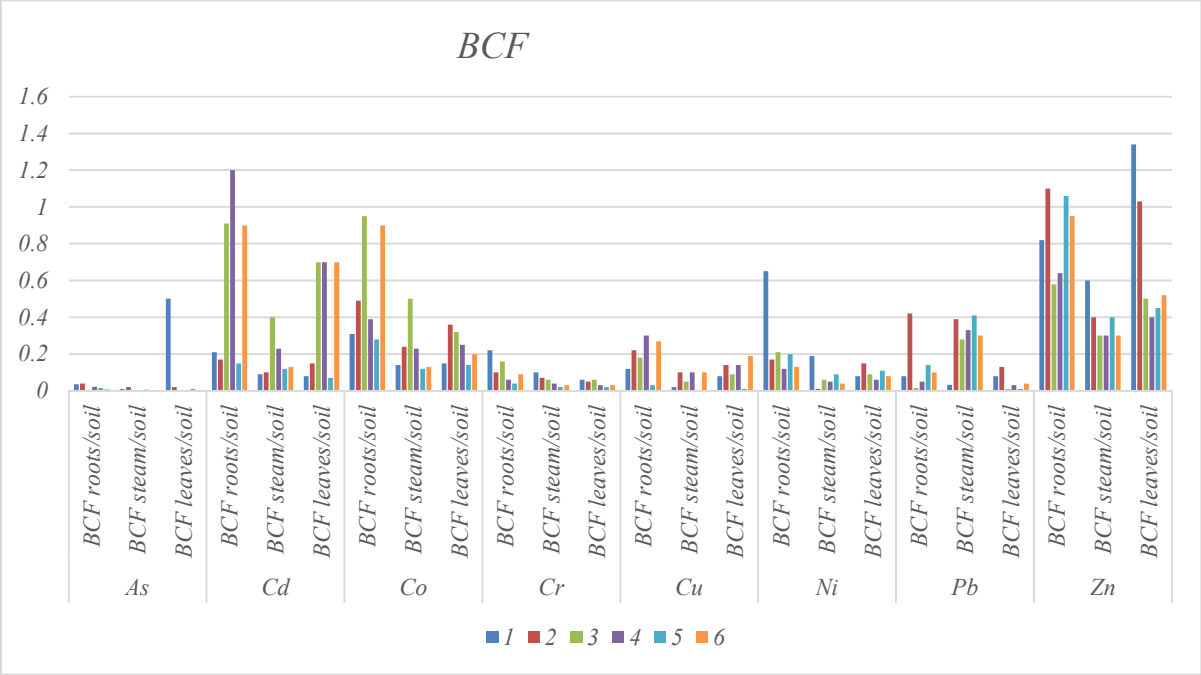

Figure 2. *BCF* for Salix purpurea from the Mitrovica locality

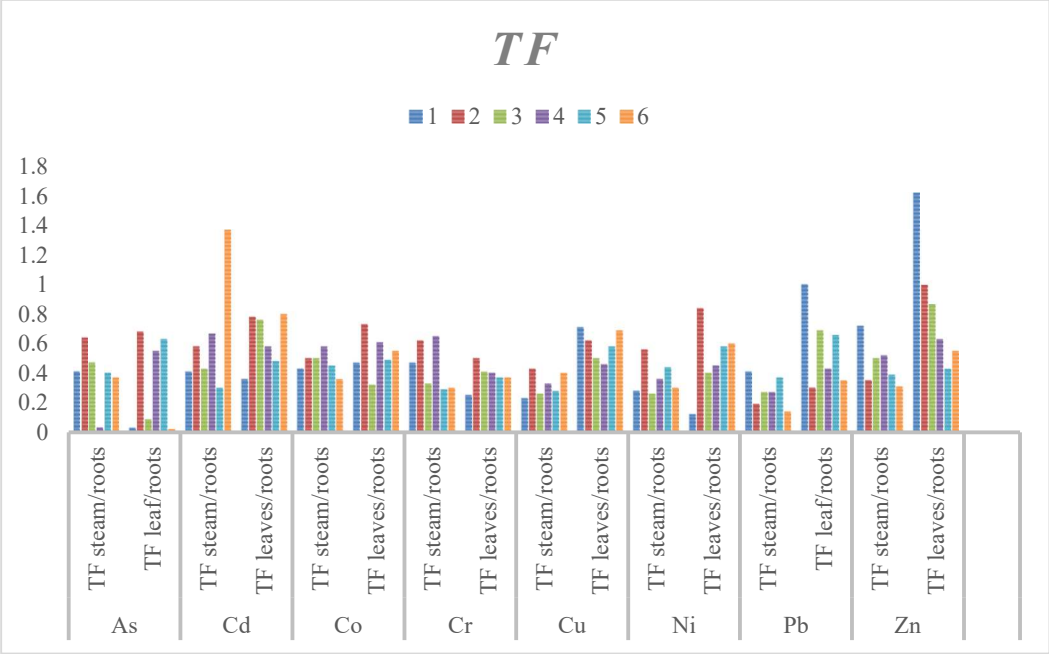

Figure 3. *TF* for Salix purpurea from the Mitrovica locality

To assess the relationship between soil and bioconcentration of metals in Salix purpurea a principal components analysis (*PCA*) was applied to evaluate the possible relevance of the major elements with the highest environmental impact such as Zn, Pb, Cd, Cu, Co, Cr, Ni and As. Two principal components (Factor 1 and Factor 2) were extracted through principal components analysis of each heavy metal of six soil and plant samples analyzed.

As shown in Figure 4, the determination of the relevance among heavy metals in soil and plant were grouped into two classes of components. The closest relevance was shown between Cd, Cu, Cr, Co and Zn and Ni and As and Pb on the other side. The relevance of the heavy metals supports the fact that Pb and As are more concentrated close to the Lead smelting area, while other elements are more concentrated on flotation and zinc smelter in Mitrovica Industrial Park.

Table 4. Principal Component Analysis for heavy metals in soil, roots, leaves, steam from the Mitrovica Region

	PCF1	PCF2
As	0.990378	0.032119
Cd	0.999611	-0.007349
Co	0.999201	-0.005337
Cr	0.998695	-0.044640
Cu	0.993996	0.078789
Ni	0.897482	-0.243843
Pb	0.989415	0.082134
Zn	0.085545	0.990274

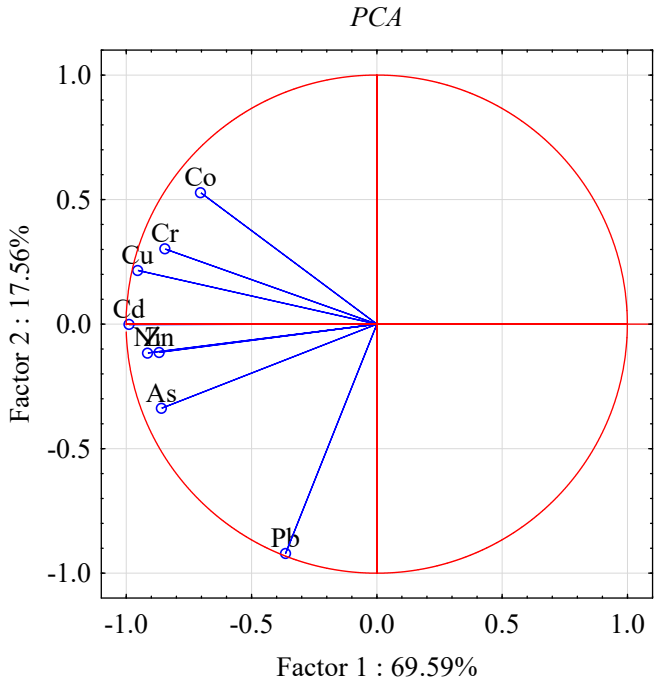

Figure 4. Principal components analysis (*PCA)* diagram for heavy metals in soil, roots, leaves, steam from the Mitrovica Region

4. CONCLUSIONS

The research showed that the soil and plant contamination in the Mitrovica region, Kosovo is highly affected by mining activities. Mitrovica urban area is facing a huge threat after the deposition of mining waste in open tailing damps without proper management. The mining waste located close to the urban area remains the major source of heavy metals mobility. Other observed results show that the uptake of metals by *Salix purpurea* as well as the degree of accumulation is high close to flotation and Mitrovica industrial park were the concentration with heavy metals resulted to be very high. The statistical analysis of response surface plots concentration characteristics and principal components analysis shows that heavy metals originated from anthropogenic mining sources.

The results also indicate that there is an increasing need for further research mainly focused on the mechanisms of remediation of the contaminated soil where the plants such as *Salix purpurea* can survive in mining areas.

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DETERMINATION AND STATISTICAL ANALYSIS OF THE PRESENCE OF ELEMENTS IN SOIL, HONEY, AND POLLEN IN THE REGION OF MITROVICA, KOSOVO

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Abstract

The study aimed to investigate the presence of the selected elements in soil, honey and pollen, and their distribution by using multivariate analysis. Geoaccumulation index (I_{geo}) was calculated in order to estimate the level of pollution of soil. Sixteen soil, honey and pollen samples each were collected in the region of Mitrovica, Kosovo. The content of elements was determined by using inductively coupled plasma – atomic emission spectrometry (ICP-AES) and inductively coupled plasma – mass spectrometry (ICP-MS). Moderate to strong pollution of Pb, Zn, As, and Cd was observed in soil. Increased contents of Pb in honey were found as well. The study revealed moderately to strongly pollution for Pb, Ni and Al, while Cluster analysis illustrated interconnection between the contaminants and the sites with major pollution.

Key words: Mitrovica, Kosovo, honey, pollen, soil, ICP–AES/ICP–MS.

1. INTRODUCTION

Under the influence of natural processes or human-driven ones, chemical elements frequently reach sites and concentrations in the environment locations, where can cause adverse effects on living organisms. It has been shown that metals can induce toxic effects on microorganisms (Rico et al., 2009, p. 92; Madoni, & Romeo, 2006; Gallego et al., 2007, p. 647) and wild and agricultural plants (Singh et al., 2016, p. 2; Küpper & Andresen, 2016; Clemens, 2006, p. 1708). Several researchers have shown various disturbing effects of heavy metals on human health (Jan et al., 2015, p. 29593; Yia, Yanga, & Zhang, 2011). The contamination of soils has been reported in many research cases (Šajn et al., 2013, p. 2; Stafilov et al., 2010, p. 896). Sources of contaminants emission are of varying nature, such as emissions from automobile engines in

traffic (Duong, & Lee, 2011; Li et al., 2007, p. 481), metallurgic industry (Kerolli–Mustafa et al., 2015, p. 162), fossil fuel burning (Yue et al., 2019, p. 145) and other urban processes. Metallic contaminants have been found in honey (Pacarizi, Berisha, & Halili, 2019) and honey bee pollen (Kalbande et al., 2008, p. 233) too. Elevated concentrations of heavy metals in soils, as compared to some background levels, are probably the most common indicators of pollution (Šajn et al., 2013, p. 2; Stafilov et al., 2010, p. 896). However, many other environment components have been considered for heavy metal pollution monitoring. Among these, honey and honey bee pollen are suggested as bioindicators.

This study was conducted in the region of Mitrovica-Kosovo, which is expected to be polluted with heavy metals as there are situated mines, lead-zinc smelter, and a batteries production plant. The determination of eighteen elements in soil, multi-floral honey and multi-floral honeybee pollen was performed with the focus on the presence of As, Cd, Co, Cr, Cu, Ni, Pb, and Zn. An evaluation of the contamination of the area was performed through statistical analysis of the acquired data.

2. MATERIALS AND METHODS

2.1. *Study area*

The sampling area was the region of Mitrovica which is located in the north of Kosovo and encircles 2077 km^2 as shown in Figure 1. The samples of soil, honey and honey bee pollen, were collected from 16 locations spread as homogeneously as possible (Figure 1). Locations of sampling were numbered as follows: 1 (Polac), 2 (Vajnik), 3 (Padalishtë), 4 (Klinë e epërme), 5 (Bukosh), 6 (Dumnicë), 7 (Frashër), 8 (Shupkofc), 9 (Mitrovicë), 10 (Kushtovë), 11 (Zveçan), 12 (Karaq), 13 (Zveçan), 14 (Kulla), 15 (Krushevle) and 16 (Leposaviç).

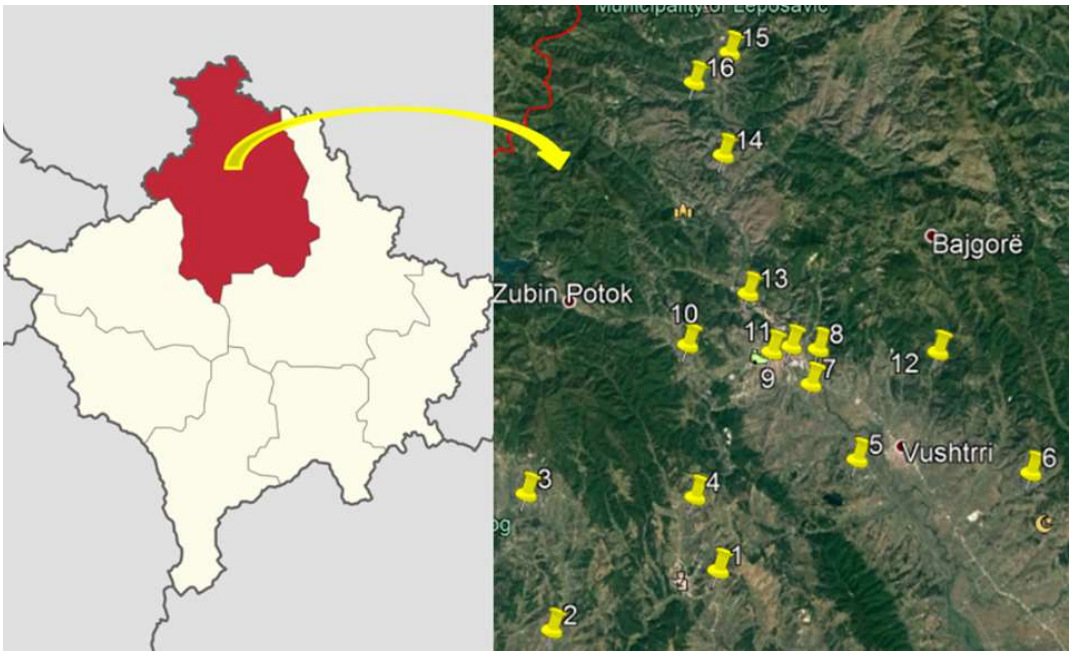

Figure 1. Sampling sites in the study area

2.2.Soil, honey, pollen sampling

At each sampling point representing non-agricultural land, about 1 kg of 3 to 5 soil subsamples in a 50 x 50 m area, were taken. The soil samples was put into plastic bags then dried in an oven at 45°C for 3 days. Once the soil was dried it was grinded, the subsamples were mixt to obtain a more representative sample and the obtained mixture was sieved through a 125 μm sieve. The sieved soil was put in plastic containers and stored until further treatment. Honey samples were collected directly from bee hives using a wooden spoon, and they were stored in plastic containers. To collect pollen samples, a plastic grid equipped with a recipient was put at the entrance of the hive so that the pollen was combed off the bees into the recipient. Pollen was also stored in plastic containers.

2.3. Chemical analysis

0.25 g of the soil sample was put into a Teflon beaker where 5 ml HNO_3 69% were added and it was heated until complete evaporation. After cooling 5 ml HF and 1.5 ml $HClO_4$ were added, and finally, after evaporation and cooling, 1.5 ml HCl and 3 ml redistilled water is added into the sample. The solutions obtained were then diluted to 25 ml in a volumetric plastic flask and were sent for analysis. Honey and pollen samples were digested in a microwave system; 0.5 g of honey or pollen was put in the Teflon tube where 7 ml HNO_3 (69% *V/V*, trace pure, Merck, Germany) and 2 ml H_2O_2 *p.a*. (30% *V/V*, Merck, Germany) were added and microwave digestion system (Analytic jena TOPwave) was applied. The solutions obtained were then diluted to 25 ml in a volumetric flask and were sent for analysis.

By the application of inductively coupled plasma – atomic emission spectrometry (ICP-AES, Varian, model 715ES) the following 13 elements were determined: Al, Ba, Ca, Cr, Cu, Fe, K, Mg, Mn, Na, P, Sr and Zn. An inductively coupled plasma – mass spectrometry (ICP-MS, Plasma Quant ICP-MS, Analytic Jena) was applied for the analysis of As, Cd, Co, Li, Ni and Pb. Standard solutions of the analysed elements were prepared by dilution of 1000 mg/L solutions (11355-ICP multi Element Standard).

2.4 Methods for estimating pollution indicators

In order to assess the level of pollution geo-accumulation index (I_{geo}) was calculated by using the following formula (Muller, 1969):

$$\text{Igeo} = \log_2\left(\frac{Cn}{1.5 \cdot Bn}\right)$$

where Cn is the measured content of metal n (in mg/kg) in soil, Bn is the geochemical background value (in mg/kg) of the element in the background sample and the factor 1.5 is introduced to minimize the effects of possible variations in the background values which may be attributed to lithogenic effects. Müller (1969) proposed the following descriptive classes for increasing I_{geo} values: I_{geo} >5 – extremely contaminated, I_{geo} from 4 to 5 – strongly to extremely contaminated, *Igeo* from 3 to 4 – strongly contaminated, I_{geo} from 2 to 3 – moderately to strongly contaminated, I_{geo} from 1 to 2 – moderately contaminated, I_{geo} 0-1 – uncontaminated to moderately contaminated, $I_{geo} \leq 0$ uncontaminated soil.

Microsoft Excel and SPSS 12 software was used to perform statistical analyses. Cluster analysis was used for investigating the similarities between major variables and heavy metals samples.

Evaluations of similarity were based on the average linkage between groups of Cluster analysis (CA) (Ferati, Kerolli-Mustafa, & Kraja-Ylli, 2015).

3. RESULTS AND DISCUSSION

3.1. Soil

Eighteen elements were determined in 16 soil samples collected throughout the region of Mitrovica collected at depths of 0-5 cm. The basic statistical parameters such as mean, median, minimum, maximum content, and standard deviation, were calculated and are presented in Table 1. The statistical parameters for honey and pollen samples are given in Tables 2 and 4.

An administrative instruction, was approved on 62 meeting of the Government of Kosovo, with the decision No.13/62, date 28.08.2018 (Administrative Instruction GRK no 11/2018). According to this instruction, polluted soil was divided into three categories when metal pollution is concerned; A – clean, B - acceptable contamination, but further investigation is required, and C - high contamination and needs to be cleaned. The median of the contents of Pb, Zn, Ni, As and Cr measured during this investigation fall in the category C, those of Cd and Ni are between A and B, whereas Cu median corresponds with category A.

According to the I_{geo} values (Muller, 1969), only samples No. 8 and 11 appeared to be extremely contaminated with Pb, then sample No. 8 and 14 were extremely contaminated with Ni and Cd, respectively. Sample No. 8 was strongly contaminated with As. The elements Co, Cd, and As were the least contaminants, followed by Cr and Zn, whereas Ni and Pb had the highest I_{geo} values (Table 4).

Table 1. Basic statistics of elements content (mg/kg) in the depth of soil 0-5 cm.

	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	P	Pb	Sr	Zn
Mean	22607.71	25.44	251.16	26570.47	1.37	17.11	174.74	41.02	24936.01	11653.19	7204.84	741.78	1868.04	199.24	751.84	487.18	87.86	224.50
Median	19331.20	8.16	247.07	11347.30	0.41	14.04	101.91	35.69	23287.45	11616.55	5451.64	553.31	1998.27	94.71	626.87	165.95	60.93	152.59
Min	8212.79	2.01	157.00	2344.43	0.10	4.23	45.75	16.55	14693.00	7619.37	2603.50	408.53	472.02	29.94	523.54	15.49	31.45	69.60
Max	46207.20	272.43	449.38	146582.00	8.80	71.58	1099.37	88.85	45381.50	15812.50	20450.40	1983.33	3415.10	1262.84	1672.62	3610.41	249.85	1115.68
STD	10426.78	66.21	86.97	37473.90	2.53	16.01	252.04	18.67	8466.38	2614.00	4850.27	407.32	944.08	295.60	315.93	896.53	62.22	253.79

Table 2. Basic statistics of elements content (mg/kg) in honey.

	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	P	Pb	Sr	Zn
Mean	2.59	0.04	0.09	19.06	0.02	0.01	0.23	1.57	5.87	858.10	15.59	1.36	3.53	0.14	39.25	0.54	0.10	0.80
Median	1.99	0.04	0.07	15.66	0.02	0.01	0.10	1.33	4.41	774.60	14.37	1.04	3.00	0.13	33.42	0.42	0.10	0.73
Min	0.49	0.02	0.01	8.84	0.01	0.00	0.10	0.52	1.93	121.40	3.22	0.15	1.79	0.02	17.70	0.05	0.04	0.18
Max	9.10	0.12	0.20	59.07	0.04	0.03	0.84	2.98	14.88	2398.34	33.50	4.47	12.58	0.22	79.90	2.10	0.28	1.90
STD	2.09	0.022	0.059	12.04	0.01	0.0075	0.24	0.798	3.88	593.94	8.92	1.24	2.47	0.053	17.39	0.50	0.06	0.53

Table 3. Basic statistics of elements content (mg/kg) in pollen.

	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	P	Pb	Sr	Zn
Mean	33.21	0.01	4.66	1234.38	0.05	0.13	0.28	6.61	58.97	3890.61	577.25	13.18	36.77	2.11	3632.96	0.43	3.09	26.01
Median	31.73	0.01	4.72	1193.53	0.02	0.12	0.28	6.63	59.39	4026.32	578.25	12.84	37.64	2.00	3779.95	0.20	3.27	26.55
Min	8.96	0.00	3.47	1018.12	0.02	0.06	0.28	5.66	21.99	2901.91	392.73	8.83	21.35	0.98	2503.12	0.14	1.99	16.56
Max	57.71	0.02	6.25	1753.03	0.15	0.23	0.28	7.65	94.33	4483.79	762.37	18.72	45.26	3.16	4517.14	1.69	4.50	31.74
STD	16.25	0.008	1.12	214.81	0.046	0.048	#DIV/0!	0.59	22.47	427.82	119.90	3.10	8.59	0.82	607.15	0.53	0.97	4.53

Hierarchical cluster analysis is presented in Figure 2. The dendrogram constructed by Ward's method revealed 6 clusters. The first cluster is associated with Ca, the second is associated with Al and Fe, the third cluster is that of K and Mg, the forth is represented by Zn, Cr, Ni, Mn, P, Pb, the fifth is Na, and cluster 6 is associated with As, Cd, Co, Cu, Li, Sr, Ba. Cluster 1, 2, 3, and 5 and 6 are mostly related to the geochemical composition of the soil (Administrative

Instruction GRK no 11/2018). Cluster 4 appears because of the anthropogenic activities, mainly from the lead smelter in Zveçan and Zinc smelter in Mitrovica, samples 9, 11, and 13.

Table 4. Geoaccumulation index (I_{geo}) of selected elements for each sampling site

S. No.	Igeo(As)	Igeo(Cd)	Igeo(Co)	Igeo(Cr)	Igeo(Cu)	Igeo(Ni)	Igeo(Pb)	Igeo(Zn)
1	-2.388	-1.170	-1.47	-0.70	0.88	2.10	1.02	-0.12
2	-0.711	-0.705	0.62	0.76	1.67	3.49	0.97	0.65
3	0.091	4.872	0.23	-0.75	1.45	1.41	-0.46	-0.10
4	-1.991	1.063	-0.36	-0.02	0.65	1.37	1.03	0.14
5	-0.274	-0.363	0.90	0.86	0.78	2.81	2.11	0.65
6	-0.359	-1.170	-0.93	-0.98	-0.24	0.15	-0.77	-0.16
7	-0.589	2.508	0.05	-0.20	0.46	1.34	4.16	1.92
8	4.697	5.290	0.36	0.21	1.85	2.14	5.19	2.20
9	-1.032	-1.229	-0.90	-0.12	0.88	1.64	2.40	1.12
10	-0.367	2.047	0.57	1.18	0.87	3.36	-1.16	0.34
11	1.608	2.138	0.29	0.41	2.19	1.89	6.71	3.84
12	-0.858	-0.595	-1.13	0.08	0.71	1.16	1.54	1.83
13	0.017	1.830	0.26	0.15	0.55	1.71	3.45	0.92
14	-0.979	1.769	2.61	3.61	0.99	5.55	4.34	1.80
15	0.028	0.013	1.38	1.36	1.07	3.25	2.87	1.02
16	0.045	0.658	0.27	0.46	0.48	1.72	3.01	1.02

Heavy metals clustering in soil samples

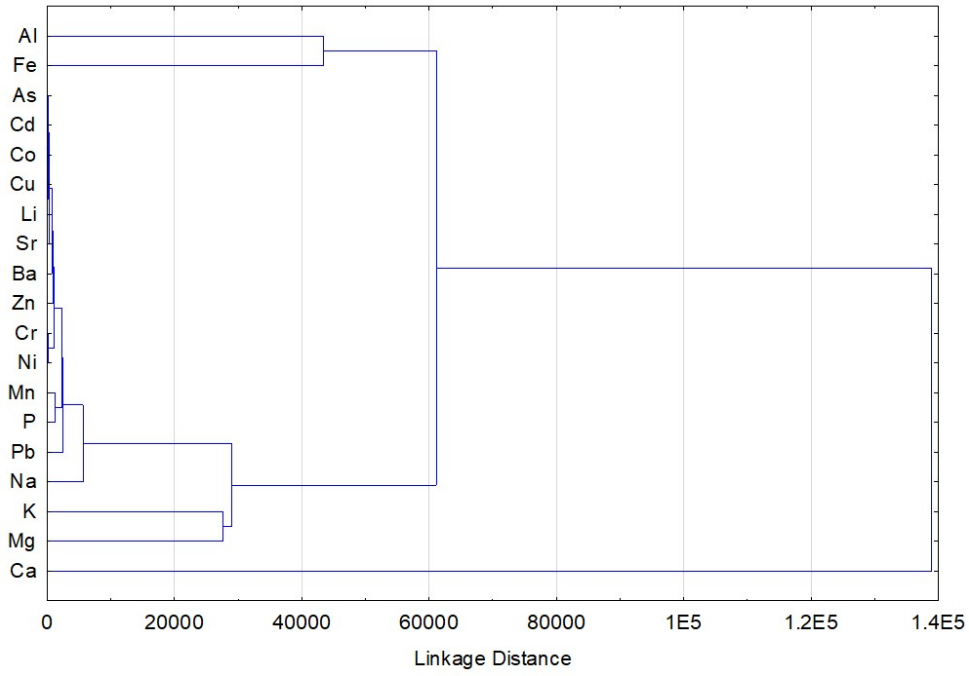

Figure 2. Hierarchical cluster dendrogram for heavy metals in soil

3.2. *Honey*

Multifloral honey samples were collected at the same locations as soil ones and the basic statistics are given in Table 2. The most present of eight selected heavy metals in honey was Cu, with a median of 1.33 mg/kg and a maximum concentration of 2.98 mg/kg. According to the Food and Agricultural Organisation and World Health Organisation (FAO/WHO) (Codex

Alimentarius CXS 193-1995), the maximum content of As, Cd and Pb permitted in food are different for different foods (there are no national standards for heavy metals in food, or honey and pollen particularly, in Kosovo). For As the permitted maximum concentration in foods ranges from 0.1–0.5 mg/kg, for Cd the permitted concentration range is 0.003–2 mg/kg, and for Pb 0.03–0.4 mg/kg. The median content of Pb (0.42 mg/kg) is a little higher than the maximum permitted by FAO/WHO recommendation (0.4 mg/kg), while the values of As and Cd medians are quite lower than the maximum contents recommended by FAO/WHO for these metals. However,, Pb content in samples from many different sampling sites exceed the maximum recommended value of 0.4 mg/kg.

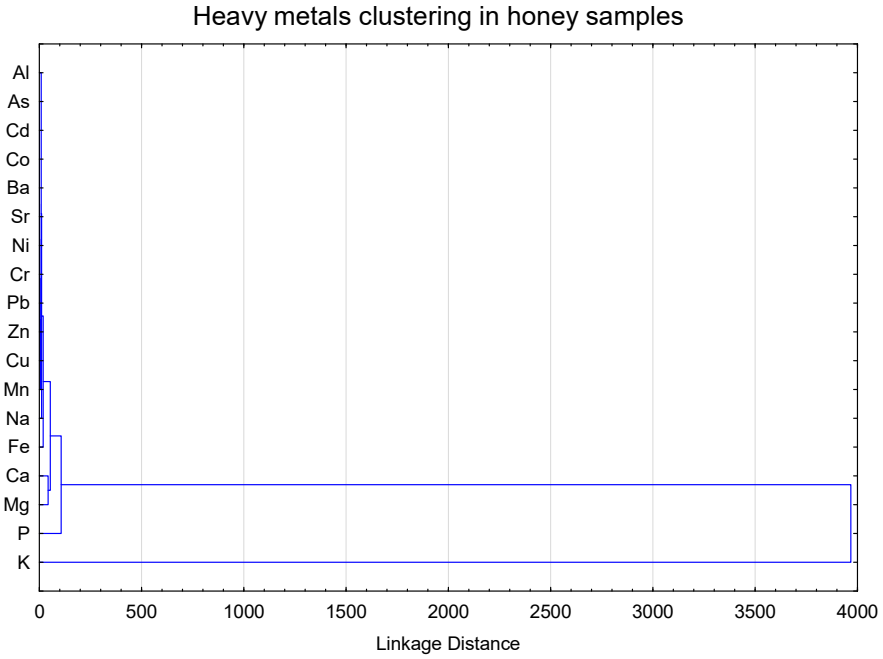

Figure 3. Hierarchical cluster dendrogram for heavy metals in honey

The hierarchical clustering analysis is presented in Figure 3, and four clusters can be identified. Potassium stands out of all elements and forms the first cluster. It is the most abundant element of honey with a median of concentration 775 mg/kg, followed by P (33.4 mg/kg), Ca (15.7 mg/kg), and Mg (14.4 mg/kg) which fall in the cluster 2 (P, Mg, Ca, Fe, Na, Mn). The third cluster is represented by Cu, Zn, Pb, Cr, Ni, Sr. The highest concentrations of five of the heavy metals Cu, Zn, Pb, Cr, Ni, are mostly observed in samples around the cities of Mitrovica and Zveçan where lead and zinc smelters are located, indicating obvious anthropogenic origin. The fourth cluster consists of Al, As, Cd, Co, and Ba. Here again, Al, As, Cd, Co, tend to be more concentrated in honey samples 7 to 13 which are closer to the industrial ore processing facilities around the city of Mitrovica.

3.3 Pollen

The basic statistics for the content of the analysed elements in pollen samples are shown in Table 3. Minerals are permanent constituents of pollen and elements such as K, Ca, P, Mg, Zn, Fe, Mn, Cu, Na, Cr, are frequently reported (Thakur,& Nanda, 2020; Aldgini et al., 2019). In this study, the minimum and maximum contents of some of these elements in mg/kg were:

2902-4484 (K), 2503-4517 (P), 1018-1753 (Ca), and 393-762 (Mg). According to FAO/WHO (Codex Alimentarius CXS 193-1995), the maximum concentration of As measured in the region of Mitrovica, was under the minimum concentration permitted in some foods which are 0.01 mg/kg. Cd and Pb exceeded the minimum concentrations set for some foods, which is 0.03 mg/kg for Pb and 0.003 mg/kg for Cd, but were lower than their permitted maximum of 2 mg/kg and 0.4 mg/kg respectively.

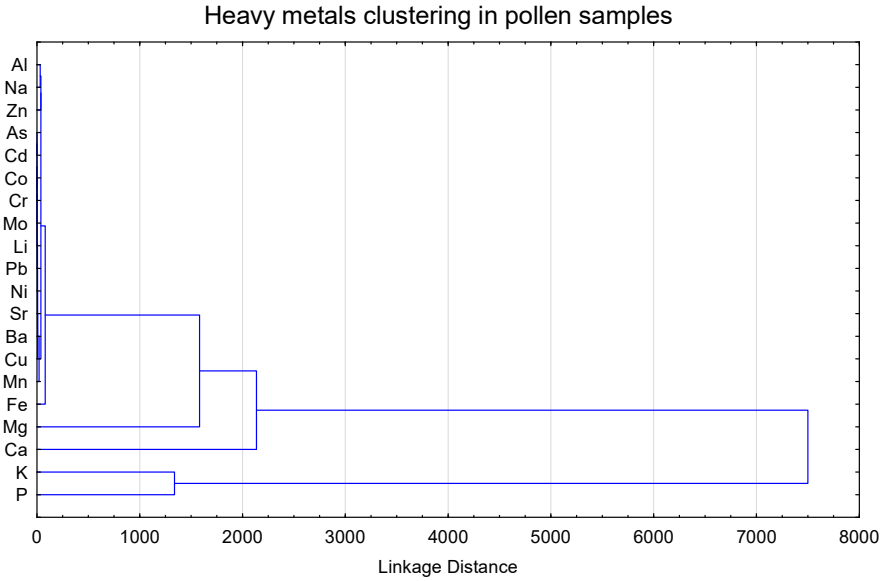

Figure 4. Hierarchical cluster dendrogram for heavy metals in pollen

The cluster analysis with Ward's method revealed 4 distinct groups of elements in pollen (figure 4). The first group is formed by K and P, the second is Ca and Mg, Fe alone constitutes the third group, and the largest group is constituted of Mn, Cu, Ba, Sr, Ni, Pb, Li, Mo, Cr, Co, Cd, As, Zn, Na, Al. The first and second group are of natural origin and the third also. Group 4 includes elements which are not used during any industrial process in the area of investigation. However, Pb and particularly Zn are indicators of pollution because of mining and ore processing activities, as well as elements which can be associated with their ores.

4. CONCLUSION

Extremely high contents of Pb, Zn, and Ni in soil samples were found around the lead-zinc smelter plant. Arsenic and Cr were also present at very high contents at the locations close to ore processing facility in Mitrovica. Pollution indices showed values indicating not polluted areas, moderately polluted areas and extremely polluted ones, particularly with lead and zinc. Lead content in honey was beyond the maximum permitted limit in foods set by FAO/WHO in 9 samples, whereas arsenic only exceeded the maximum permitted value in two samples. Cadmium also was present at a higher content than the maximum permitted values only at one sampling site. Cluster analysis revealed groups of elements related to sources of pollution, and also those that are usually expected to be of geogenic origin. It can be said that the soil in the region of Mitrovica, mostly around the industrial facilities is highly polluted with heavy metals. In honey and pollen samples lead content is concerning and zinc is particularly high in pollen.

Since this is the first research on honey and pollen in the entire region of Mitrovica, more research should be conducted so as to more thoroughly evaluate the contamination situation of these two natural products. Lead/zinc smelters in Mitrovica do not operate since 2000, however the ore concentration process should be improved to reduce emitted dust. Clearly a strong source of pollution are tailings dumps, as fine particles are transported from them towards the surroundings. To prevent the spread of pollution form those dumps they could be covered with unpolluted soil or concrete. Another possibility is to transport the tailings into the cavities created in more remote areas during gravel excavation and cover them with soil.

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CAN COOPERATIVES HELP TO INTEGRATE SMALL FARMERS IN MODERN VALUE CHAINS?

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Abstract

Vertical coordination in agri-food chains is a significant and increasing phenomenon in CEEC. It is observable that this development prefers large scale production. However, in these countries the agricultural sector is still a mixture of small scale and large-scale farming. Hence, for small scale farmers, horizontal collaboration can be assumed to be a prerequisite to stay in the market. Therefore, the main aim of this paper is to investigate the question whether co-ops are the appropriate approach to integrate small farmers into modern supply systems. Further we want to analyze how co-operatives can cope with the quality demands they face in modern distribution channels.

Key words: Vertical coordination, small holder, cooperatives, agri-food business.

1. INTRODUCTION

For transition countries of Europe and Central Asia Swinnen (2005) shows that vertical coordination in agri-food chains is an important and growing phenomenon. He also indicates that in these countries it is even more wide spread in scope and complexity than in western economies. A major reason for verticalisation is that in order to overcome disruptions of supply private contractual initiatives were formed. In this course traders, agribusinesses and food companies contracted with farms and provided imputes and assistances in return for guaranteed and quality supplies (Dries and Swinnen, 2005; Gow and Swinnen, 1998; Swinnen, 2005). Particularly quality can be regarded as a main source that catalyzed the development (Gorton et al. 2006). The transition process of the retail sector from state-run retail shops and retail co-operatives and farmer markets to western style large format retailers was accompanied by heavy foreign investments and therefore also by changes in the procurement systems.

One of the best examples for such development in retail sector is evolved in Hungary, which started in the 1990's. In 2002 modern retail formats accounted already for around 50 % market share (BBE, 2006). The rapid development of modern retailers was accompanied by heavy investment of western retailers in Hungary. In 2005 foreign retailers were dominating the Hungarian retail market (LZ, 2007). Because the 'big players' in retail markets are more or less identical with those in Western Europe today no significant differences in regard to

procurement systems and quality demands and thereby vertical coordination can be found (Hanf and Pieniadz, 2007). The agricultural sector in CEEC is still a mixture of small scale – even household – production and large-scale farming. In order to lower the complexity of their supply chains retailers and processors favor large scale production. Yet, the findings of Dries and Swinnen (2004) show that small scale farmers find their place in vertical coordinated chains. However, we have been told by some international retailers that they demand from small scale farmers that they have to build horizontal cooperation providing products that are meeting the qualitative and quantitative demands of the retailers. If these demands are not met farmers are excluded from the procurement systems.

Horizontal collaboration can therefore be assumed to be a prerequisite for (small scale) farmers to stay in the market. Co-operatives as the traditional form of horizontal cooperation are often discussed. Nevertheless, on several occasions we observed that in this context the advantages of co-ops have been eluded upon but their problems have not been addressed. This seems to be strange since many scholars have shown that particularly co-ops have a hard time to cope with quality demands. Therefore, the question arises if co-ops are the right approach to integrate (small) farmers into modern supply systems?

2. VERTICAL COORDINATION AND ITS CONSEQUENCE ON SMALL HOLDER

Reforms in the transition countries have caused a decline of agricultural output and decapitalization of the agricultural production system (Dries et al 2009). As a result the food and agricultural commodity value chains have undergone a tremendous change in the last decades (Swinnen and Maertens, 2006). During the transition process in Central and Eastern Europe, relationships along the whole food chain - from farm suppliers to retailers – have broken down. The result has been disruptions of supply and inferior-quality food products. At the same time, changes in consumer demand as well as the accompanying entry of 'western' investors (retailers and processors) necessitate significant reforms and adjustments in the structure of food commodity chains in order to overcome these problems. Today, foreign retailers are in leading market positions. The retail sector's transition from state-run shops and cooperatives and farmer's markets to western-style, large format retailers was accompanied by heavy foreign investments. Transition countries have embraced the new retail format to varying degrees. Dries et al. (2004) refer to this concept as 'retail waves'. They characterized "first wave" countries as those whose supermarket sector went from a tiny niche of about 5% in the mid 1990s to 40% to 50% by the mid 2000s. Examples include Hungary, Poland, and the Czech Republic. They defined "second wave" countries as those in which the sector grew to a share of 20% to 30% e.g. Bulgaria or Croatia. "Third wave" countries are those in which the share remained in a 'luxury' niche of 5% as for example in Russia. Although the market shares occupied by retailers have increased significantly, differences between the retail structures within these categories still exist. However, for almost all transition countries, there is evidence that foreign retailers are either already dominating the market - for instance, in Hungary eight of the top ten retailers are foreign owned - or that foreign retailers occupy leading positions- e.g. in Russia the German Metro Group is already the second largest retailer. Foreign retailers and investors 'export' their business models. In the context of internationalization it can be observed that 'western' retailers and processors are taking their own business models into the new markets (Hanf and Pieniadz, 2007; Palmer, 2005; Roberts, 2005). Thus, one can say

modern management concepts and their demands on the business partners are exported. For example, in the retail sector this results in the following changes: The traditional, local, store-by-store procurement must be shifted to centralized, large, and modern distribution centers and external specialized logistic firms must be used. Furthermore, modern retailers set their own private standards of food quality and safety that are often much higher than those of national governments (Dries et al., 2004). Fulponi (2006) argues that private standards will become even more prominent in upcoming years as we observe increased market concentration and buying power of the retail sector as well as its integration with financial markets. Investment by foreign companies in the sector can induce significant structural change. The requirements of the newly established procurement systems demand that suppliers are able to guarantee both disruption-free product flows and delivery of products of a certain quality. Thus, domestic producers must keep up with quantity and quality expectations. Otherwise, products will be imported (van Berkum, 2005).

In general, vertical coordination refers to the synchronization of successive stages in the vertical marketing channel from producers to consumers to overcome problems of supply and quality. It does not include transactions on spot markets, where the commodity exchange is based on a price agreement only. It includes both productive partnerships (contracting) as well as vertical integration (Swinnen and Maertens, 2007). One can assume that the higher the priority to secure quality and/or quantity of raw materials is, the stronger is the shift from spot market transactions towards advanced vertical coordination mechanisms. Productive partnership is a kind of vertical integration, characterized by collaborations of independent firms, in which the partners share interests as well as knowledge and resources to improve the outcomes of the supply chain activity. It can take different organizational forms: from loose or tacit agreements to stable, long-term, and trust-based cooperation contract (World Bank 2005b). The design of partnership depends on the strategy of the contracting initiators. Structured finance instruments are contractual arrangements to provide farm assistance. They are utilized to achieve the (shared) objectives of vertical coordination (i.e., securing the quality and quantity). In general, structured finance instruments are applied to improve farmers' access to basic production factors (capital, specific inputs) or know-how/information (knowledge and experience) (Götz et al 2009). Structured finance instruments can take three main forms: bilateral contracts, complex contract systems (e.g. triangular agreements), and vertical integration. Bilateral contracts are contracts between two partners, e.g. a farmer and a processor or a farmer and an input provider. Triangular agreements include three partners, e.g. a farmer, a processor and a bank. Vertical integration is regarded as both a particular kind of structured finance instruments and an organizational form aiming at overcoming the quality/ quantity problems within a single firm (World Bank 2005b). Vertical integration combines different levels of the value chain within one firm, via replacement of various market transactions with internal, intra-firm transactions. This can be achieved either by forming a subsidiary or by merger or acquisition. In vertically integrated firms, management directives dictate the transfer of resources across stages (Swinnen, 2005).

The key for all types of vertical coordination is contracting. Marketing contracts only address the issue of supply disruptions by private contractual initiatives (Dries and Swinnen, 2005; Gow and Swinnen, 1998) whereas production contracts address quality concerns (Gorton et al. 2006). These contracts vary in control allocated and risk transferred across stages. In marketing contracts, the contractor and producer may negotiate delivery schedule, pricing method, and

product characteristics. The contractor usually provides a market for the goods but engages in few of the producer's decisions. In production contracts (resource-providing contracts), the contractor provides a market for the goods, engages in many of the producer's decisions, and retains ownership of important production inputs (Martinez and Reed, 1996). For both types of contracts Swinnen (2005:1) states that "these private contract initiatives can be quite substantial". Empirical evidence indicates that they include farm management assistance, extension services, quality controls, farm input assistance programs, trade credit, and even bank loan guarantees. The programs generate important improvements in the credit situation of the farms, as they contribute directly to improved access to finance (e.g. through trade credit), and indirectly as they improve contracting farms' access to loans from banks or external financial institutions (through loan guarantees, enhanced farm profitability, and improved future cash flows). Summing up, there are different factors influencing participants towards contract arrangements. The main motivating factors for farmers are the following, as reported by the USDA (1996): I) income stability (to reduce risk compared to other ways of selling on traditional marketing channels); II) improved efficiency (management decisions are transferred to the farmers); III) market security (entering the contract provides a certain security in that the product will be sold if it meets with the requirements); IV) access to capital (contractor often provides inputs for farmers, which reduces the usage of credits). Main reasons that processors enter into contracts include the control over input supply. Further, processors use contracts in order to achieve uniformity and predictability to suit consumers, but they also benefit from lower costs in processing, packing, and grading (Boland et al. 2002, Drabenstott 1999, Sykuta and Parcell 2003, Tsoulouhas and Vukina, 1999). However, two reasons for the breaching of contracts have been detected. First, producers mistrust their buyers and are afraid they will not be paid. Second, they may not be able to fulfill a contract because they cannot access basic production factors (Gow and Swinnen 1998).

Contract enforcement is still an important problem. In the World Bank study (2005) the enforcement problem was regarded as one of the most important barriers for successful vertical coordination. However, in some cases public enforcement institutions are not fully functioning. Furthermore, since transition countries are often described as having limited social capital, there is also an absence of societal enforcement mechanisms (e.g. peer or community pressure, a sense of mutual obligation, an overall sense of distrust). Thus, in order to improve the farmer's access to basic production factors (capital, specific inputs) and know-how/information (knowledge and experience) means have to be worked out and put down in writing i.e. contracts have to be signed. Such means can be subsumed under farm assistance. Farm assistance can have many faces. Vertical Coordination aims to overcome the disruptions in supply and inferior-quality products. However, the key actors (retailers and processors) find themselves constrained not by their own capital capacity but by that of other participants along the chains on which they depend for critical inputs. This is because traditional lending institutions such as banks do not give credit to enhance the interfirm product flow. Overall, farm assistance can include input supply programs, investment assistance, trade credit, bank loan guarantees, extension and management advisory services, etc. (World Bank 2005). Thus, farm assistance programs must be accompanied by appropriate governance mechanisms. Vertical coordination favors (in theory) large scale farming. The change to modern procurement systems are one reason for initiating vertical coordination and therefore chain-based financing. The requirements set by these systems favor large scale production for two reasons: (1) significantly

fewer large suppliers are needed, and hence the complexity of the system is lowered, which decreases transaction costs, and (2) it is more costly to provide assistance to small farms than larger farms.

Many studies show that as a result, many retailers and processors would like to see a growth in farm size. However, retailers and processors are (still) forced to include small farmers. Small farmers are essential for ensuring the required quantities in some transition countries. Particularly in labor intensive sectors, small scale farming has important cost advantages. If the (farm) suppliers get too large they begin to re-capture some power. Since larger farms have the feeling that they can survive just by themselves, it may be more likely that smaller farmers have a higher likelihood of joining horizontal collaborations and ultimately creating much larger units. The degree of market development is important for the degree of vertical coordination. The less a market and its institutional environment are developed, the less likely it is that a complex system of vertical coordination will emerge (where marketing contracts are dominant). The more developed a market (i.e. the greater the demand for higher quality products) the higher the degree of vertical coordination will be. When that is the case, production contracts are predominantly used. However, when the higher quality products become standardized (e.g. IFS or GlobalGAP certified) and there are no supply difficulties, then marketing contracts will be used. In that case, production contracts will only be used for markets that cater to consumer segments that have differentiated demands.

The search for quality is a key engine of vertical coordination - but what happens when it is reached? Quality is becoming less of a driver towards vertical coordination because in “first” and “second” wave countries, retailers now dominate the markets and hence set the standards for food safety. Currently, the need to enhance efficiency can be regarded as the main motivation for vertical coordination. For example, for production chains that bear high costs, retailers and processors work closely with their suppliers to reduce costs. Quality will remain a key driver only in those cases in which a higher than average quality is explicitly demanded by the customers or in those cases in which it can be used to provide the opportunity to differentiate from competitors.

3. THE ROLE OF CO-OPERATIVES

The structural changes in agrifood markets of transition countries have increased the need for vertical coordination in value chains. As the quality of the final product is often a cumulative function of handling activities at several stages of the value chain, upgrading quality implies coordinating those interdependent activities. In light of these challenges, cooperatives have gained increasing attention (Bijman et al 2011; Shepherd 2007). Bijman et al (2011:83) mention that international donors and NGOs have (re)discovered the importance of cooperatives for rural development in general and for strengthening smallholders’ access to markets in particular.

In general, a co-operative can be understood as a user-owned and user-controlled business that distributes benefits upon the basis of use (Barton 1989). Thus, the principles of co-operatives can be delineated by the identity of users and owners, the democratic principle of voting and the non-existing of barriers of entry. Additionally, the legally manifested business aim to nurture their members can be seen as a further characteristic (Anschhoff and Henningsen 1986).

Traditionally, the aim to establish countervailing power has been regarded as the most important duty of a co-operative (van Dijk 1997). Other business aims like correcting market failure, guaranteeing markets and enhancing margins can be seen as levers to implement the main business aim (Cook 1997, Sykuta and Cook 2001). However, besides these benefits co-operatives also have some problems. By using a property rights approach Cook (1995) pointed out five general sets of problems: Free Riding Problems, Horizon Problems, Portfolio Problems, Control Problems and Influence Cost Problems. Using a principal-agent approach and the concepts of opportunistic behavior, conflicts of interest, asymmetric information and stochastic conditions Eilers and Hanf (1999) show that it is not clear who is the principal and who is the agent, i.e. both the co-operatives and the members can be principals and agents. For this reason, neither leadership mechanisms nor selective terms of delivery can be enforced by the co-operatives, i.e. the members can deliver all the commodities which alternative dealers do not accept. Co-operatives being forced to accept these commodities face the problem of adverse selection. Additionally, Fulton and Giannakas (2001) show that the cross-subsidization and member heterogeneity in large centralized, multipurpose co-ops may lead to substantial financial pressures for the co-operative because members of such co-operatives do not see a strong connection between the success of the co-op and their own business. Furthermore, Karantininis and Zago (2001) showed by applying a game theory model that instead of selling their commodities to open co-ops farmers would rather sell them to investor-owned-firms if they had the choice. Fulton (1995) concludes if markets disappear as a result of increased vertical co-ordination co-operatives may also begin to disappear. Hendrikse and Bijman (2002) share this assessment for the case that the investment on side of the processor or retailer becomes more important for the total chain value than the investments by the farmers. The author considers that further restraints for co-operatives include that the majority of the co-operatives are quantity rather than quality orientated and lack end consumer orientation, resulting in not having well known brands. This brief literature overview indicates that even though co-operatives have advantage still the problems – particularly the ones related to quality - might outweigh them. On account of this, it is not clear whether co-ops are a feasible way to integrate (small) farmers into modern value chains and their demands on (high) quality products.

On account of the above described development some co-ops modified better to say modernized their business concepts. The before mentioned general agency problems (Cook 1995), quality problems (Eilers and Hanf 1999), and the problems caused by heterogeneous business interests of the members (Fulton and Giannakas 2001) caused that the “modern” co-ops are installing a centralized authority. Having gained this authority they are able to select their members which includes that if necessary a member is dispersed. Thus, these co-ops have a closed membership. Furthermore, the co-op has the right to define quality norms for their supply (Hanf and Schweickert 2007). Whereas, in Europe such thoughts are fairly newly introduced the concept of “New generation Co-operative” is discussed for quite some time in the US. The “New generation Co-operative” can be understand as co-operative organizations in which asset appreciation mechanism, base equity plans as well as increased share liquidity by delivery rights clearing houses have been developed (Chaddad and Cook 2004). The creation of such “modern” governance and business concepts enables these co-ops to deal with the traditional problems. In their efforts to change their business concepts often co-operatives try to stay in a dual (in between) position i.e. on the one hand they try to keep the traditional business concept and on

the other hand to try to implement elements of "modern" co-ops. By offering strictly supervised contacts to their members they try to separate members willing to produce higher quality from those that are not willing. Afterwards they are able to market the resulting products via different marketing channels (Beuck 2002). In the context of contract production, Sykuta and Cook (2001) showed that because of their governance structure and ownership farmers are more willingly to accept contracts by their 'own' co-operative assuming that they are not being cheated (Schulze et al, 2007). Studying wine co-operatives Hanf and Schweickert (2007) were able to show that some successful co-ops have formed groups of members which have common business aims.

In Central and Eastern Europe where the majority of agricultural producers are of small size the output of a great numbers of farmers has to be combined in order to achieve the demanded quantity. Hence, there is a need for horizontal collaboration i.e. the establishment of co-operatives (Hanf, 2009). However, cooperatives face hard times in transition countries. In former times farmers have been 'forced' to join collective farms being understood as cooperatives. Thus, still today cooperatives have a bad reputation (Török et al, 2010). Furthermore, during Soviet times collective farms and processing firms were very inefficient. As the old production techniques have not been changed in the first transition period the inefficiency prevailed. An additional problem is that there is often a lack of trust and social capital among farmers and villagers so that collective action is already hindered at the first stage. Thus, Gardner and Lerman (2006) conclude that the evidence for cooperatives in agricultural production is still unfavorable. However, for marketing and supply cooperatives they observe a more promising situation. Reason for this is that new forms of cooperatives have been started (Hanf and Török, 2009). An example is a Hungarian cooperative that successfully deals with the changing market environment.

4. THE CASE OF HUNGARIAN MORAKERT COOPERATIVE

Having discussed before co-ops mostly in general, we now want to give an example of a Hungarian co-operatives that successfully deals with the changing market environment. The Morakert cooperative was established in 1995 by 52 farmers. Its aims is to increase the income of its members by purchasing inputs at low costs, to access and secure markets, and to gain relatively high prices for its products. However, right from the start emphasis was also laid on quality so that the Morakert was able to be the first officially acknowledged producer organization in Hungary in 2002. In order to secure and access markets they actively worked on gaining access to retail outlets. Today, its sales to retailers account for roughly 90 % of their domestic sales with increasing tendency. Hence, the Morakert cooperative is able to comply with changing market and retailer sector requirements.

There are four core elements of the Morakert's success. One of them resides in filter rules applied to potential members. Another is a strict coordination of the required quality and quantity of products. The third originates from the ability of cooperative leaders to build trust between members and management. Finally, an efficient private contract enforcement mechanism is arranged (Bakucs et al., 2007). Vertical integration becomes more and more important to develop activities in the cooperative with higher added value. Therefore, in the Morakert cooperative all the activities (purchasing, handling, sorting and packaging of

products, transportation and storage) are carried out in one place. All these activities are supported by a common IT system (Fertö and Szabó, 2002). Furthermore, this co-operative has successfully launched an own brand.

The example of the Morakert cooperative shows that some of the mentioned general problems can be reduced. For instance, the agency problem is not so significant because of the well-organized trust promotion mechanisms and appropriate consideration of human factors. In the future, the establishment of the secondary or regional type cooperative is planned. In this case the chance of free riding problems will grow because the cooperative will depend more on non-member trade (Fertö and Szabó, 2002).

5. CONCLUSION

The establishment of vertically strictly coordinated chain organizations is a worldwide phenomenon that does not stop at transition countries. By contrast, well known scientists such as Johan Swinnen or Tom Reardon assume that retailers and foreign direct investments can be regarded as a more powerful source of structural changes in transition countries than WTO and trade policy. Starting with almost zero percent market share in the beginning of the 1990`s the supermarket sector went from a tiny niche of around 5 % of food retail in the mid 1990's to a 40-50 % by mid-2000's. Examples are Hungary, Poland, or Czech Republic. The following six changes are named as the major ones (Dries et al. 2004); (1) shift from local store-by-store procurement to (nationally centralized) large and modern distribution centers; (2) shift to regionalization of procurement over countries; (3) shift from traditional brokers to new specialized wholesalers; (4) increasing use of global logistic firms; (5) shift to preferred supplier systems; and (6) shift to high private standards of quality and safety. Thus, today no significant differences in regard to procurement systems and quality demands and thereby vertical coordination can be found between eastern and Western Europe. However, the agricultural sector in CEEC is a mixture of small scale – even household – production and large scale farming. And often the majority of production is still produced by small scale farmers. Thus, the questions arise whether and how small farmers can be integrated into the modern marketing channels of retailers.

In order to answer these questions, we discussed the role cooperatives – as a traditional form of horizontal collaboration – can play in this process. However, because of their governance structures co-operatives face severe problems to deliver high quality products. Since retailers – even as a basic quality – demand high quality products we conclude that co-operatives have to modernize their governance structures and business models. Differentiating between traditional and modern co-ops we discussed for each of them their future roles in a verticalized agri-food business. We indicated necessary changes co-operatives have to conduct in order to stay on the market or better to say to be integrated into modern supply organizations. In that case co-ops are capable of integrating small farmers into such supply chain networks. Presenting the example of the Morakert co-operative we were able to show that also in Hungary co-operatives are changing becoming modern marketing-oriented "user-owned and user-controlled businesses" that are able to successfully link their members to modern supply chain organizations.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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MATERIALS SELECTION IN PRODUCT DESIGN OF ELECTRIC KETTLE

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Abstract

Material selection is the central point in engineering design. Different product requirements have to be carefully analyzed and identified by the product designer. Next, comprehensive required material properties have to be defined. For the proposed materials and designs, a comparison of advantages and disadvantages has to be made. The most important are functional requirements, such as mechanical and chemical properties. Manufacturing possibilities and constraints can be also challenging for the designer. Environmental considerations for the selected materials and processes are increasingly being highlighted and must be taken into consideration. Last but not least, the cost of the proposed materials selection in a novel product design often makes the final decision. This paper presents the analysis of the operating conditions, product property requirements and relevant material properties in the design of the hot water kettle typically used for preparing tea and coffee. Borosilicate glass, ceramics, stainless steel and polypropylene plastics for producing the housing of the water kettle are proposed and compared.

Key words: material selection, product design, electric kettle.

1. INTRODUCTION

Materials selection is a complex and systematic process used either by product designers or engineers for identifying the most suitable type of material for a specified product, while eliminating the unsuitable solutions. The product design may be the development of a novel product, or the improvement of an existing product. In order to find the best suited material which meets the design requirements, the first and most important step is the identification of product requirements. The requirements typically fall in the following categories: exploitability, durability, processability, aesthetics, costs, and increasingly, environmental impact. Based on the product requirements, a list of relevant material properties is created and used for most appropriate material selection or comparison.

The electrical water cooker, i.e. electric kettle is a product that is typically produced in mass quantities mostly with plastic material housing. The concerns of the effect of different organic

additives used in the manufacturing of polymeric materials and polymeric products are increasing. Design modifications oriented towards improving environmental impact are called eco-design.

Since the electric kettle heats the water that will be consumed to very elevated temperatures, and is used several times a day, throughout the year, the materials that will be used for the kettle housing are very important to most users.

Studies have been done in order to reduce the energy wastage by improving the design of the kettle (Murray et al., 2016, p. 233). Electric kettles are mostly used in the period of time most individuals spend awake, Figure 1. Electricity pricing or electricity tariffs differ by countries and by customer types (households, industry, business, etc.). For many households dual pricing often includes higher electricity prices during awake time.

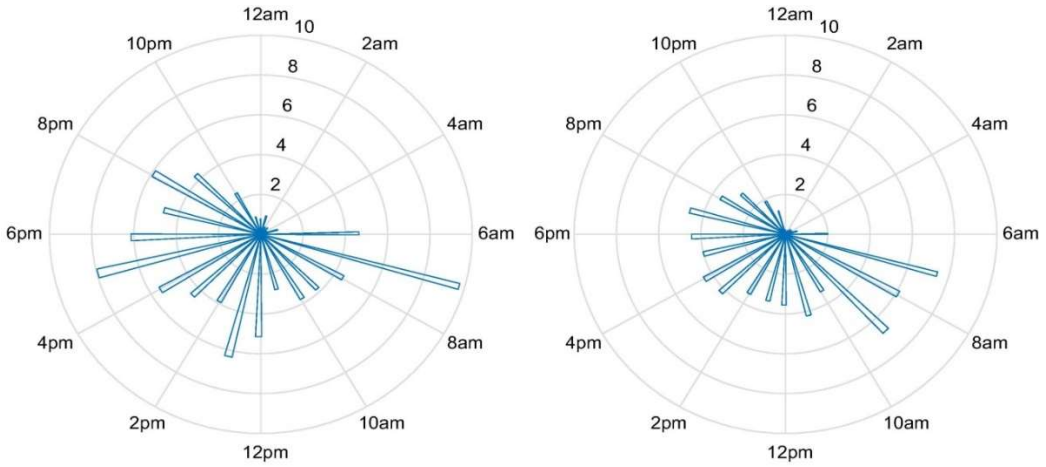

Figure 1. Hourly usage of kettle in October 2014: a) weekday, b) weekend (Murray et al., 2016, p. 233)

2. WORKING CONDITIONS

Water cookers or kettles that are heated via stoves or open fire have been used for thousands of years. Different materials have been used for the kettle housing, such as ceramics, cast iron, brass, aluminum, glass and steel. Since mid-19th century, when the electric kettles have been designed, their use has constantly grown due to their practicality and energy effectiveness in preparing simple dishes or drinks.

Depending on the target user group, electric kettles vary in size, materials, and price. According to the usage scenario, electric kettles are one of the simplest household appliances. Electric kettles are used in households, business spaces and other public or shared spaces (e.g. hotels, self-serving restaurants, student dormitories, elderly homes, etc.) due to their numerous advantages. Electric kettles are used for simplifying and speeding up the water boiling process and saving energy when heating water for the preparation of hot beverages, such as tea, coffee, or simple meals like instant dry soups, instant oatmeal, etc.

When using a kettle, it is necessary to pour water into it up to the desired level and start the warm-up process. The moment the water reaches the boiling point, the switch goes off and the

process is complete. Some electric kettles have the option of automated temperature regulation, in order to keep the water at a specific, set temperature. In addition to the clicking sound of the switch, water cookers can also inform the user in other ways about the completed process of water heating: visually – by determined light effects, or acoustically – by specific sound signals, which can be especially useful to people with special needs.

Water cookers range from those extremely simple, without any additional options, but at very low cost, to cookers intended for specific target groups with special requirements, such as lightweight travel kettles, wireless kettles, or with various options and lighting effects and with a more luxurious and tempting design.

3. PRODUCT REQUIREMENTS

When buying an electric kettle, its energy efficiency, typically defined by maximum electricity power, aesthetics, ergonomics (shape, practicality, weight) and price are the most common deterring factors for the acquisition. An increasingly important requirement when selecting the materials in the product design is the environmental impact.

3.1 Exploitability

The most important exploitability requirements for the materials selection include heat resistance to at least 100 °C, high thermal conductivity, sufficient strength and stiffness. High thermal conductivity assures a rapid heat transfer from the heating element to the boiled water. On the other hand, high thermal conductivity of the kettle housing may lead to skin burning if the whole kettle housing is made from a material with very good thermal conductivity.

High hardness is considered also a mechanical request, although minor, as it assures a good scratch resistance. Sufficient Young's modulus of elasticity of the selected materials is needed for sufficient product stiffness.

One other physical property when selecting materials that may be taken into consideration is the impact strength, i.e. toughness. Significant material toughness would prevent cracking and breaking during accidental impacts when handling with the electric kettle.

3.2 Durability

When selecting the appropriate material for the kettle housing corrosion resistance must be taken into consideration, as well. The resistance to hot water may be very important when selection a polymeric material that may absorb water, and when selection metallic materials, the electrochemical aqueous corrosion is obviously important. Other possible aggressive media typically include citric acid or acetic acid used for descaling, and also mild detergent or ethyl alcohol for cleaning. The materials which may be selected for the electric kettle housing have to be highly resistant to all of the listed media.

3.3 Processability

Production process which is to be selected should assure that both inner and outer surface of the housing is smooth, for preventing the accumulation of bacteria, dirt or scale. The housing surface should also be made non-absorbing, in order not to store any odors coming from cleaning substances, and not to absorb cleaning substances at all.

The selected materials and their processability have to be simple and cost-effective as possible in order not to increase the product price significantly.

3.4 Ergonomics

The electric kettle must be ergonomically designed so that the handle is comfortable for the users during short-term holding despite the added weight of water and the risk of elevated temperatures. External parts of the kettle which come in contact with the user should match the anatomy of the human hand, and should not be overheated to prevent injury during regular use.

One of the technological product requirements for the selected materials includes the possibility to easily imprint relevant water level markings on the housing, such as minimum, maximum, or a content grading scale.

Considering the ergonomics, the water level markings are often imprinted in such a way that they are visible on both sides of the kettle so that they are suitable for both left-handers and right-handers.

One of advisable sensor properties for the housing material used which may also be important is the transparency, which would ease both the usage as well as prompt cleaning or descaling of the product.

3.5 Environmental impact

In order to assess the environmental impact of a design with selected materials, different methods may be used. One of them is Life Cycle Analysis (LCA), which takes into account all "life" phases of a product. These phases include: the production of the material itself, the processing of the material into the product, the transport of the product to the user, the typical usage time and finally the chosen disposal option at the end of product life.

Each of these product life phases may be characterized by some parameters, such as the required energy, i.e. energy consumption, CO_2-footprint ("carbon footprint"), water usage, recycling rate, etc.

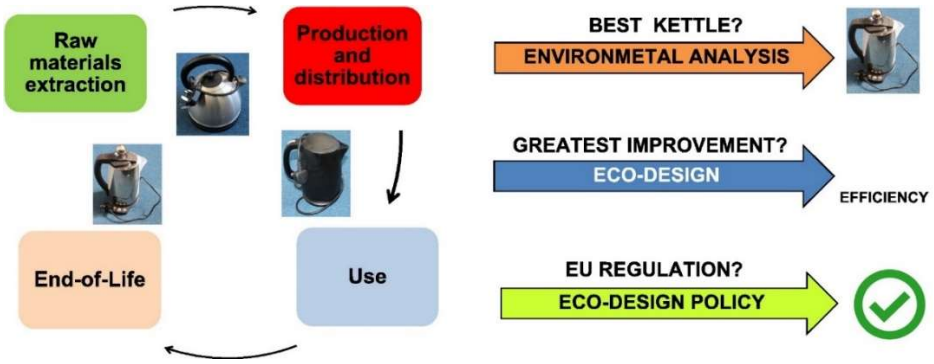

Figure 2. Life cycle analysis of electric kettle Hourly usage of kettle in October 2014: a) weekday, b) weekend (Gallego-Schmid et al., 2018, p. 137)

When all life phases of analyzed materials and processes, weights, transport distances, etc. are taken into consideration for different proposed product designs, a comprehensive analysis and comparison of product variants may be done (Gallego-Schmid et al., 2018, p. 138), Figure 2.

A comparison of variants of electrical home appliances confirmed significant environmental impact resulting from the materials production processes. The environmental impact of selected materials is significantly higher for polymeric housing design when CO_2 footprint emissions are considered (Ng, C.Y. & Chuah, K.B., 2012, p. 3393).

4. SELECTED MATERIALS

After analyzing all the product requirements, some of the requirement are usually more important that the other. The importance level may be either assessed by some quantitative method or may be approximated according to the expertise and subjective assessment done by the product designer.

Four material representatives were considered for the design of the housing for the electric kettle and their respective benefits and drawbacks have been analyzed, Figure 3.

Figure 3. Variants of compared electric kettles housing: a) ceramic, b) metal, c) glass, d) polymeric (Gorenje Group, 2020)

4.1 Ceramic Housing: Pros et Cons

The first considered material is the ceramics. One of the positive properties of ceramics is very high heat conductivity which will allow a uniform and rapid distribution of heat from the heating element to the heated water. Ceramics are also very corrosion resistant to different media, such as mild alkali and acids, and hot water. For electric kettles stoneware ceramics is mostly used. The porcelain would represent a very expensive option and the technical ceramics such as alumina even more expensive, although such variants would probably intrigue and interest some of the possible consumers.

The mechanical properties of ceramics typically include high Young's modulus of elasticity which ensures high stiffness of the housing. Also, high hardness will allow a high scratch resistance of the surface and prolonged aesthetical value of the water cooker.

The density of stoneware ceramics of around 2.3 g/cm^3 is much lower than the steel variant, and higher than the polymeric option. What is important to notice is that although the density of stoneware is relatively low, the required wall thickness of ceramic housing would increase the weight of the final product, since the flexural strength of ceramics is comparably low.

The ceramics has to be glazed, by which non-toxic and lead- and cadmium-free glazing has to be used. The materials that will be applied to the housing most definitely have to be certified for safe usage in contact with food. In the European Union the Directive 2005/31/EC Ceramics: Directive 2005/31/EC was introduced in 2005 in order to reduce the risk of using ceramics that

are intended to be used in contact with food (Commission of the European Communities, 2005). This European Commission directive applies to prohibiting the trade, manufacture and importation into the EU of ceramics that are not in accordance with the Directive. What is tested are the migration limits on lead and cadmium in standard acetic acid aqueous solutions.

4.2 Metal Housing: Pros et Cons

Metal housing of electric kettles are typically made from austenitic stainless steel. This steel is sometimes labeled on cookware as "18/10", which indicates the weight content of 18 % chromium and 10 % nickel. Austenitic stainless steel is a type of steel highly corrosion resistant to hot water, cleaning acids and solutions. Also, it is highly aesthetic since the high nickel content in austenitic steels, which gives them shiny and attractive appearance. The surface may be brushed to get a matt appearance as well.

The high plasticity of austenitic steel, with typical values of elongation around 40 %, makes it easy to form different forms to both attract the customer, as well as to assure an easy operating and effective cleaning. High Charpy toughness at room temperature, but also at low temperatures, of 200 J also is a favorable property for the safe operating and longevity of the product. High toughness, i.e. materials impact resistance of the metallic housing is an important advantage of steel housing as compared to stoneware variant.

The recyclability of steel is known as being very good and steel waste is a valuable secondary resource. Although stainless steel has a high density of about 7.7 g/cm^3, the wall thickness is not high so the total weight of the metal housing does not pose a problem for the users. The electric kettle housing variants of either stoneware or stainless steel have high thermal conductivity, for a fast and uniform heat distribution, but on the other hand this can lead to skin burning or in general uneasy operation, especially for minors, elderly of disabled.

The opacity of steel makes it impossible to track water levels, so steel housing either have imprinted water lines within the housing or have an additional constructional element made from transparent plastics or glass. Such construction additions elevate the production costs, and lower the recyclability of the water kettle.

4.3 Glass Housing: Pros et Cons

Borosilicate glass is typically used for laboratory equipment, but also often as cookware as well. The main component is silicon dioxide, SiO_2, around 70 % and 10 % (sometimes up to 25 %) boron trioxide, B_2O_3. Borosilicate glass has very low thermal expansion coefficient, which allows a high resistance to thermal shock, i.e. internal tensions caused by thermal gradient.

As other glasses borosilicate glass has high low impact strength and will break if it falls to the ground. High hardness of borosilicate glass makes is resistant to wear and scratching. High Young's modulus makes it possible to produce thin walled housing thus the total weight is not high. Also the density of the borosilicate glass is lower than the stoneware, which also allows a mass reduction and better ergonomic properties of the glass kettle.

Borosilicate glass is known for high corrosion resistance to aggressive acids, salts, hydroxides, organic solvents, etc. Chemical inertness makes borosilicate glass a highly food safe material, which is one the most highlighted benefits of glass electric kettles.

Last, but bot least are the remarkable optical properties of borosilicate glass. The optical quality transparency makes borosilicate housing very practical for use and highly aesthetic.

If properly handled, glass kettles typically have a very long exploitation time, without any degradation of properties. At the end of life, borosilicate glass is theoretically easy to recycle. But, the chemical composition of borosilicate glass differs greatly from the glass that is used for food packaging, which makes it difficult to recycle. Waste food packaging glass is typically collected in special municipal containers, and reused in the production of new food packaging. The possible presence of waste borosilicate glass is packaging glass would present significant recycling problems.

4.4 Polymeric Housing: Pros et Cons

The least expensive option in material selection for the housing of the water kettle is plastics. Plastic housing are usually made of heat resistant polymers, such as polypropylene (PP), which is the most common, or acrylonitrile butadiene styrene (ABS), Polypropylene, ABS. The benefits of selecting plastic materials is the low price, ease of production, lightweight and good esthetics.

Plastics used in electric kettles are corrosion resistant to the required environments. Considering the chemical composition of polypropylene, it is considered a safe material to be used in contact with foods. On the other hand, polymeric materials are rarely used pure, but with various additives and fillers. Additives may enhance the impact strength, increase or decrease stiffness, reduce the viscosity for easy molding, restrain polymer aging, change the polymer color or degree of crystallinity, add fragrance, etc. Some additives are inorganic compounds, but organic substances are used as well as polymeric additives. Small amounts of additives may leach into the hot water during the use of the electric kettle, especially at elevated temperatures which normally occur during boiling of water. Sometimes, the users can feel the olfactory properties (i.e. properties relating to the sense of smell) of low-end plastics even when the electric kettle is cold and unused, since polymer additives may be volatile chemical compounds. Such plastic kettles are typically considered as dubious by the consumers.

The plastic electric kettles that are sold in the European Union have to comply with the standard EN 12546 “Materials and articles in contact with foodstuffs - Insulated containers for domestic use”. Commission Regulation (EC) No 1935/2004 provides a legal EU framework by defining general principles of safety and inertness for all Food Contact Materials (FCMs). The Regulation requires that FCMs do not release any components into food at levels which are considered harmful for human health; materials should not change the composition, taste or odor of food, etc.

European Commission Regulation No 10/2011 on plastic materials defines the composition of plastic FCMs and compounds allowed to be used in the manufacturing of FCMs (European Commission, 2011). The plastic products often have the “Knife and Fork” logo, i.e. the German LFGB certification (German: LFGB from “Lebensmittel- und Futtermittelgesetzbuch”) which are based on the standards EC 76/769/EEC and EC 1935/2004. Plastic electric kettles often have the BPA-free (Bisphenol A-free) or FDA (American Food and Drug Administration) logos as well.

All plastic water cookers are lightweight since, for example, the density of polypropylene is around 0.9 g/cm^3. Thermal conductivity of plastics is low, so the kettle has a low risk of burning

the user's skin. Considering the transparency, polypropylene is not transparent. Sometimes, an additional element is constructed on the housing wall in order for the users to be able to detect the water level by using transparent polymers, such as polycarbonate.

The recycling property of polymers, for example polypropylene, is typically labelled as recyclebar. The drawback of plastic electric kettles is also a shorter life span, which increases the environmental effect of these products.

5. CONCLUSION

Electric kettles are widely used electric home appliances with a relatively short life span. Considering the materials selected for the kettle housing, the most common variants are stainless steels and polymers, each of which has many benefits and drawbacks. Less often used are glass and ceramics.

When selecting the most adequate material the designer has to take into account many product requirements and consider which material properties are relevant for the selected requirements. Often the designer is faced with contradictory requirements, and some compromise or optimization must be done.

The most important properties are oriented towards successful and safe use of the designed product. Then, the selected materials have to be easy processed into the manufactured product. In order to ensure a long lifespan of the product, additional requirements to the selected materials are set. The ergonomics play also an important role in selectin and often combining different material, so that the product is comfortable to the user. Nowadays, many producers highlight the favorable environmental aspect of their products, either coming from selected "eco-friendly" materials or from the energy efficiency of the appliance. Finally, the economic criteria in materials selection are always important in developing different product variants, which will be offered to different end-users.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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DESIGN MODERN DISTRIBUTED SYSTEMS BASED ON MICROSERVICES ARCHITECTURE

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Abstract

Distributed systems are very commonplace nowadays. They have seen an enormous growth in use during the past few years. The idea to design systems that are robust, scalable, reliable, secure and fault tolerance are some of the many reasons of this development and growth. Distributed systems provide a shift from traditional ways of building systems where the whole system is concentrated in a single and indivisible unit. The latest architectural changes are progressing toward what is known as microservices. The monolithic systems, which can be considered as ancestors of microservices, cannot fulfill the requirements of today's big and complex applications. In this paper we decompose a monolithic application into microservices using three different architectural patterns and draw comparisons between the two architectural styles using detailed metrics that are generated from the Apache JMeter tool. The application is created via .NET framework, uses the MVC pattern and is fictive. The two comparable apps before testing with Apache JMeter, will be deployed in almost identical hosting environment in order to gain results that are valuable. Using the generated data, we deduce the advantages and disadvantages of the two architectural styles..

Key words: Distributed systems, Microservice, Monolithic, MVC.

1. INTRODUCTION

Microservices are a new development, coming into light just a few years ago. They offer many advantages compared to the old monolithic architectures. That is why many of the big tech companies have successfully made the switch to microservices. Currently, the monolithic architecture is the default model for creating a software application. Its trend is decreasing as it cannot keep up with the demands and the challenges of the new applications that are now quite big and complex.

In the monolithic architecture, application is built as a single indivisible unit. This usually means that the application has three core components that interchange information with each other: a user interface, a server-side and a database (Amen, 2017, pp. 17-24). This architecture is characterized by a huge code base and has almost no modularity. Because they have a single code base, they can become so large and hence difficult to maintain. The whole application will

need to be redeployed from a single small change in the code. More crucial is the fact that it is not very reliable since a bug in any part of the code can bring down the whole application (Amen, 2017, pp. 30-45).

Monolithic architecture, however, has some subtle advantages and with some tweaks it can still be useful to many modern applications. These include: the easiness of deployment (since only one file needs to be deployed), the easiness of development (compared to the microservices) and the network latency and security which are more noticeable in the microservices architecture. Monolithic architecture is also very easy to test. We can do so by simply launching the app and testing the UI with Selenium. However, some of the drawbacks of this architecture have made the switch to microservices a necessity (Kharenko, 2019). As authors in (Jack, Bredley, & Casey, 2018) put it, one of the problems that can arise from the monolithic applications is the evolvement into a "big ball of mud" state, which is a situation in which none of the developers understand the entire application. To overcome the obstacles, microservices provide a very reasonable and effective architectural style, which as mentioned, are increasingly being used and deployed in many modern applications. In fact, microservices are considered as the future of distributed systems. On the other hand, despite its name, microservices are by no means, small. In this architectural style, the application is made up of a suite of small devices, all of which have their own unique codebases. Microservices use lightweight mechanisms, somewhat like an API, to communicate between different services. Contrary to monolithic architecture, these services can be deployed together or separately. These services are loosely coupled (or headless) making this architectural style mostly decentralized (Jack, Bredley, & Casey, 2018).

It must be understood that a microservice is not a layer within a monolithic application. It has its self-contained functionalities with clear interfaces, and through its own internal components, must implement a layered architecture. According to the author in (Telai, 2019) this architecture follows the Unix philosophy of "do one thing and do it well". In the following sections we will explore some of the main advantages of microservices and whether it is a good idea to fully deploy an application into microservices.

The research questions we will try to answer from our experiment and analysis of literature, are:

- Does decomposing into microservices impact the system's average response time?
- Is it always adequate to develop an app using the microservices logic?
- To what extent should the monolithic application be decomposed into a microservice?

1.1. Design and structure of monolithic applications

A monolithic application describes a single-tiered software application in which the user interface and data access code are combined into a single program from a single platform. It is self-contained, and independent from other computing applications. The design philosophy is that the application is responsible not just for a task but can perform every step needed to complete a particular function. Layered architecture is a common pattern seen in monolithic applications. This architecture allows for the technical capability to be changed fairly easily, especially if they are isolated to a particular layer (20056).

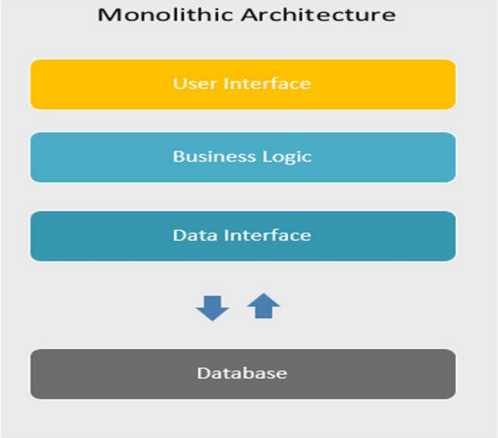

Figure 1. Monolithic application architecture

The main idea behind this architecture is the separation of concerns, the main monolithic application components which include authorization, presentation, business logic and database are organized into four main categories or layers: The presentation layer, The application layer, The domain layer, The infrastructure layer (also known as the persistence layer).

An example of monolithic system architecture of real-world application is shown on Figure 2. The diagram shows main components needed to build an Ecommerce application which authorizes costumer, takes an order, checks products inventory, authorizes payment and ships ordered products (20057).

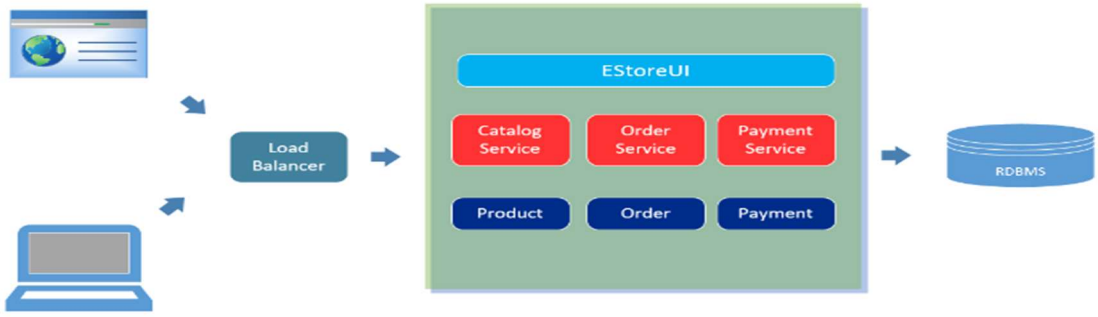

Figure 2. Monolithic Architecture (Ecommerce Application)

Despite having many components which are independent from each other the system as shown in Figure 2 is build and deployed as one application. With issues regarding maintenance, response time and scaling, monolithic architecture should be avoided when designing large and complex applications which may be used in different environments with different configurations or in applications which may change and need to be frequently updated.

2. STATE OF THE ART

As mentioned previously, over the last decades, industry demands have pushed software design and architectures in various directions. The ever-growing complexity of enterprise applications, along with change and evolution management ushered in the rise of different architectures with

an aim to replace or improve the traditional unified software designing model known as monolithic architecture. Various architectures (besides the eminent ones) have been designed, researched, and used in industry, in recent years there has been a lot of hype regarding the new architectural model called microservice architecture. Considered new, microservice architecture has found itself being researched and compared a lot with existing architectures including SAO, serverless and monolithic architectures. Most of research studies were oriented on performance analysis, cost and resource usage. In a research that was done by Singh and Peddoju, the performance of a monolithic application is compared to a microservices application, the applications that were built were tested for their response time and throughput. Obtained results made it clear that microservices architecture has a better performance especially when it is used for a large number of requests (Singh & Peddoju) .. The results showed a significant performance boost in monolithic architecture applications in many configurations and environments, which in a way contradicts the results shown by Singh and Peddoju (Ueda, Nakaike, & Ohara). A different approach was used on research paper done by Chen, Li and Zheng from Nanjing University. This paper discusses ways to decompose a monolithic application to microservice architecture. Throughout the paper the researchers used a top-down analysis approach and developed a dataflow-driven decomposition algorithm. They defined a three-step procedure for process decomposition involving business requirement analysis, usage of dataflow-driven algorithm and individual modules extraction (Chen, Li, & Li).

3. METHODOLOGY AND RESULT

The goal of this section is to offer a way of passing between monolithic architecture to microservices approach and comparing them. So, we are going to demonstrate how to identify key design issues of monolithic applications and how they should be reflected in microservices approach. For that purpose, we will use a monolithic application that is developed in Model-View-Controller approach, which is based on monolithic architecture, and we will try to offer a way of decomposing it in microservices approach. We are aware that there are a lot of design patterns that exists for developing web applications. But based on usage we have decided to use MVC as one of most used architectural patterns for developing web applications that are based on monolithic architecture and not only.

3.1. E-Shop Monolithic application

As we said earlier, we will use an application that uses MVC approach, which is developed in Asp.NET Core with MVC approach. Before analyzing this application, we want to make purely understood that the term “monolithic”, in this context refers to the fact that these applications are deployed as a single unit, not as a collection of interacting services and applications (Microsoft Developer Division, .NET, and Visual Studio product teams, 2020). Application that we have developed for this paper is based on application of Microsoft (Microsoft, n.d.), for e-shop. The main reason why we have chosen to develop an e-shop application is to demonstrate how to pass between monolithic to microservices is because there is an almost perfect example that microservices should be used there.

In *Figure 3* we have presented schematically controllers of the application that are developed.

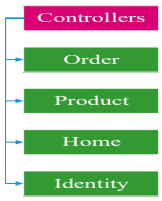

Figure 3. Controllers for E-Shop

As is can be seen there are four controllers that monolithic application currently has. First controller, Order, is for handling requests that are for ordering items on application. Second controller, Product, it is used for managing products. The third controller, Home, is for main and privacy terms. The last controller which is default controller for authentication and authorization is Identity, it used to manage accounts and roles. In *Figure 3* we have presented Identity as a Controller, but in latest version of Identity Microsoft uses Razor pages for this module, but we will abstract this, and we will consider as a controller.

3.2. Decomposing to microservices

In this section we will try to offer a way of how to decompose E-shop application to microservices approach.

Before starting to identify microservices we want to make purely understood that there is no general method that can be applied to every monolithic application. This means that we need to study very deeply application before architecting to microservices.

For E-Shop application, the first thing that must be transformed to microservice is Identity service, which is used for authentication and authorization purpose. One the most important services in E-Shop application, and in most applications, is security. Identity service is an IdentityServer4 (Revision, n.d.), which is a typically used for managing authentication and authorization in microservices environment. Typically, IdentityServer4 acts as a middleware (Smith, 2020) that adds the spec compliant OpenID Connect and OAuth 2.0. With IdentityServer4 all access to microservices can be managed and this service is responsible for generating access token for clients.

Other important microservice for E-Shop application is product microservice, which is responsible for managing products for this application. So, this microservice can register new products, edit them, or see details about products. So, this microservice does only one thing but it does in a perfect way. Last microservice is responsible for handling orders of customers. So, this microservice is focused only on processing orders, and offers a payment for orders.

For testing purpose is developed a client which will use microservices over RESTful API (R. Fielding, 2014). A schematic presentation of E-Shop application decomposed to microservices is displayed in *Figure* . As it can be seen from *Figure* , in this case we have 3 microservices, which we have described before. This decomposition offers a very good way to deal with scenarios where ordering a product is not possible, still application can offer service by listing all product that are there. So, with this decomposition we have archived a good way to handle problems with no function of order product, but order product currently contains functionality for checkout and payment.

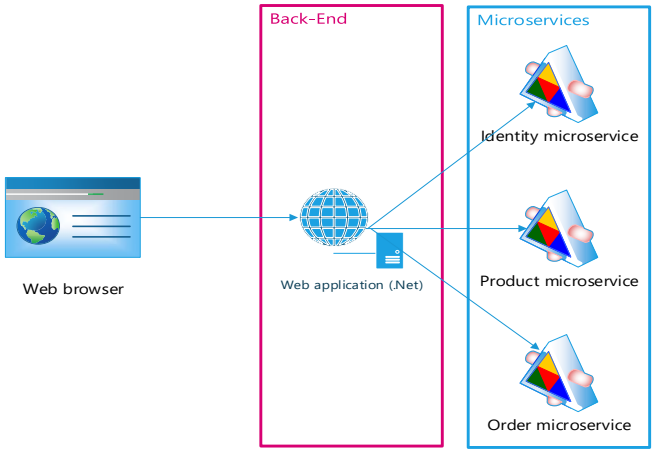

Figure 4. E-Shop application decomposed to microservices

As part of comparison is this model of decomposition with E-Shop monolithic system, and other types of microservices architecture that will be presented. As it can be seen from *Figure* , the main problem with decomposition of E-Shop application in microservices architecture that is offered, is Order microservice, which needs to be decomposed to three microservices. These 3 microservices that will be derived from Order microservice are: Order microservice, Checkout microservice and Payment microservice.

Schematically this decomposition is presented in *Figure 5*.

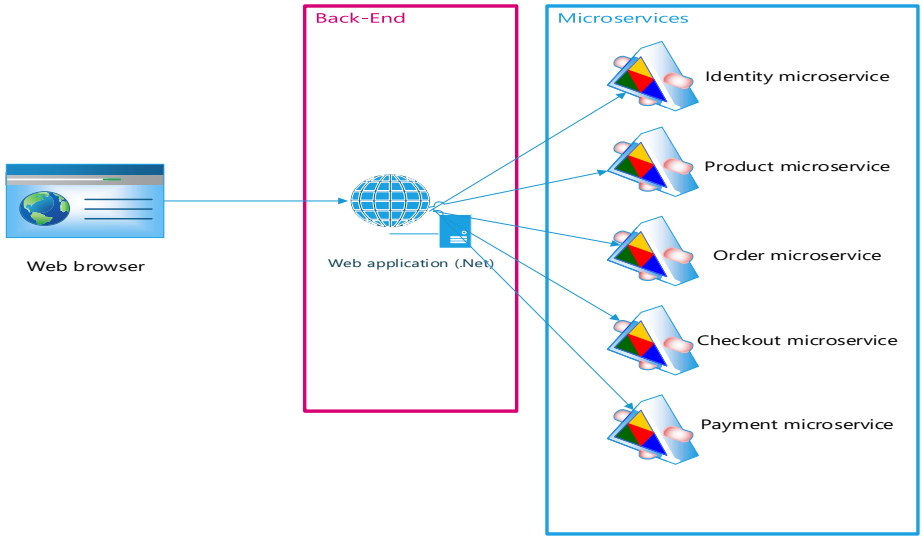

Figure 5. E-Shop application decomposition second version

With decomposition of Order microservice, are archived many things. The last feature that will be applied when decomposing to microservices, in *Figure 5*, is adding an API Gateway. Schematically this is presented in *Figure* 6.

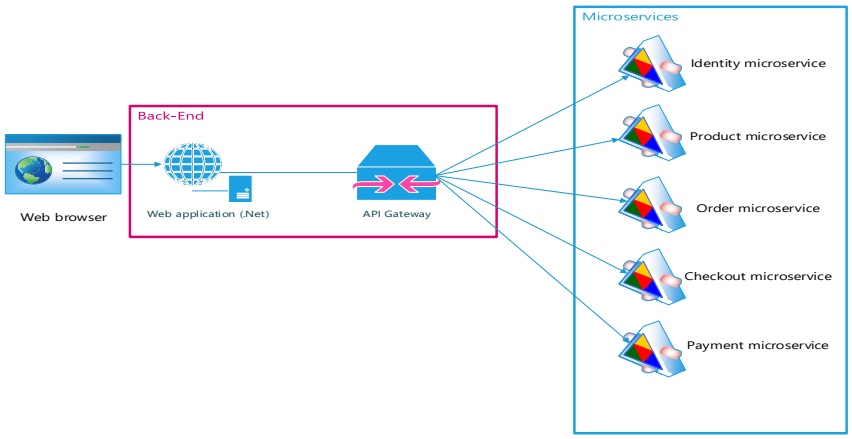

Figure 6. Decomposition that has API Gateway

Decomposition that has been displayed in *Figure* , contains an API Gateway, which acts as reverse proxy, hides functionality of microservices that are currently implemented in E-Shop application. This is a very good place to implement security for microservices.

3.3. Load test comparison

In this section we will compare monolithic application with microservices for our fictive application. Comparison is made by using Apache JMeter (Apache JMeter, n.d.) with different parameters. To have results that are comparable with each other we have hosted to Docker, with Linux container, all microservices, monolithic application and Client which consumes microservices is hosted in Internet Information services for Windows. For this purpose, we have deployed to test environment which is identic for microservices and monolithic application.

The first scenario will perform Get request to home page, then to list of products and finally to edit product page. All three requests are Get requests. Parameters of testing are set same for all applications. Parameters in Apache JMeter are:

- Number of Threads (users) = 100
- Ramp-up period(seconds) = 50
- Loop count = 5

After creating test plan in Apache JMeter, we have gained results as below.

Table 1. Results for first test

Parameter\Application	Monolithic	Microservices First	Microservices Second
Request	Get	Get	Get
Samples	1500	1500	1500
Average	6	10	9
Min	2	6	6
Max	41	159	98
Std. Dev.	5.14	8.83	5.33
Error %	0.00 %	0.00	0.00
Throughput	30.2/sec	10.1/sec	10.1/sec
Received KB/sec	247.14	81.38	81.53
Sent KB/sec	3.78	1.17	1.17
Avg. Bytes	8368.6	8268.6	8273.7

In second comparison, as additional will be added post request which is responsible for adding new products to database. Parameters for Apache JMeter are same as above. After creating test plan in Apache JMeter, we have gained result as below.

Table 2. Results for second test

Parameter\Application	Monolithic	Microservices First	Microservices Second
Request	Get, Post	Get, Post	Get, Post
Samples	2000	2000	2000
Average	872	1851	1219
Min	2	7	8
Max	5024	7931	6361
Std. Dev.	1161.98	1858.53	1428.10
Error %	0.00 %	0.00 %	0.00 %
Throughput	22.5/sec	18.0/sec	20.7/sec
Received KB/sec	2197.87	1855.62	2154.23
Sent KB/sec	4.50	3.54	4.08
Avg. Bytes	100061.3	105852.1	106604.9

The final comparison will be made to order part. There will be added get request for checkout, order detail for specific product, update to database number of orders and finish payment.

After creating test plan in Apache JMeter, we have gained result as below.

Table 3. Results for third test

Parameter\Application	Monolithic	Microservices First	Microservices Second
Request	Get, Post	Get, Post	Get, Post
Samples	2000	2000	2000
Average	7	22	21
Min	3	6	6
Max	113	127	319
Std. Dev.	5.38	15.52	16.53
Error %	0.00 %	0.05 %	0.15 %
Throughput	40.4/sec	39.8/sec	40.1/sec
Received KB/sec	220.37	3576.13	2270.08
Sent KB/sec	7.61	8.90	8.95
Avg. Bytes	5591.9	91920.7	57980.4

Very important statistic that can be derived from *Table 3*, is average response time that is from First and Second microservice. Decomposing to Microservices of course that has many benefits, but sometimes benefits that can be archived from decomposing might hurt performance of system. This is proved by results displayed in *Table 3*.

4. CASE STUDY

In case study will be discussed for complex system, which is implemented in Kosovo, which is Health Insurance Fund Information System of Kosovo. Because of data sensitivity we have

decided to not use this system to decompose to microservices approach, so we have used a fictive application. Results that are archived by using fictive application are very important and there can be draw parallel with Health Insurance Fund Information System and other systems. Based on results that are archived there should be made a tradeoff between current architecture that has this system, which is monolithic application and is developed in Asp.Net, to decompose to Microservices approach. Again, based on results from table 1, 2 and 3 is evident that decomposing to microservices would decrease average response time, but benefits that could be archived from microservices, especially for this system, are bigger than the average response time. Benefits that will be archived are same as mentioned in section C of III.

5. CONCLUTIONS

It is obvious that microservices offer a lot of advantages compared to the traditional monolithic architecture. Many of the core functionalities of microservices were described throughout the paper. Our approach in this paper, was to analyse and then compare the same application but developed with the two architectural styles. From the results obtained we saw that microservices can increase the system's average response time since there are different services that need to communicate and exchange information with one another. Testing for different parameters with Apache JMeter we saw the differences in response times. One big advantage of microservices, is that they are not tied to a programming language. They also overcome the cumbersomeness of dealing with databases as we saw while developing our fictive application. To conclude, choosing whether to use the monolithic or the microservices architecture is not always clear cut. It all boils down to the type of application and what the developer wants to achieve. Big applications will benefit from the robustness, efficiency, and the well-organized code that the microservices make possible.

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INDENTATION SIZE EFFECT OF CONVENTIONAL AND NON-CONVENTIONAL SINTERED AL2O3 CERAMICS

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Abstract

The objective of this study was to investigate and analyze the indentation size effect (ISE) by means of Vickers method of the alumina (Al_2O_3) ceramics sintered by conventional (electric kiln) and non-conventional sintering method (hybrid microwave kiln). The Vickers hardness was measured under the following loads: 0.98 N, 2.94 N, 4.90 N, 9.81 N, 29.42 N and 49.03 N. The ISE is analyzed using the Mayer's law, a proportional specimen resistance (PSR) model and a modified proportional specimen resistance (MPSR) model. Dependence of the hardness on test loads indicates Meyer's index (n) that is less than 2 for alumina ceramics sintered by both sintering methods. High correlation coefficients confirm that all applied mathematical models are suitable for the data analysis, while the best correlation between measured values and mathematical models was achieved with the MPSR model with a correlation coefficient of 0.999.

Key words: alumina ceramics, conventional and non-conventional sintering methods, indentation size effect, Vickers hardness.

1. INTRODUCTION

Each step of the production process: powder preparing, shaping of the green bodies and sintering process have important impact on the final properties and microstructure of the ceramic material (Lóh, Simão, Jiusti, et al., 2017; Tian, Dai, Xu, et al., 2016). Sintering, as a final step in ceramics production, might be conducted by conventional or non-conventional sintering method. Conventional sintering includes heat transfer via conduction from the outside to the inside of the material while the microwave heating process generates heat internally within the material and transmits outwards (Figiel, Rozmus, & Smuk, 2011; Agrawal, 2010).

Hardness, as one of the important mechanical properties of ceramic materials, represents material's resistance to plastic deformation. For testing very hard materials, such as ceramics, it is commonly used Vickers (HV) or Knoop (HK) method, because their diamond pyramidal penetrators are able to leave visible indentations (Ćurković, Lalić, & Šolić, 2009; Bhattacharya, Kundu, Bhattacharya, et al., 2019).

Applied load, used during the hardness testing, can influence the results (Bhattacharya, Kundu, Bhattacharya, et al., 2019). The change in applied load causes changes in manifested ("apparent") hardness. The phenomenon, when material endures a decrease in hardness with the increasing load (Meyer's number $n < 2$, Figure 1), is called normal indentation size effect (ISE) (Ćurković, Lalić, & Šolić, 2009; Kampouris, & Konstantinidis, 2017; Pharr, Herbert, & Gao, 2010; Peng, Gong, & Miao, 2004; Majić Renjo, Ćurković, Štefančić, et al., 2014). It is also possible that material manifests an increase in hardness with the increasing indentation load (Meyer's number $n > 2$, Figure 1) which is known as reverse ISE (RISE) (Kölemen, 2006; Bhattacharya, Kundu, Bhattacharya, et al., 2019). In Figure 1 is illustrated non-constant or load dependent hardness (often called "apparent" hardness), and constant hardness ("true" hardness or load-independent hardness) that usually occurs at higher indentation loads (Ćurković, Lalić, & Šolić, 2009).

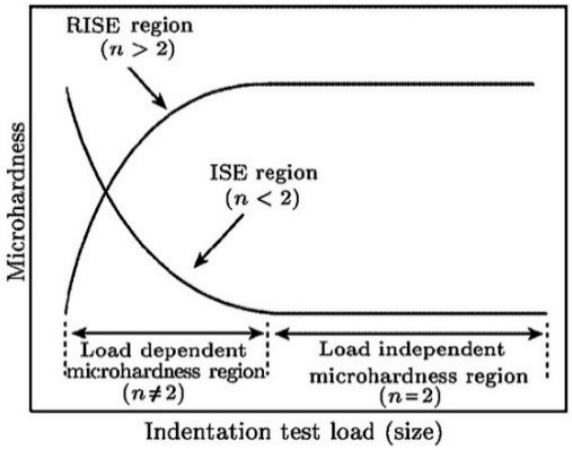

Figure 1. Schematic plot of hardness variation with test load, showing the indentation size effect (ISE) and reverse indentation size effect (RISE) (Ćurković, Lalić, & Šolić, 2009)

In this research, the Vickers method was used for determination of hardness of alumina ceramics. The goal of this research is to analyze the observed ISE of alumina ceramics sintered in electrical and hybrid microwave kiln using the traditional Meyer's law, a proportional specimen resistance (PSR) model and a modified proportional specimen resistance (PSR) model. To achieve that goal, Vickers hardness measurements on alumina ceramics sintered by both sintering methods were conducted.

2. MATERIALS AND METHODS

Cold isostatic pressed (CIP) cylindrical pellets (produced at Applied ceramics, Croatia) of a high purity Al_2O_3 ceramic, with 10 mm in diameter and 20 mm height, were used in this research.

The cylindrical alumina pellet, used for conventional sintering method (sample EK), was sintered using an electric kiln (Nabertherm P310, Germany) at 1600 °C for 6 h. The second cylindrical pellet (sample MK) was sintered by non-conventional sintering method in a hybrid microwave kiln (Over, Kerestinec, Croatia) at 1600 °C for 1 h. Sintering regimes were adopted according to the preliminary results (Vukšić, Žmak, & Ćurković, 2019). The hybrid microwave

kiln was used at low-frequency 2.45 GHz and 1.5 kW microwave magnetron. A silicon carbide susceptor was used to aid the heating of the sample in the microwave cavity.

Prior to measurements of Vickers hardness the samples were prepared by the standard ceramographic technique (Ćurković, Lalić, & Šolić, 2009). For hardness measurement the hardness tester Wilson Wolpert Tukon 2100B (HV 0.1 – HV1) (Instron, Grove City, PA, USA) and Vickers tester Zwick (HV3 and HV5) were used. Diagonals were measured on an optical microscope Olympus BH (Olympus Imaging Corp., Tokyo, Japan) immediately after unloading. The Vickers hardness was measured 10 times per sample under the loads listed in Table 1 at room temperature.

Table 1. Loads used for Vickers hardness testing

	Hardness						
HV	HV	HV0.1	HV0.3	HV0.5	HV1	HV3	HV5
Load F, N	F, N	0.9807	2.942	4.903	9.807	29.42	49.03

The Vickers hardness was calculated according to the Equation 1

$$HV = \alpha \frac{F}{d^2} \tag{1}$$

where F stands for applied load (N), d (mm) is the mean value of the indentation diagonals (Equation 2), while α is the indenter's geometrical constant, that is 0.1891 for the Vickers diamond pyramid.

$$d = \frac{d_1 + d_2}{2} \tag{2}$$

3. RESULTS AND DISCUSSIONS

Obtained data (Figure 2.) show variations of calculated hardness with the applied load. All data shown are averages of ten values.

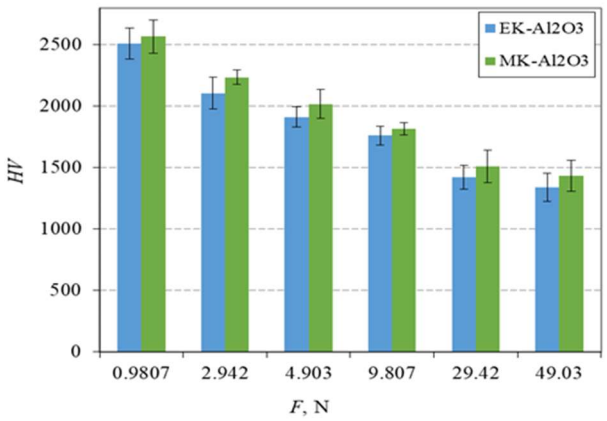

Figure 2. The dependence of the measured Vickers hardness on the applied load for alumina ceramics sintered in (A) electrical kiln (EK-Al_2O_3) and (B) hybrid microwave kiln (MK-Al_2O_3)

In order to quantify the normal indentation size effect (ISE), three models were applied on the obtained data: Meyer's law, the proportional specimen resistance (PSR) and the modified proportional specimen resistance (MPSR) model.

Meyer's law gives the relation between the applied load F and average value of indentation diagonals *d* according to the Equation 3

$$F = K \cdot d^n \tag{3}$$

where *n* represents the Meyer's number (index) and *K* is the standard hardness constant for a given material. The Equation 3 coefficients can be obtained by linear regression analysis from the *log F* versus *log d* plots (Figure 3), where the slope represents Meyer's index, while the intercept gives *log K* values.

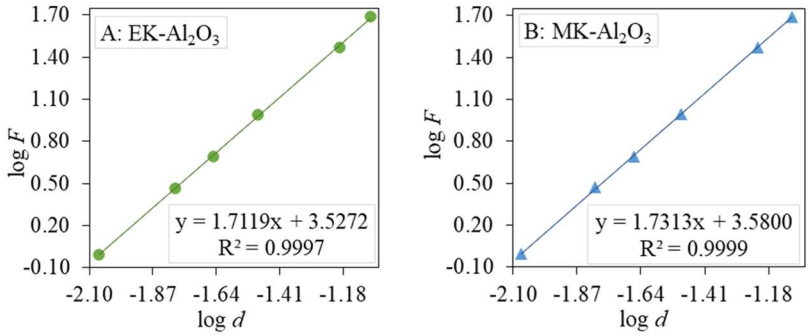

Figure 3. The Vickers hardness data for alumina ceramics sintered in (A) electrical kiln (EK-Al_2O_3) and (B) hybrid microwave kiln (MK-Al_2O_3), according to the Meyer's law

Table 2. The results of the Vickers hardness data analysis, according to the Meyer's law for alumina ceramics sintered in electrical kiln (EK-Al_2O_3) and hybrid microwave kiln (MK-Al_2O_3)

Sample	n	log K	K (Nmm-n)	R2
EK- Al2O3	1.7119±0.0228	3.5272±0.0361	2718	0.9997
MK- Al2O3	1.7313±0.0332	3.5800±0.0526	3619	0.9999

Proportional specimen resistance (PSR) model is a modification of Meyer's law (Li, & Bradt, 1993) that explains the relationship between the applied load *F* and indentation diagonal *d* considering energy balance. PSR is described by Equation 4

$$F = a_1 \cdot d + a_2 \cdot d^2 \tag{4}$$

where a_1 (N mm^{-1}) is a constant related to the specimen's resistance representing energy used to create new surfaces or to friction and elasticity. Coefficient a_2 (N mm^{-2}) is a measure of the "true" hardness, meaning the hardness that is load independent and it is related to occur permanent deformation (Gong, Wu & Guan,1999; Majić Renjo, Ćurković, Štefančić, et al., 2014). These coefficients are shown at Figure 4. and listed in Table 3.

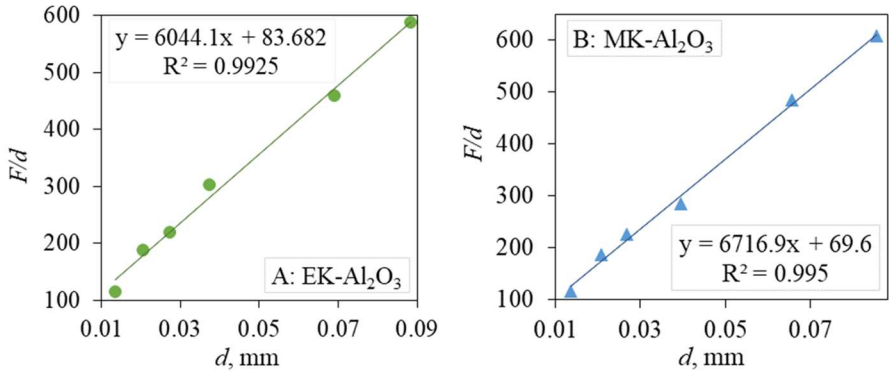

Figure 4. The Vickers hardness data for alumina ceramics sintered in (A) electrical kiln (EK-Al_2O_3) and (B) hybrid microwave kiln (MK-Al_2O_3), according to the proportional specimen resistance (PSR) model.

Table 3. Regression analysis results of experimental Vickers hardness data, according to the proportional specimen resistance (PSR) model for alumina ceramics sintered in electrical kiln (EK-Al_2O_3) and hybrid microwave kiln (MK-Al_2O_3)

Sample	a_1, N mm^{-1}	a_2, N mm^{-2}	R^2
EK- Al_2O_3	83.7±9.8872	6044±262	0.9925
MK- Al_2O_3	69.9±12.174	6717±220	0.9950

Modified proportional specimen resistance (MPSR) model is expanded PSR model with an additional coefficient, a_0 (N) related to the material properties and the quality of sample surface preparation. MPSR model is expressed by the Equation 5.

$$F = a_0 \cdot + a_1 \cdot d + a_2 \cdot d^2 \quad (5)$$

The coefficients of the obtained curves are shown in Figure 5. by the following order: a_2, a_1 and a_0. Those coefficients, obtained by polynomial regression analysis of the F versus d plot, are presented in Table 4.

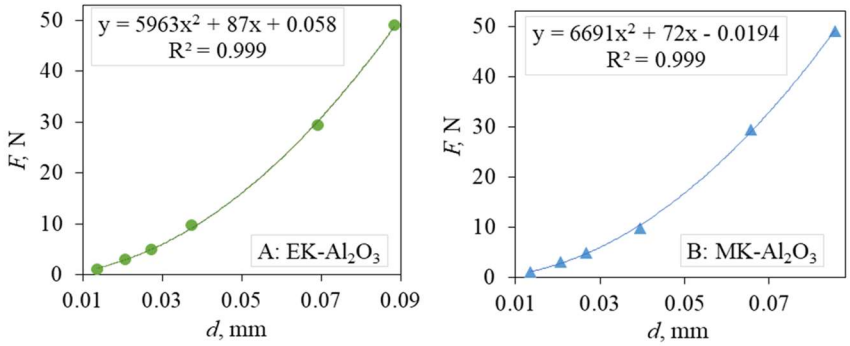

Figure 5. The Vickers hardness data for alumina ceramics sintered in (A) electrical kiln (EK-Al_2O_3) and (B) hybrid microwave kiln (MK-Al_2O_3), according to the modified proportional specimen resistance (MPSR) model

Table 4. Regression analysis results of experimental Vickers hardness data, according to the modified proportional specimen resistance (MPSR) model for alumina ceramics sintered in (A) electrical kiln (EK-Al_2O_3) and (B) hybrid microwave kiln (MK-Al_2O_3)

Sample	a_0, N	a_1, N mm^{-1}	a_2, N mm^{-2}	R^2
EK- Al_2O_3	0.058±0.812	87±49	5963±518	0.999
MK- Al_2O_3	-0.019±0.635	72±38	6691±421	0.999

The residual surface stress coefficients a_0 reach relatively small values due to the careful grinding and polishing of the specimens.

"True" Vickers hardness HV_T can be calculated according to the Equation 6 (Majić Renjo, Ćurković, Štefančić, et al., 2014)

$$HV_T = \alpha \cdot a_2 \quad (6)$$

where α is the geometrical constant of the indenter (0.1891 for Vickers) and a_2 is the coefficient of the PSR and MPSR models, related to the occurred permanent deformation. "True" Vickers hardness values of sintered Al_2O_3 ceramics in electrical and hybrid microwave kiln are summarized in Table 5.

Table 5. "True" Vickers hardness values of alumina ceramics sintered in electrical kiln (EK-Al_2O_3) and hybrid microwave kiln (MK-Al_2O_3), according to the PSR and MPSR models

Sample	PSR model	MPSR model
EK- Al2O3	**1143**	**1128**
MK- Al2O3	**1270**	**1265**

"True" values obtained by PSR and MPSR models show higher hardness of sample sintered in hybrid microwave kiln (MK-Al_2O_3) for 11 – 12 % compared to the one sintered in electrical kiln (EK-Al_2O_3).

In order to examine whether the differences between the means of Vickers hardness of EK-Al_2O_3 and MK-Al_2O_3 are statistically significant, analysis of variance (ANOVA) is conducted (Table 6) using the significance level of 0.05 (α=0.05) (Montgomery, 2013).

Table 6. ANOVA of Vickers hardness values of alumina ceramics sintered in electrical kiln (EK-Al_2O_3) and hybrid microwave kiln (MK-Al_2O_3)

Source of Variation	SS	df	MS	F	p-value	F crit
Between Groups	**23014.46**	**1**	**23014.46**	**0.122**	**0.735**	**4.965**
Within Groups	**1964827.36**	**10**	**.**			
Total	**1894291.39**	**11**				

The null hypothesis is defined in the way that the group means are equal i. e. the Vickers hardness means results for the EK-Al_2O_3 and MK-Al_2O_3 are equal. Obtained *p-value* equals 0.735, that is higher than chosen significance level α, meaning that there is no significant difference between means of Vickers hardness of EK-Al_2O_3 and MK-Al_2O_3 samples. In this case null hypothesis is accepted.

4. CONCLUSIONS

Results presented in this paper show that:

- Measured hardness of conventional and non-conventional sintered Al_2O_3 ceramics decreases with an increase in applied indentation load, meaning that both samples undergo the normal indentation size effect.
- Three different mathematical models were used for analysis of the normal indentation size effect: the Meyer's law, the proportional specimen resistance (PSR) and modified proportional specimen resistance (MPSR) model.
- Meyer's indexes were less than 2 for both samples: 1.6785 for sample sintered in electrical kiln and 1.7237 for the one sintered in hybrid microwave kiln. In that way the normal indentation size effect was also confirmed.
- The MPSR model resulted in the best coefficient of determination (0.999) for both conventional and non-conventional sintered Al_2O_3 samples and because of that is recommended for determination of load-independent or "true" Vickers hardness.
- Sample sintered in hybrid microwave kiln has higher "true" Vickers hardness. Nevertheless, analysis of variance showed no statistically significant difference of hardness between Al_2O_3 ceramics obtained by two sintering methods.

Acknowledgements

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THE EXPERIMENTAL INVESTIGATION OF THE POLLUTION PENETRATION ALONG THE DEPTH COLUMN IN THE INDUSTRIAL WASTE DEPOSIT GATER

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Abstract

The industrial waste deposit Gater was used for disposal of different metallurgy wastes including heavy metals The land was heavily contaminated, by heavy metals sulphates, sulphides, chlorides, and soda ash, but after the mixed hazardous waste removal, there was a need for the land pollution estimation and for simulation of the pollution penetration throughout the depth column, and possible discharge to the ground or surface waters. In the field intended for cultivation, characteristic points were determined, based on several factors that indicated the existence of certain and required pollutants that significantly affect the quality of the soil. It was primarily visual to find these points in order to approach sampling and more detailed analysis on the basis of other primary indicators such as: weight, color, granulometric composition, etc. In this significant and extensive handling of samples, the methods that are most adequate for accurate and reliable soil analysis were used, and with the obtained results it is possible to give certain suggestions for future remediation. Samples with 8 (eight) characteristic points were taken and in order to obtain relevant data indicating a possible method of remediation, sampling was performed from the surface and from a depth of 300 mm. The results showed that lead, arsenic and ferric compounds have penetrated into the deeper layer of the soil, and Copper, cadmium and antimony have been on the surface.

Key words: Mixed hazardous waste, heavy metals, depth column, penetration

1. INTRODUCTION

Mining is an important activity that provides critical raw materials for the development, and also, it is an important economic driver for many countries, especially for some developing (Moreno et al. 2014). However, the important benefits that mining brings come with large impacts on the environment and population. The mining process generates a large quantity of residues that must be strategically treated and managed to combine economic efficiency with demands for environmental sustainability (Aznar-Sánchez et al., 2018).

According (Jamieson et al., 2015) application of mineralogical characterization to mine waste has the potential to improve risk assessment, guide appropriate mine planning for planned and active mines and optimize remediation design at closed or abandoned mines. There are many

studies dedicated to the characterization: Kostadinova and Todorova, (Kostadinova and Todorova, 2014) evaluated the impact of the wastes from mines 'Bobov dol' on the environment components by means of classification and characterization of the wastes; Galjak et al., (Galjak et al., 2020) used different analytical methods for materials characterization, and points out the importance of synergy of the advanced techniques in obtaining the best results in tailing waste characterization at "Gornje Polje" tailing waste deposit. Stojmenović et al., (2017) performed tailings and wastewater characterization on samples taken from lead and zinc mine Grot in Serbia where characterization of the tailing samples included: thermal (differential thermal analysis and thermogravimetric analysis (DTA/TGA) and infrared analysis (FTIR), determination of the chemical composition and content of the heavy metals and qualitative roentgen analysis (XRPD).

The mining and metallurgical production in the region is well known from antic and medieval times. But, significant development of metallurgical activities at north has started in 1926. when Englishman bought concession and established "Trepca Mines Limited". Result of that development is that in city of Mitrovica is situated the largest metallurgic and mining complex in Europe named ''Trepca''(Prathumratana et al., 2018). The production in Trepca was not interrupted even within the Second World War. After 1945, the economic development has been intensified, especially in the field of mining, metallurgy and energetic. In the period from 1970-1990, processing industry was developed in Trepca and existing capacities enlarged (Nikolić and Jakšić, 2005). Finally, due to environmental, economic and political reasons production completely stopped in 1999. For 60 years, in the period 1939-1999, 3.284.568 t of refined lead, 4.110 t of silver, 3.296 t of bismuth and other commercial products (Nikolić, 1999) have been produced. However, now the greatest danger to the environment is posed by industrial landfills formed from waste originating from Trepca.

Unfortunately, during ''Trepca'' operating period and latter many environmental impacts are occurred and analyzed by numerous authors: Milentijević et al., (2014) show the results on the environmental situation in Mitrovica region in the period from 2006-2013. and conduct the analysis predicted by the laws and regulations made in the period from 2006-2013; Kelmendi et al., (2018) conducted a survey about agricultural land focusing on the partitioning of the Pb, Cd, and Zn to the rural part of Mitrovica; Prathumratana et al. (2018) investigated lead contamination in topsoil of the mining and smelting area of Mitrovica; Nannoni et al. (2011) reports the results of a geochemical study focusing on the partitioning of As, Cd, Cu, Pb, Sb and Zn in soils; According to (Kerolii Mustafa and Ćurković, 2016) Trepca Mining Complex is identified as one of the biggest environmental hot spots in the region with toxic/acidic effluents, uncontained waste rock, contaminated building facilities, dust emissions and unsecured working environments, poorly contained and unstable tailing waste. Kelmendi et all., (2011) claim that only from the smelter during 1990, it is estimated to be emitted about 730 [t/year] dust, 438 [t/year] Pb, 83 [t/year] Zn and 3.6 [t/year] Cd, while the total amount of accumulated waste in the landfills of the Mitrovica region was about 40 000 000 tons. One of the significant environmental problems is the GATER landfill. The landfill "Gater" is located in the alluvial area along the river Ibar, north of the central part of Zvecan. At the for which there was no place in the lead smelter at that moment are being disposed of. In the vicinity (20-30 meters) of the landfill-landfill is the river Ibar, which speaks of the possibility of penetration of toxic location, in an uncontrolled and inadequate manner in the area of the old warehouse,

all materials substances through the deposited material and alluvium, especially in the regime of high waters when the groundwater levels rise.

2. MATERIALS AND METHODS

2.1. Sampling area

The "Gater" landfill is located in an alluvial area along the Ibar River. It is irregular and very elongated in shape, about 480 meters long on the longest part and 80 meters wide on the narrower part to approximately 160 meters on the widest. It is bounded on the south by the road Zvecan-Raska, on the west by the Embankment and the road Zvecan-Zubin Potok, on the north side by the road and the tailings field of flotation tailings (partially rehabilitated and recultivated, also from the process in RMHK "Trepca") and on the east by the railway Kosovo Polje-Belgrade. The altitude (absolute) is between 490 and 500 meters, and in relation to the surrounding terrain it is almost flat, with certain deviations, which range from 0.5 to 2.5 meters. Also, the part towards the West (hill) is barely noticeably elevated, while in the extreme part, on the north side, there is a large excavation about 2-2.5 meters deep, which was created during the last cleaning of the landfill.

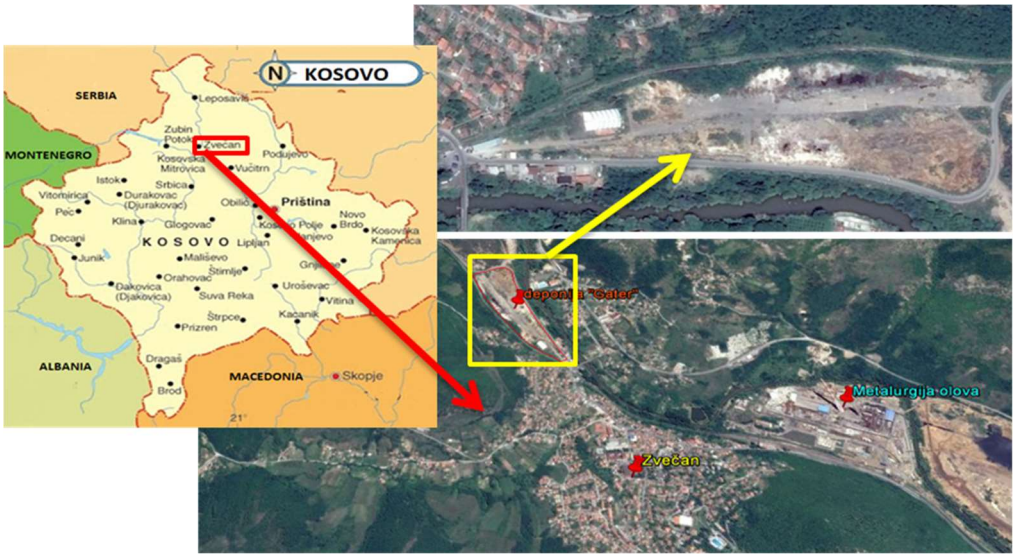


Figure 1. Location of the industrial waste deposit Gater

The surface of the landfill is mostly made of hardened tailings, partly fine and very fine granulation, almost sandy in appearance, reddish-brown to dark brown in color, and white in places where lead chloride is present.

There is an extremely small fund of plant species on the landfill. The fauna is not present, there are no nests or resident birds or migrants, settlements of any species of mammals or reptiles have not been noticed.

The proximity of the river Ibar, which is only 20-30 meters from the landfill, shows that the penetration of toxic substances is possible by penetrating through the deposited material and alluvium, especially in the high-water regime when the groundwater levels rise.

2.2. Material Characterization

To characterize the samples from the tailings "GATER", three methods were used for chemical and qualitative-quantitative tests:

1. SEM-EDS,
2. ICP-AESi
3. XRD.

The testing was performed as follows: demineralization of water on ion exchange columns (conductivity 1.5 μS / cm). Classical distillation of demineralized water via KMnO4 and water permeation through an apparatus for obtaining ultra-pure water (conductivity 0.055 μS / cm) on the apparatus: Barnstead ™ GenPure ™ Pro (Thermo Scientific, Germany).

Microstructural tests were performed using a scanning electron microscope (SEM), model JSM 6460, company JEOL with energy dispersive spectrometer (EDS), company Oxford instruments. The samples were annealed at 1000C to dry the samples, the samples were homogenized, and then the samples were glued on double-sided adhesive tape to place the samples in an electron microscope.

Chemical tests were performed on an ICP-AES device Thermo Scientific iCAP 6500 Duo ICP (Thermo Fisher Scientific, Cambridge, United Kingdom). The calibration standard used is ILM 05.2 ICS Stck 1, manufactured by VGH Labs, Inc-Part of LGS Standards, Manchester, USA (www.vhglabs.com). Sulfur quantification was done on the emission line: SI 182,034 nm, calibration curve had a coefficient correlation 0.99963. Microwave digestion, ETHOS 1, Advanced Microwave Digestion System, Milestone, Italy with HPR-1000 / 10S high pressure segmented rotor was used for sample preparation. The mass of the solid sample is 0.1 g. Reagents, 5 mL of ultrapure water, 5 mL of HNO3 (65%, Sigma Aldrich) and 3 mL of H2O2 (30%, Sigma Aldrich) were used to dissolve the samples.

Diffractometric tests or X-Ray diffractometry (XRD) were performed on a powder diffractometer D2 PHASER, company Bruker. The device is equipped with a dynamic scintillator detector and a ceramic X-ray tube made of Copper (KFL-Cu-2 K) with a 2θ range from 50 to 750 with a phase shift of 0.020. TOPAS 4.2 software with ICDD PDF2 (2013) database was used to interpret the obtained diffractograms.

2.3. Sampling

The places where the samples were taken are characteristic points, determined on the basis of several factors that indicated the existence of certain and required pollutants, which significantly affect the quality of the soil. are: weight, color, granulometric composition, etc., approached sampling and more detailed analysis

Samples with 8 (eight) characteristic points were taken (Figure 2) and in order to obtain relevant data indicating a possible remediation method, sampling was performed from the surface and from a depth of 300 mm. The depth of 300 mm is determined as the depth for secondary sampling because it is within the limits of cost-effectiveness for detailed cleaning and removal of material.

Figure 2. Industrial waste deposit with sampling spots

In the part that was not analyzed, there were changes on the surface of the tailings zone so that sampling was not possible. The material from that surface was deposited in the zone of sample No. 6. and was processed below.

3. RESULTS

The detected compounds or minerals in the tested samples are shown in Table 2.

Table 1. Summary list of compounds or minerals with their formulas:

Compounds	Formula
Diopside, ferroan	$Al_{0.05}Ca_{0.95}Fe_{0.13}Mg_{0.88}Na_{0.01}O_6Si_{1.98}$
Corundum	Al_2O_3
Quartz	SiO_2
Feldspar	$Al_2O_8PbSi_2$
Magnetite	Fe_3O_4
Halite	NaCl
Pyrite	FeS_2
Alumodiarsenate	$KAlAs_2O_7$
Dipotassium oxide	K_2O
Disodium oxide	Na_2O
Magnesium oxide	MgO
Calcium oxide	CaO
Copper oxide	Cu_4O_3
Zinc peroxide	ZnO_2
Lead oxide	PbO
Tilanum dioxide	TiO_2
Manganese dioxide	MnO_2
Dianlimonuytetrxide	Sb_2O_4
Lead dichloride	$PbCl_2$

As the obtained laboratory reports are very extensive (refer to the results of all 8 examined samples from the surface and depth of 300 mm), the further paper presents the results of chemical, microstructural and diffractometric tests of Sample 1 as characteristic.

3.1. Chemical composition of Sample 1

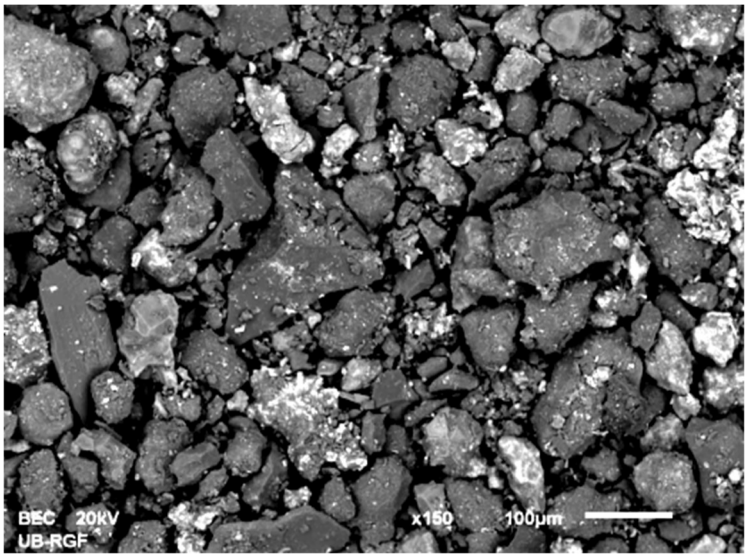
The chemical composition of the tested sample 1 on the soil surface (H = 0 mm) and at a depth of 300 mm (ICP-AES) is shown in Table 2. The values of the detected elements are expressed in weight percent and milligrams per kilogram of sample.

Table 2. Chemical composition of sample 1 (ICP-AES)

Elements	H=0 mm		H=300 mm	
	mass. %	mg/kg	mass. %	mg/kg
Ag	0,011	114,2	0,001	14,2
Al	4,402	44012,4	3,412	3412.6
As	0,243	2428,1	0,143	1428,1
Ba	0,006	59,2	-	-
Ca	0,737	7366,5	1,437	14376,5
Cd	0,001	13,8	-	-
Co	0,004	41,7	0,002	24,6
Cr	0,004	39,1	0,002	19,8
Cu	1,392	13921,0	0,923	923,2
Fe	2,235	22348,9	4.216	42168.5
K	0,025	250,6	1,025	10254.6
Li	0,000	4,2	-	-
Mg	0,468	4682,5	0,668	668,3
Mn	0,161	1612,2	0,264	2642,7
Mo	0,000	0,6	-	-
Na	0,104	1044,8	0,176	1763.2
Ni	0,015	149,1	0,005	54,8
Pb	8,281	82811,6	6.452	64527.8
Sb	0,026	259,4	0,023	232,4
Se	0,002	18,4	-	-
Sn	0,005	46,1	0.002	21.6
Sr	0,002	23,6	-	-
V	0,002	17,7	-	-
Si	17,032	170325,4	21.246	21242.4
Zn	0,795	7953,4	0,496	4963,6

3.2 Microstructural tests of Sample 1

Microstructural analysis of sample 1 was performed on the soil surface and at a depth of 300 mm. Figure 3 shows the SEM microstructure of sample 1 on the soil surface.



For sample 1, two surfaces marked M1 and M2 were analyzed. The compositions of the characteristic surfaces are shown in Table 3. During the test, the elements were not assigned, but the method was chosen so that the device itself detects all the elements present in the sample (Semi qualitative analysis).

Table 3. Semi-qualitative analysis of sample 1 on the soil surface (in weight percent)

	Detected elements (mass. %) on the soil surface											
	O	Na	Mg	Al	Si	K	Ca	Ti	Fe	Cu	Zn	Pb
M1	52.76	1.19	0.85	6.3	17.55	1.47	0.86	0.43	5.77	2.42	1.84	8.55
M2	50.66	1.17	1.02	5.91	16.73	1.49	0.78	0.42	7.22	2.81	2.56	9.22

Figure 4 shows the SEM microstructure of sample 1 at a depth of 300 mm. The results of the semi - qualitative analysis of sample 1 at a depth of 300 mm are shown in Table 5.

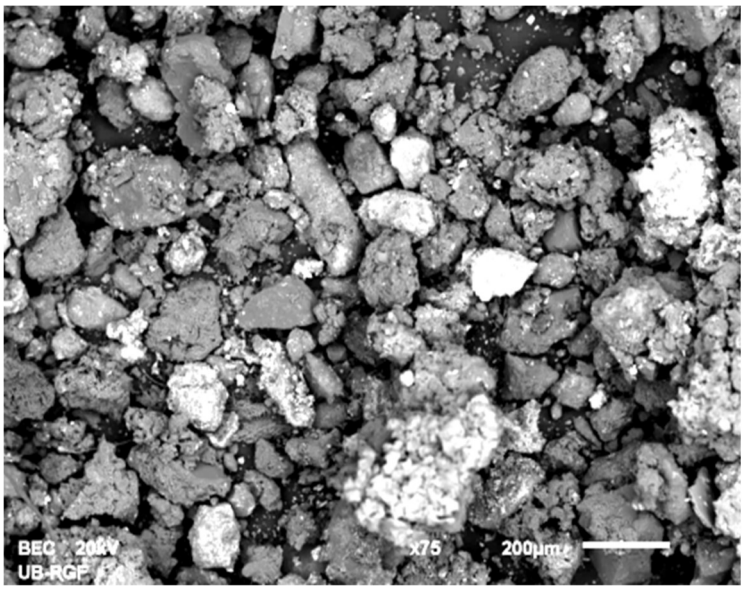


Figure 4. Sample 1 300 mm deep

Table 4. Semi-qualitative analysis of sample 1 at a depth of 300 mm

	Analyzed elements of sample 1 at a depth of 300 mm (mass. %)										
	O	Na	Mg	Al	Si	K	Ca	Ti	Fe	Cl	Pb
M1	57.15	1.79	0.57	7.27	18.65	1.61	1.1	0.27	4.66	0.53	6.39
M2	56.64	1.38	0.83	6.4	18.27	1.73	0.84	0.33	4.69	0.54	6.77

3.2. Diffractometric examination of Sample 1

Diffractometric examination of the sample was performed on an XRD device. Based on the obtained diffractograms, the analysis of the present compounds was performed. Detected compounds and minerals are shown in the right part of Figure 5. for the surface sample, and in Figure 6. for the samples at a depth of 300mm

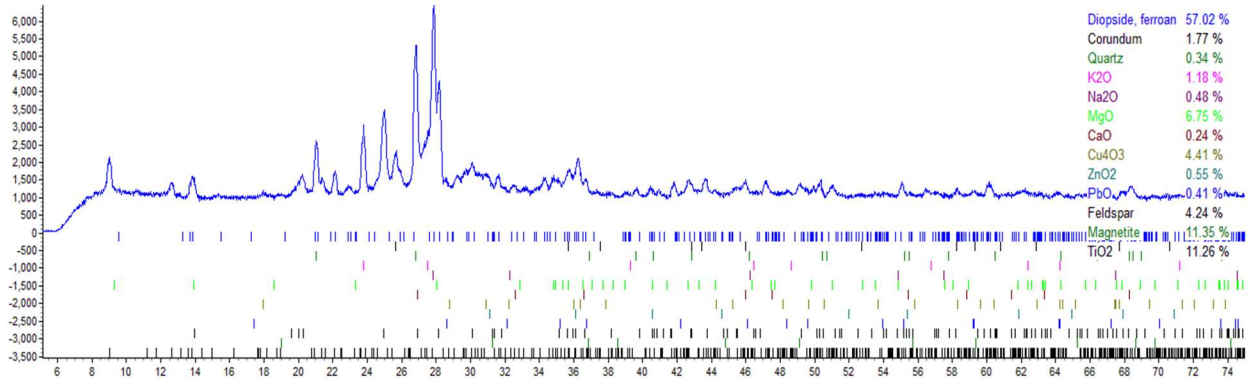


Figure 5. Diffractogram with detected minerals for sample 1 on the soil surface

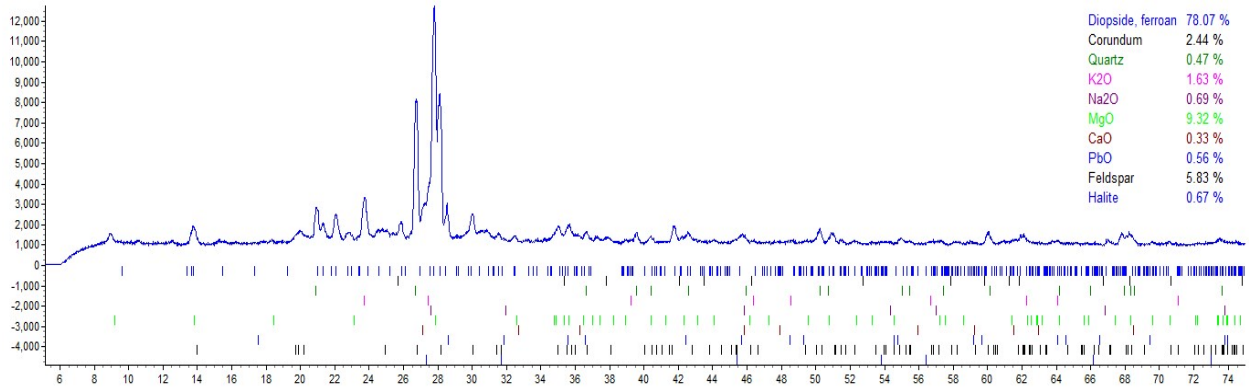
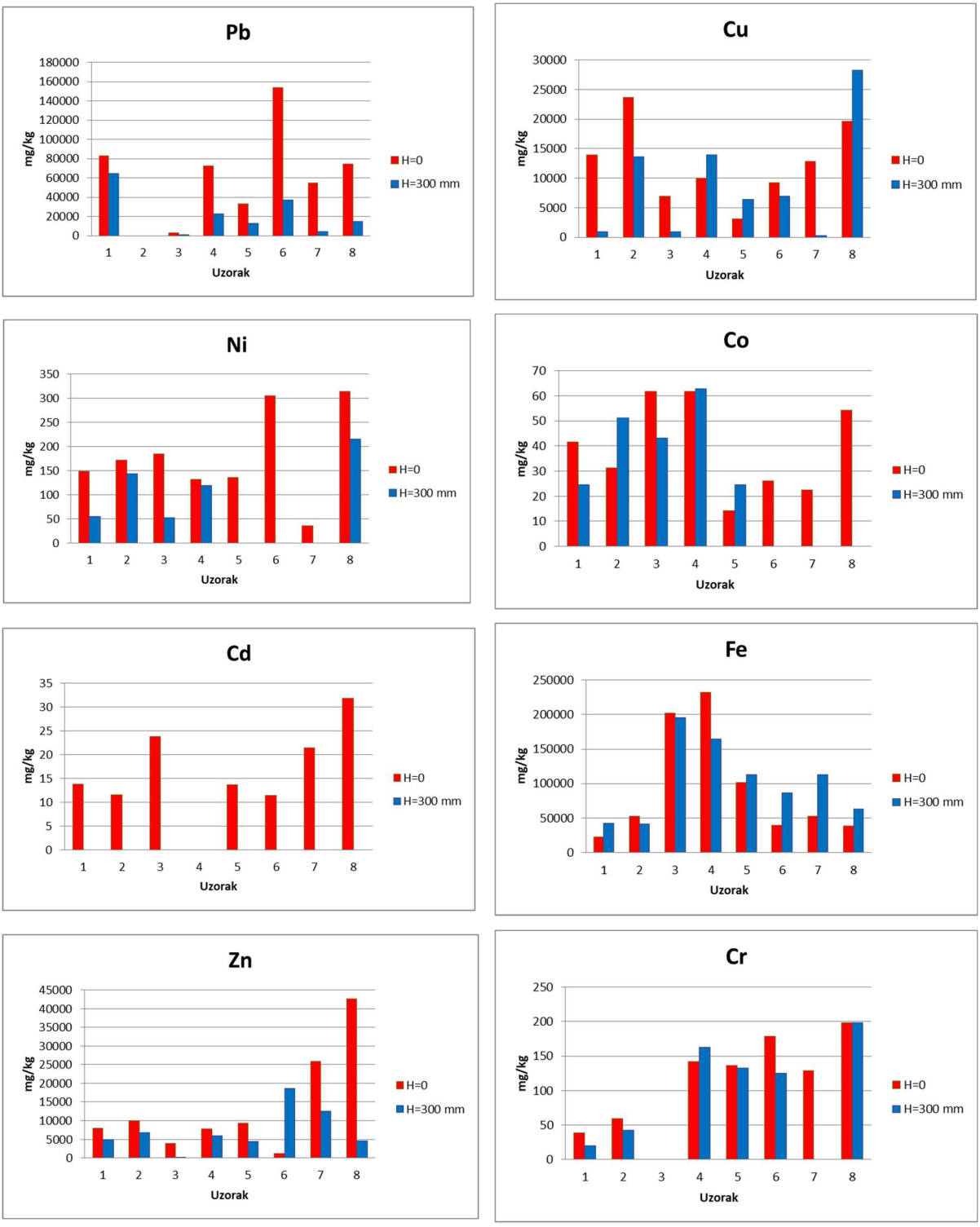


Figure 6. Diffractogram with detected minerals for sample 1 at a depth of 300mm

4. DISCUSSION

The presence of heavy metals along the depth column are presented in the Fig.7

– **Heavy metals**



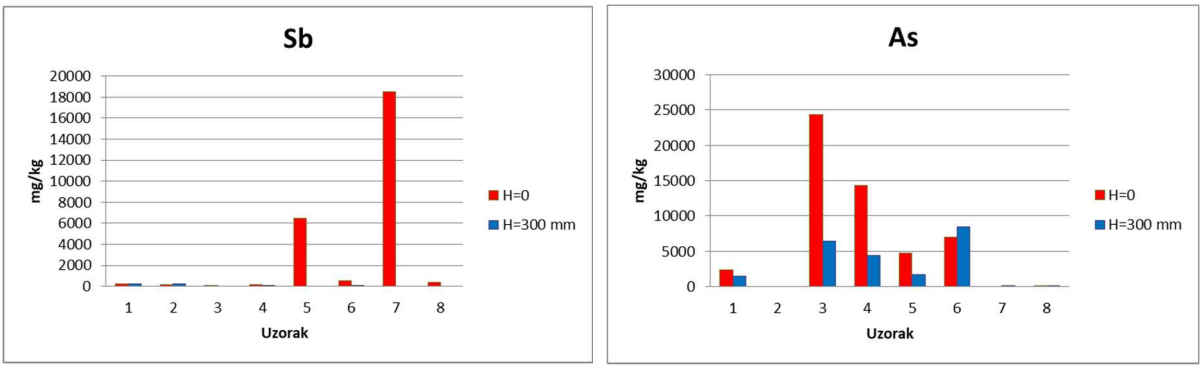


Figure 7. Heavy metals concentrations in all 8 samples

Based on the obtained results, we see that not all the elements penetrate into the soil along the depth column at the same level. Lead is proportionaly distributed in the sample 1, as it was present in the form of oxide PbO. At the other hand, lead remains on the surface mostly when being present in the form of sulphide and sulphates. From the results for the sample 8, it can be seen that the lead is mostly accumulated at the surface as it is present in the form of sulphide and coupled with pyrite. Cadmium, on the other hand is not present in the deeper layers as it is in the form of sulphate. Antimony is present in the oxide form, and was not found in the deeper layers, and Arsenic is movable along the depth column.

5. CONCLUSION

The study presented the behavior of the mixed non homogenous hazardous waste in the weathering conditions. The metallurgical waste was left on the open surface in the close vicinity of the river, exposed to the weather conditions. The environmental impact depends on the composition of the waste, and its exposure to the wind and precipitation. Heavy metals from the waste showed different behavior in the solute transport and penetration along the depth column. It was observed that the penetration depends on the metal, but also on the form of compound and mineralogical composition of the material.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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EFFECT OF CUTTING PARAMETERS ON SURFACE ROUGHNESS DURING END MILLING OF AL 6082-T6 USING RSM

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Abstract

In this paper the influence of cutting parameters on a surface roughness in the end milling of aluminum 6082-T6 using solid carbide end mill with three teeth is presented. The experimental plan was based on orthogonal array L10 with three factors and three levels for each factor. Factors are cutting parameters (spindle speed, feed rate and depth of cut) and levels are different values of them. The effects of the cutting parameters different values on surface roughness were investigated using Design of Experiment (DoE) with Response Surface Methodology. Surface roughness was measured, using a Mahr profilometer in laboratory conditions. The results of measurement were analyzed in the Minitab 17 software package. This software package is used for this experiment to make contour plot, interaction plot, surface plot and regression model for data analysis. Changing values of cutting parameter (increasing number of revolutions, depth of cut and decreasing feed rate) decrease roughness and provides the better quality of the end milling process.

Key words: surface roughness, milling, aluminum.

1. INTRODUCTION

The drastic increase in consumer needs for quality products (better surface finishing and precise tolerance) has forced the metal cutting industry to continuously improve the quality of the cutting process. Surface roughness is an important parameter that affects the processing performance and product quality in the cutting process. It is impossible to report a smooth surface during machining, which means that there is always some roughness on the surface, which can vary depending on changes in machining parameters. There are a large number of factors that affect the roughness of the treated surface, and these are: workpiece material, tool geometry, cutting condition, wear and vibration of the machine that affect the formation of chipboard. In order to achieve better product quality during the cutting process, it is necessary to select the optimal processing parameters as well as the appropriate geometry of the cutting tool, condition, wear and vibration of the machine that affect the formation of chips.

The aim of this study is based on experimental measurement of surface roughness in the end milling process using Response Surface Methodology, determination the influence of input parameters (spindle speed, feed rate and depth of cut) and optimization of the surface roughness.

2. RESPONSE SURFACE METHODOLOGY

Response Surface Methodology (RSM) is a widley used statistical and mathematical techniques for modeling, developing, improving and optimizing processes. Using the method, it is possible to predict the relationship, interaction between the values of a measured response variable and the values of a set of experimental factors that affect the response, predict the response value under different process conditions and find the values of the factors that produces the best value or values of the response (Ranganath et al., 2015).

Method was introduced by Box and Wilson in 1951. RSM is basically a combination of design of experiments, regression analysis and statistical inferences (Hafiz et al., 2007). The method is based on few steps (Prajna, 2013):

- identify the research problem and define the goal of the experiment
- define input factors and levels, as well as desired output responses,
- define an experimental design plan,
- calculate statistical analysis of variance (ANOVA) for input variables to find the parameters that affect the response,
- determine the situation of a quadratic RSM model
- perform optimization and provide an experiment to confirm and verify the predicted performance characteristics.

2.1 Literature review

A large number of researchers and manufacturers were interested in optimizing the cutting process using RSM to achieve better productivity and the impact of parameters on the cutting process.

Routara et all investigated the optimal cutting conditions which leads to minimal surface roughness during CNC turning of EN-8 steel. A mathematical model of cutting parameters was developed using Design Expert software, RSM was used to predict surface roughness, and a Genetic Algorithm based on experimental results was used to obtain optimal cutting parameters. The surface roughness parameters R_a, R_q and R_{sm} decreased with increase depth of cut and spindle speed, but increases with increase feed rate (Routara et all, 2012). Shunmugesh et all investigated the optimal machining parameters during turning process of 11sMn30 using carbide tip insert under dry condition. The experimentation was carried out using three parameters: cutting speed, feed rate and depth of cut. The main objective of this work was to find out the optimal cutting parameters that affect the surface roughness values R_a and R_z using RSM. The observation result shows that the primary factor affecting the surface roughness is depth of cut, subsequently followed by cutting speed and feed. The optimized control factors for minimizing the surface roughness R_a were: cutting speed 225m/min, feed rate 0.1mm/rev and depth of cut 1.5mm. The optimized control factors for minimum surface roughness R_z were: cutting speed 225m/min, feed rate 0.1mm/rev and depth of cut 1.5mm (Shunmugesh et all, 2014). Philip et all in their paper predicted of surface roughness in end milling operations

of duplex stainless steel using RSM. The optimal surface roughness of 0.52 μm was obtained when the spindle speed was kept at high level (1000 rpm), the feed rate at low level (40mm/min) and the axial depth of cut at low level (0.4 mm). The predicted results are compared with results from confirmation tests and the error is within the range of -3 to 5%. (Philp et all, 2015). Sandeep et all investigated influence of cutting parameters (cutting speed, feed rate and depth of cut) during CNC turning of AISI 8620 steel alloy using RSM. The optimized parameters for minimum surface roughness are speed (100 rpm), feed (0.06 mm/rev) and depth of cut (0.1mm). The optimized minimum surface roughness is 0.340 μm (Sandeep et all, 2016).

3. EXPERIMENTAL SET UP AND CUTTING CONDITIONS

The experimental measurement of surface roughness in the end milling process was conducted using work piece material of aluminum alloy 6082-T6. Chemical composition and mechanical properties of aluminum 6082-T6 are given in Tables 1. and 2.

Table 1. Chemical composition of aluminum 6082-T6

Chemical elements	Al	Si	Mg	Mn	Fe	Cr	Zn	Ti	Others
Compososition [%]	95.2-98.3	0.7-1.3	0.6-1.2	0.4-1.0	0.5	0.25	0.2	0.1	0.15

Table 2. Mechanical properties of aluminum 6082-T6

Material	Yield stress [MPa]	Tensile strength [MPa]	Hardness [HRB, HB]
Al 6082-T6	245.1	305.6	95

The milling process was performed on a universal milling machine „Prvomajska“ UGH with solid carbide end mill JS413160D2SZ3.0, manufactured by SECO, Figure 1. (Stanojković & Radovianović, 2019). Cutting geometry of used solid carbide end mill is given in Table 3.

Table 3. Cutting geometry of solid carbide end mill JS413160D2SZ3.0

Description	Value
Depth of cut maximum in feed direction	32 mm
Cutting diameter	16 mm
Shank diameter	16 mm
Flute helix angle	40 deg
Overall length	100 mm
Shanktype	Cylindrical
Number of teeth	3

Figure 1. Universal milling machine „Prvomajska“ UGH with solid carbide end mill

Based on the performance of the universal milling machine and the recommendation of the cutting tool manufacturer, the values of the cutting parameters were determined. Cutting parameters (spindle speed, feed rate and depth of cut) are factors of the milling process in this measurement experiment. Levels are different values of them (Stanojković & Radovianović, 2019). The levels and factors are shown in Table 4.

Table 4. Levels of the input factors

Factors	Levels		
	-1	0	1
Spindle speed-n (rev/min)	320	420	560
Feed rate-Vf (mm/min)	62	93	175
Depth of cut-ap (mm)	0.4	0.7	1.2

Surface roughness was measured on a Mahr profilometer under the laboratory conditions, Figure 2.

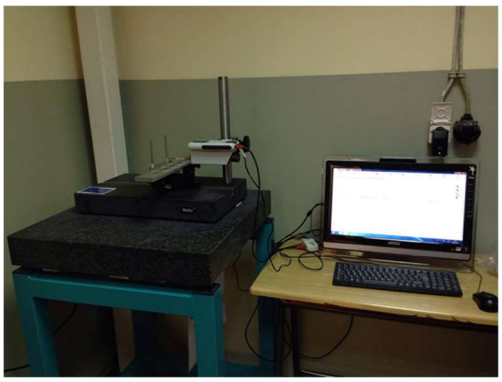

Figure 2. Measuring surface roughness on Mahr profilometer

The experimental plan was based on orthogonal array L10, with three factors and three levels for each factor, Table 5 (Stanojković & Radovianović, 2019).

Table 5. Experimental plan

No.	n [rev/min]	Vf [mm/min]	ap [mm]	n [rev/min]	Vf [mm/min]	ap [mm]	Ra [μm]
1	-1	-1	-1	320	62	0.4	2.907
2	-1	-1	1	320	62	1.2	1.600
3	-1	1	-1	320	175	0.4	5.191
4	-1	1	1	320	175	1.2	4.267
5	1	-1	-1	560	62	0.4	1.673
6	1	-1	1	560	62	1.2	1.757
7	1	1	-1	560	175	0.4	3.348
8	1	1	1	560	175	1.2	3.301
9	0	0	0	405	93	0.7	1.945
10	0	0	0	405	93	0.7	1.976

4. ANALYSIS OF RESULTS AND DISCUSSION

Using software package Minitab 17, the response surface method was performed. RSM was used for examining the relationship between a response variable and a set of experimental variables. The model is tested for its significance by its regression equation, model individual model coefficients and lack of fit, Table 6.

Table 6. Analysis of variance for R_a

Source	DF	SS	MS	F-value	P-value
Model	7	13.6061	1.94373	116.03	0.009
Linear	3	10.8329	3.61098	215.55	0.005
n	1	0.6017	1.88762	112.68	0.027
Vf	1	8.3436	8.34361	498.05	0.002
ap		1.8876	0.60170	35.92	0.009
Square	1	1.7472	0.92700	55.33	0.009
n*n	1	1.7472	0.34196	55.33	0.009
2-Way interaction	3	1.0259	0.37498	20.41	0.047
n*Vf	1	0.0079	0.64298	22.38	0.5262
n*ap	1	0.6430	0.00794	38.38	0.025
Vf*ap	1	0.3750	0.01675	0.47	0.042
Error	2	0.0335	0.03302		
Lack-of-Fit	1	0.0330	0.00048	68.73	0.076
Pure Error	1	0.0005			
Total	9	13.6396			

Based on the P-value can determine which parameters are significant to the response. Factors are significant if their value ≤ 0.05 (Garg & Goyal, 2015). In case the P-value is higher that factor or their interaction of has no significance for RSM. The interaction between spindle speed and feed rate ($n*V_f$) is not significant.

After the significant parameters determined, the regression equation to predict response is:

$$Ra = 1.49 - 0.05776n + 0.03101V_f - 3.450a_p + 0.00006n \cdot n + 0.005906n \cdot a_p + 0.00139V_f \cdot a_p \quad (1)$$

Measured values of surface roughness based on cutting parameters during end milling aluminum 6082-T6 using the software package Minitab determine the main effects and interaction effects for a response surface model, Figure 3. The plots display the effects, be sure to evaluate statistical significance by looking at the effects in the analysis of variance table. The greatest influence on the surface roughness has feed rate. By increasing the feed rate, surface roughness increases, while increasing depth of cut decrease of surface roughness.

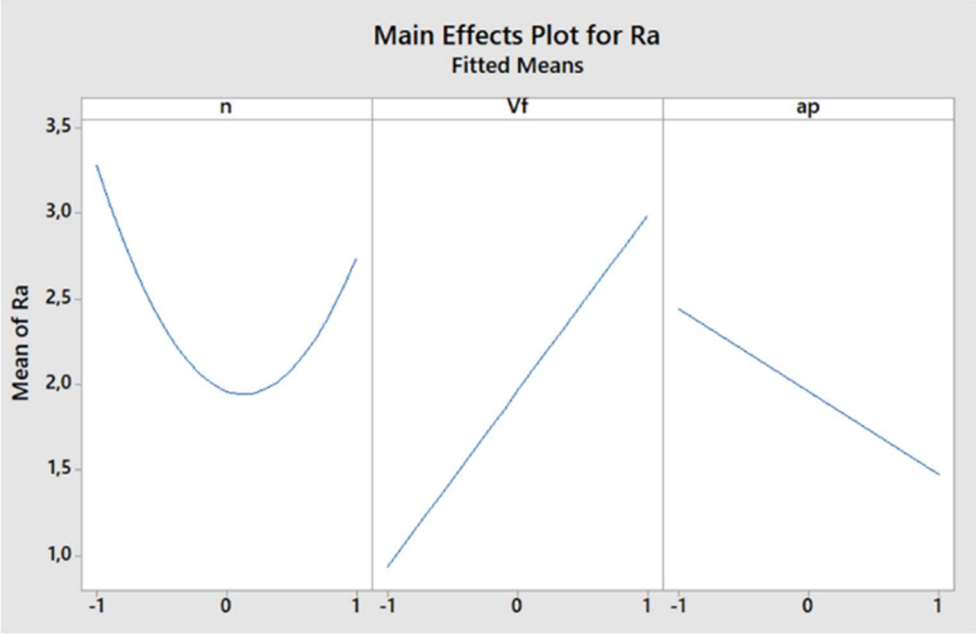

Figure 3. Relation between cutting parameters (n, V_f and a_p) and surface roughness R_a

Using RSM can be generated a contour plot for a single pair of variables or separate contour plots for all possible pairs of variables (Routara et all, 2012). Contour plots show how the fitted response relates to two continuous variables. A contour plot provides a two-dimensional view where all points that have the same response are connected to produce contour lines of constant responses (Nazak & Sodhi, 2017).

By generating contour plots using software for response surface analysis, the optimum is located with reasonable accuracy by characterizing the shape of the surface. Each contour corresponds to the particular height of the response surface, Figure 4a. Figure shows the effect of feed rate and spindle speed on surface roughness. Surface roughness is minimum (<0.1μm) when feed rate speed is minimum and spindle speed is medium value. A surface plot displays the three-dimensional relationship in two dimensions, with the factors on the x- and y-scales, and the response (z) represented by a smooth surface. Surface plot of spindle speed and feed rate on surface roughness, Figure 4b.

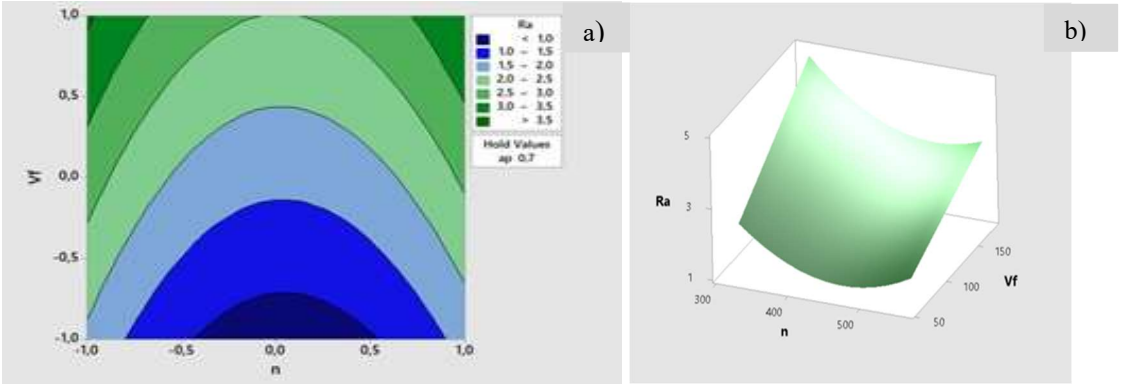

Figure 4. Plots a) contour plot, b) surface plot

A surface plot displays the three-dimensional relationship in two dimensions, with the factors on the x- and y-scales, and the response (z) represented by a smooth surface. Surface plot of spindle speed and feed rate on surface roughness, Fig. 5.

Predict response optimization is used to identify combinations of input variables that jointly optimize a single response or set of responses. Joint optimization must meet the requirements for all responses in the set, which are measured by composite desirability. The goal of optimization in this case is to minimize surface roughness. The Figure 5 shows the levels to be selected for ideal milling parameters.

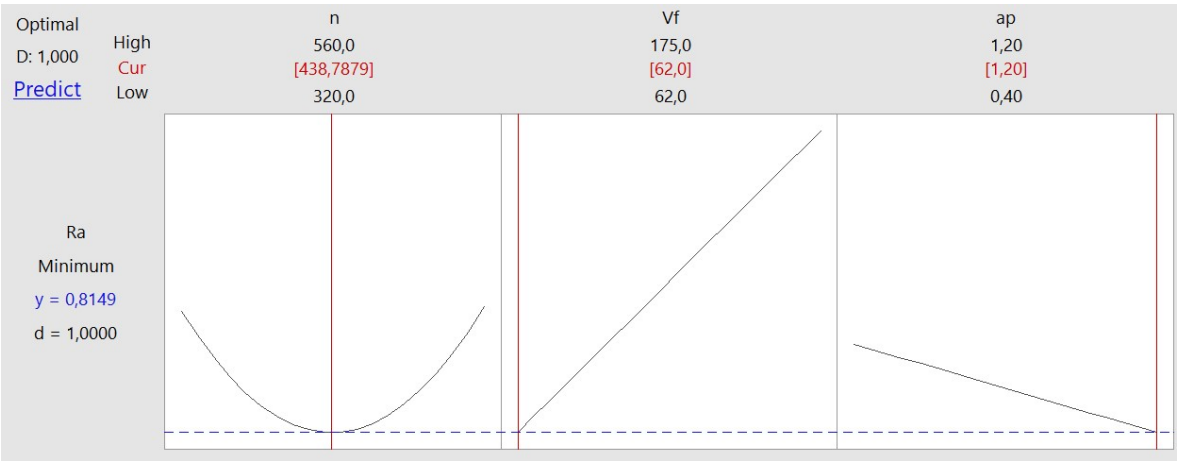

Figure 5. Predict response optimization of surface roughness R_a

5. CONCLUSIONS

The measurement of the surface roughness was carried out for different values of spindle speed (320.405 and 560 rev/min), feed rate (62, 93 and 175mm/min) and depth of cut (0.4, 0.7 and 1.2 mm) in the laboratory conditions on the milling machine “Prvomajska” UGH during end milling Al 6082-T6. Solid carbide end mill, manufacturer Seco, was used for milling process and Mahar profilometer was used for measuring surface roughness. Response surface methodology was used for optimization and effect of cutting parameters (spindle speed, feed rate and depth of cut) surface roughness.

Feed rate is the major influencing factor to affect the performance measures surface roughness.

Contour and surface plots were used for display relates of factors and relationship in two dimensions on surface roughness.

The optimal parameters for cutting process to generate the best roughness surface are spindle speed 438 rev/min, feed rate 62 mm/min, and depth of cut 1.2 mm. The optimized minimum surface roughness is 0.814 μm.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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DECISION MAKING TOOLS IN REGIONAL SANITARY LANDFILL LOCATION SELECTION

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Abstract

Application of intelligent multi-criteria analysis has been done in this paper for the purpose of ranking criteria in process of location selection for Regional Sanitary Landfill. Analysis is performed for 3 pre-selected locations which have been chosen based on size of the available surface area, access to site, potential preparation difficulties, ground waters occurrences, biodiversity and proximity to urban area. These locations have been chosen as those most suitable for construction, both from engineering, economic and environmental aspect. The analysis represents the best example of application of intelligent multi criteria analysis as useful environmental management tool in the decision-making process. Analysis is performed for three proposed locations of Regional Sanitary Landfill: Kasilo, Krystal and Savina Stena. The locations are in relatively close proximity to the municipalities of Zvecan (Savina Stena) and Leposavic (Kasilo and Kristal). For the situation of the post conflict region of Kosovo, there was a lack of verifiable data for the criteria, and the mathematical method have included also the results from the public debate on each location. In order to achieve the most objective results, the AHP and PROMETHEE methods were applied. By using these methods for calculations, the following ranking of the locations for Regional Sanitary Landfill was obtained, regarding their suitability: Savina Stena, Kasilo and Kristal. This result can contribute to the decision-making process of a prioritizing development strategy on the local, but also on the regional level.

Key words: multi criteria analysis, location selection, Regional Sanitary Landfill.

1. INTRODUCTION

The area of project is located in the Zvecan Municipality and it will serve the Municipalities of Leposavic/ Mitrovica (north), Zvecan, and Zubin Potok. The location should be selected for the construction of a new landfill, which will reduce the shortage arising from waste disposal. As of 2011, the Municipalities in North Kosovo have proposed three (3) new sites for the installation of a new landfill, for which they have developed a comparison report. The construction of the new landfill is urgent in the project region in order to protect the human life and the environment. The Municipalities of the study area had the initiative to search for new

sites to host the new sanitary landfill. In 2011 a Commission from Representatives of the three Municipalities (Mitrovica, Zvecan and Leposavic) has been established. The task of that Commission was: to submit a plan of implementation for a new landfill in the area, to determine the potential location of the new landfill to analyze different elements for the potential sites i.e soil, ground water size etc. The Committee prepared a report in which has introduced 3 potential sites, two of which are located in the Municipality of Leposavic and one in the Municipality of Zvecan:

1. Location Kristal, the industrial landfill - Popovacka Polje
2. Location - called Kasilo – in the regional road Leposavic- Kursumlija, and
3. Location , near Srbovac village called Savina Stena – in the main road Raska - Mitrovica

2. METHODOLOGY

One of the advantages of MCA is its ability to help the researcher overcome doubts and problems in a consistent manner. Complexity of data in MCA is reflected in the large amount of data, different measuring units of some parameters, and different scales used to analyze the problem. These methods do not replace the decision-making process, but can contribute to understanding the deliberated multi-criteria problem (Agarski, 2014).

The criteria selection for assessment is an important and very complex step, determining the final results of the MCA. The set criteria estimation result essentially depends on their weight factors. For coupling the weight factor to the selected criterion, it the mixed approach was applied, using subjective and objective methods in order to achieve final integrated weight factors (Agarski, 2014). The analyzed criteria for all five flotation tailings are shown in Table 1.

Table 1. Presentation of criteria of analyzed landfill sites

Criteria	Analyzed Criteria
C1	Proximity of the settlement
C2	Proximity of permanent water flow
C3	Geological environment
C4	Ownership
C5	Volume/ Capacity
C6	Terrain configuration
C7	Public acceptance
C8	Existence of the flooding water sources
C9	Proximity of the Agricultural area

In order to ascertain the ranking of potential landfill locations PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) is used in this paper. The consideration and description of these two methods from a mathematical aspect is presented briefly considering that these methods are explained in detail in numerous papers.

The PROMETHEE method is one of the most important in the field of multi-criteria analysis. This method finds its application in different industrial sectors (mining, chemistry, ecology,

medicine, etc.). This allows complete ranking of the alternatives. The method was developed by Jean-Pierre Brans,1982 in two basic versions: PROMETHEE I, a method of partial ranking the alternatives; and PROMETHEE II, a method for complete or combined ranking of alternatives. The most important advantages of this method are its simplicity and that the parameters used have an explanation and meaning. Following elements of ranking are completely eliminated (Albadvi, 2007). This method relies on qualitative and quantitative data for each criterion and alternative. The PROMETHEE method introduces preference function $P(a,b)$ for alternatives, a and b, which are valued by function criterion. Alternative a is better than b according to criterion f if $f(a) < f(b)$ (Albadvi, 2007). The value of the preference function is within the interval [0, 1], i.e., higher preference is presented by higher function value and vice versa.

The preference function is defined as:

$$P(a,b) = \begin{cases} 0, & if\, d \leq 0 \\ 1, & if\, d > 0 \end{cases}$$

In this case, the following combinations of the function of preference are possible:

$P(a,b) = 0$no preference, indifference;

$P(a,b) \cong 0$weak preference, $k(a) > k(b)$;

$P(a,b) \cong 1$strong preference, $k(a) >> k(b)$;

$P(a,b) = 1$ tough preference, $k(a) >>> k(b)$.

After that it can be concluded that there are the following two features of the preference function:

- $0 \leq P(a,b) \leq 1$,
- $P(a,b) \neq P(b,a)$.

The basic precondition of the functioning of PROMETHEE is to define the general set of criteria for each individual criterion $k(a)$. There are six types of the general criteria. In creation of the specific model for each type of general criterion, the parameters must be determined. In the next section, the presentations of each individual parameter are given. For the shorter text, the sign d is involved, $d = f(a) - f(b)$. According to Brans and Mareschal (1984), there are six types of preference function:

I "Simple" criterion

$$P(a,b) = \begin{cases} 0, & if\, d \leq q \\ 1, & if\ d > q \end{cases}$$

II Quasi criterion

$$P(a,b) = \begin{cases} 0, & if\ d \leq 0 \\ 1, & if\ \ d > q \end{cases}$$

III Criteria for linear preference

$$P(a,b) = \begin{cases} 0, & if\ d \le 0 \\ d/p, & if\ 0 < d \le p \\ 1, & if\ d > p \end{cases}$$

IV Nivoj criterion—stage criterion

$$P(a,b) = \begin{cases} 0, & ifd \le 0 \\ 1/2, & if\ 0 < d \le p \\ 1, & if\ d > p \end{cases}$$

V Criterion with linear preference and domain of indifference

$$P(a,b) = \begin{cases} 0, & if\ d \le 0 \\ \dfrac{d-p}{p-q}, & if\ 0 < d \le p \\ 1, & if\ d > p \end{cases}$$

VI Gauss criterion

$$P(a,b) = \begin{cases} 0, & if \dots d \le 0 \\ 1 - e^{\frac{d^2}{2If^2}} if \dots d > q \end{cases}$$

For the multi-criteria analysis method, PROMETHEE involves preference streams:

- $\phi_j^+(a_j) = \sum_{m=1}^{j} \Pi(a_j, a_m)$—positive stream
- $\phi_j^-(a_j) = \sum_{m=1}^{j} \Pi(a_j, a_m)$—negative stream

The higher + than the other alternatives, however, means further domination over another alternative $a_j$in the system of alternatives. As a measure for multi-criteria evaluation, the PROMETHEE II involves absolute flow:

$$\Phi_j(a_j) = \Phi_j^+(a_j) - \Phi_j^-(a_j);\ j = 1, \dots, J$$

where J is the number of alternative.

In the analysis conducted in this paper for the PROMETHEE method, the commercial software Visual PROMETHEE 1.4 Academic Edition [29] was used. The PROMETHEE method does not provide us the opportunity to analyze decision making on simpler parts compared to AHP. In cases of a bigger number of criteria, this method makes it harder to come to a conclusion for the analyzed problem (Macharis et al, 2004).

For a more complete graphic presentation of the results obtained by the PROMETHEE method, the GAIA plan (Geometrical Analysis for Interactive Assistance) was used from the software Visual PROMETHEE 1.4 Academic Edition. The basic purpose of this application is better visual presentation of the multi-criteria analysis. In the frame of the GAIA plan, some information can be lost after the projection. Based on the main components, the presentation is defined by two vectors, responding to the basic flow of one criterion. Although GAIA includes some percentage of total information, it doesnot provide strong graphic support.

3. RESULTS

The Municipalities of the study area had the initiative to search for new sites to host the new sanitary landfill. In 2011 a Commission from Representatives of the three Municipalities (Mitrovica, Zvecan and Leposavic) has been established. The task of that Commission was: to submit a plan of implementation for a new landfill in the area, to determine the potential location of the new landfill to analyze different elements for the potential sites i.e soil, ground water size etc. The Committee prepared a report in which has introduced 3 potential sites, two of which are located in the Municipality of Leposavic and one in the Municipality of Zvecan:

1. Location Kristal, the industrial landfill - Popovacka Polje
2. Location - called Kasilo – in the regional road Leposavic- Kursumlija, and
3. Location , near Srbovac village called Savina Stena – in the main road Raska - Mitrovica

SITE NO1 – LOCATION KRISTAL

• Land use: The location is not included in any strategic or planning documents for Leposavic municipality.
The estimated volume of the site is: V = 21.218,25 m3
• Due to the previous use of the ground striking bays and concrete dam have been created
Ownership: Trepca , Public enterprise Srbija Sume and Socially owned enterprise Farmers' Cooperative
• Distance from the inhabited location is 3,35km
• Configuration of the site is satisfactory
• Road access to the site is satisfactory
• Capacity of the site is not satisfactory

SITE NO2 – LOCATION KASILO

• Land use: The location is not included in any strategic or planning documents for Leposavic municipality.
• The estimated volume of the site is: V = 50.000 m3 from which 10,500 m3 for the 1st phase of operation and 30,500 m3 for the 2nd phase of operation.
• Ownership: Private owners.
• Distance from the inhabited location is 3,15km
• Configuration of the site is satisfactory,
• Road access to the site is satisfactory,
• Capacity of the site is satisfactory.

From an existing project documentation derived the following elements: a) wind orientation is northeast –southwest, the location is not much exposed to wind; due to the hydrology purposes the regulation of the Kasilovo stream will be necessary as well as detailed analysis of the local springs and their possible contamination by the landfill

SITE NO3 – LOCATION SAVINA STENA

• Land use: The location is not included in any strategic or planning documents for Zvecan municipality.
• The site is located above the river Ibar
• The estimated volume of the site is > 3500.000m3
• Ownership: Public land

• Distance from the inhabited location (Srbovac) is 1,5km
• Configuration of the site is satisfactory,
• There is no access to the proposed site, therefore new access road should be constructed. The ownership of the land for the access road is private land
• Capacity of the site is satisfactory

Comparing the influence of certain criteria to the environment was based on relevant data obtained in the field. In Table 1, analyzed criteria which were used as input data for matrix formatting and quantification for coupled comparison of criteria according to the Saaty scale are presented (Table 7). Those data are than included into the calculations by PROMETHEE method, by common steps in calculation process. By valuing each criterion, coefficient weight of criteria was gained and are shown in Table 8. For the purpose of control of gained results, calculations of the *CR* are done.

Alternatives have been evaluated and a quantified matrix of decision making has been formed (Table 2) by application of the PROMETHEE method for evaluation of environmental influence of tailing ponds. In this process, certain criteria have a quantitative structure, while others are qualitative. Consequently, certain criteria (C1, C2, C3, C4, C5, C8, C9) are stated quantitatively, while others are stated qualitatively. The application of qualitative and quantitative scales provides confidence that all criteria are well arranged in the best manner possible.

Table 2. Quantified matrix of decision making (Evaluation matrix).

	Scenario1	Proximity of ...	Proximity of ...	Geological e...	Ownership	Volume/capa...	Configuration	Public accept...	Existence of ...	Proximity of ...
	Unit	m	m	unit	unit	m3	%	unit	unit	unit
	Cluster/Group	◆	◆	◆	◆	◆	◆	◆	◆	◆
⊟	**Preferences**									
	Min/Max	max	max	max	max	max	min	max	max	max
	Weight	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	Preference Fn.	U-shape	Usual	Usual	Usual	Usual	Usual	Level	Usual	Usual
	Thresholds	absolute	absolute	absolute	absolute	absolute	percentage	percentage	absolute	absolute
	- Q: Indifference	1,00	n/a	n/a	n/a	n/a	n/a	1	n/a	n/a
	- P: Preference	n/a	n/a	n/a	n/a	n/a	n/a	2	n/a	n/a
	- S: Gaussian	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
⊟	**Statistics**									
	Minimum	1500,00	301,00	0,20	0,10	21285,00	0,00	0,10	0,00	50,00
	Maximum	3350,00	2758,00	0,80	1,00	50000,00	0,70	1,00	0,80	1500,00
	Average	2666,67	1519,67	0,50	0,53	33761,67	0,40	0,70	0,50	683,33
	Standard Dev.	828,99	1003,16	0,24	0,37	12020,83	0,29	0,42	0,36	605,99
⊟	**Evaluations**									
☑	Kristal	3350,00	301,00	0,50	0,10	21285,00	0,00	1,00	0,80	50,00
☑	Savina Stena	1500,00	1500,00	0,20	1,00	30000,00	0,50	1,00	0,70	1500,00
☑	Kasilo	3150,00	2758,00	0,80	0,50	50000,00	0,70	0,10	0,00	500,00

After quantified matrix of decision making was provided, analyzed alternatives (tailing ponds) were evaluated using Visual PROMETHEE software. This resulted with a rank order of alternatives. Multi-criteria ranking method PROMETHEE introduces qualities of positive, negative and net flow [29]. The results obtained from positive, negative and net flow are presented in Table 3.

Table 3. PROMETHEE flows

Alternatives	*Ph+*	*Ph−*	*Ph*
Savina Stena	*0.0556*	*0.5000*	*0.4444*
Kasilo	*0.0000*	*0.5000*	*0.5000*
Kristal	*-0.0556*	*0.4444*	*0.5000*

4. DISCUSSION

The ranking of the analyzed alternatives is given in Figures 3–5 using the PROMETHEE method.

In Figure 1, the final ranking of analyzed tailing ponds is given. This figure is based on net flow Phi. The upper half of the given scale (colored in green) represents positive Phi value, and the lower half (red) represents negative Phi value. Alternative Savina Stena is at the top of the analyzed alternatives, preceding Kasilo, and Kristal. Values of the Phi flow for these alternatives are given in Figure 1.

Figure 2. shows a diamond PROMETHEE solution. This solution shows partial PROMETHEE I and final ranking PROMETHEE II in a two-dimensional model. The PROMETHEE diamond solution is presented with the dot on (Phi+,Phi−) flat. The flat is at an angle of 45° so that the vertical dimension (red-green axis) corresponds to Phi net flow. A cone is drawn for every alternative. The highest priority alternative is Savina Stena, and the lowest is alternative Kristal.

In Figure 3, the GAIA plan is shown (Geometrical Analysis for Interactive Assistance), which is a descriptive addition to the PROMETHEE ranking. Every alternative is presented with a dot found on the GAIA plan. The position of these alternatives is connected with the marks of a set of criteria. Each criterion is presented with the axis from the centre of the GAIA plan. The orientation of these axes shows how these criteria are interrelated. The determination axis (red axis) suggests the alternative Savina Stena has the most favourable impact on the surrounding ecosystem.

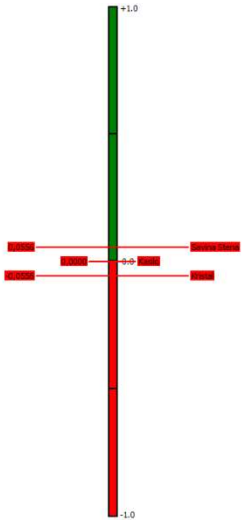

Figure 1. Final ranking

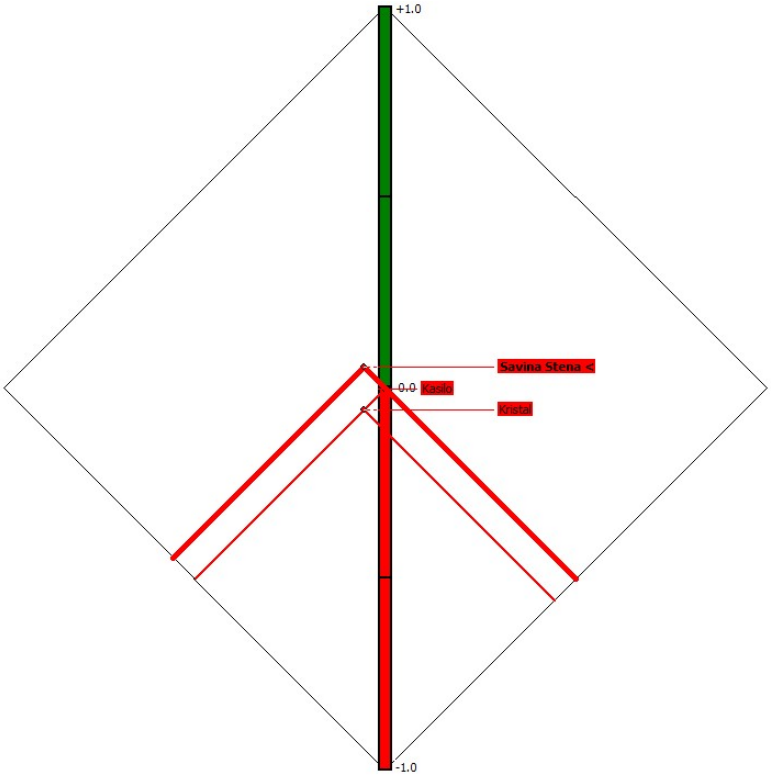

Figure 2. PROMETHEE diamond solutions

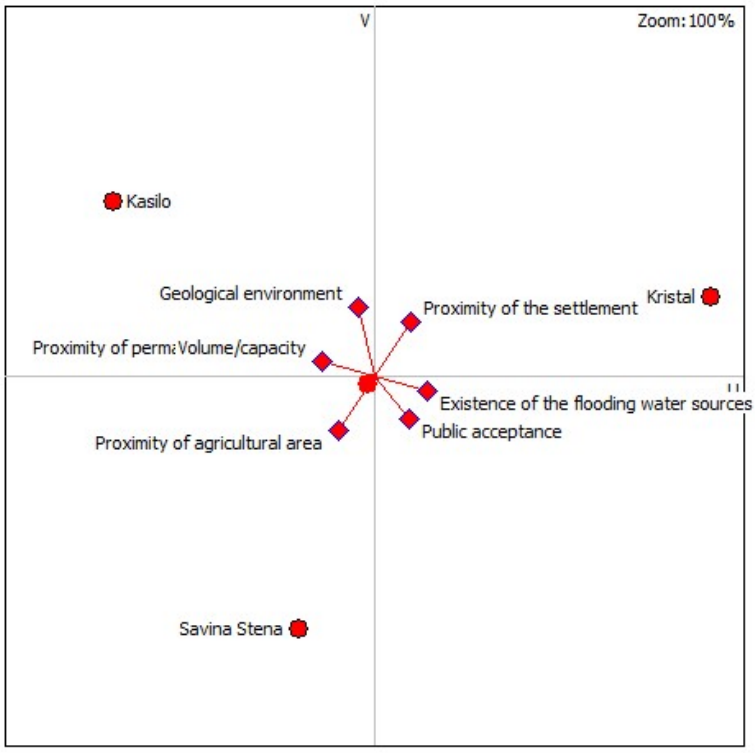

Figure 3. GAIA plan for landfill location

It should be noted that other methods of multi-criteria analysis (VIKOR, TOPSIS, ELECTRE) also should be used to verify the results and the final decision.

5. CONCLUSIONS

This paper analysed and ranked the locations for the sanitary landfill construction based on the criteria for sustainable development. The result obtained using multi-criteria analysis ranking the possibilities for successful construction among three proposed construction sites with the application of PROMETHEE method showed a certain reality, which is in accordance with the situation on the terrain. According to this analysis, the most adequate location is Savina Stena, and then Kasilo, and Kristal. Application of the results can be used in the decision-making process for spatial planning and the development plans as well as for the Solid Waste Management Plans.

The application of the method for the multi-criteria analysis of the waste management plans should be an integral part of the overall management system to the highest level as the enforcement of environmental protection is an interactive process. In the case of the Sanitary Landfill the capacity of a method for multi-criteria analysis is demonstrated in the field of analysis and ranking of the influence of the landfill have on the surrounding ecosystem, economic benefits and society as a whole.

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ASSESSING THE INDICATORS OF FARM-LEVEL SUSTAINABILITY – IDEA METHOD

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Abstract

The aim of this paper is to present the main findings of the research study for assessment of the indicators on farm-level sustainability in Kosovo. The research was conducted with the collection of data from 40 farms in the region of Pristina. Out of the total of farms, 19 farms were of small superficial size (> 5 ha), and 21 farms were large superficial size (< 5 ha). The main objective of the research was to measure sustainability at the farm level, through IDEA Method. The IDEA Method (Indicateurs de Durabilité des Exploitations Agricoles) (Zahm F. et al, 2018) is a new method for the practical assessment of sustainability, which is composed of three aspects or scale, by which the research has been conducted. Within the scope of this research, the aim was to achieve the testing of some specific objectives of the research: measurement of the sustainability in the agro-ecological aspect, measurement of the sustainability in the socio-territorial aspect, measurement of the sustainability in Economic aspect and, differences in sustainability between small and medium farms. The methodology used in this research lies in calculating the weight of each indicator that is tested (41 indicators and 3 dimensions). The economic, socio-territorial and agro-ecological aspects are the areas that has been studied and the sustainability of each other's impact on the farm level in Kosovo has been measured. The total value of a scale is a maximum of 100 points and hence, the higher the value collected within the sustainability scale the higher the level of stability in farms. The Economic aspects show more stable at the farm- level of all tested farms (52.8/100pts). Following it, the Socio-Territorial aspect is below the desirable average sustainability (47.8/100pts). Lastly, the Agro-Ecological aspect shows a desirable level of sustainability in agriculture (41.2/100pts). Overall, farms with a surface area of more than 5 ha are found to be more sustainable in all three aspects.

Key words: IDEA Method, sustainability indicators, sustainable development, Kosovo farm system.

1. INTRODUCTION

The rapid development of technology, innovation and the design of agricultural policies which aim to maximize economic profit, have influenced that agricultural activities and agricultural development in general undergo changes. Also, the shift of traditional extensive agriculture into

market-oriented intensive agriculture has oriented agriculture in a new direction of development. Agriculture in Kosovo until recently was developed in a traditional way, i.e. only to meet family needs, but after the evolution of many other external factors has undergone positive changes in the way it is developed.

Rapid developments in agricultural activities and practices have affected the stability and sustainability of agriculture in general. As in Kosovo so far there has been no empirical measurement about the impact of this agricultural development in economic, environmental and social terms or the shift of extensive to intensive agriculture, the need to realize one has increased. In addition to empirical measurements which will be performed by testing key indicators for measuring sustainability, necessary to have a better picture of Kosovo's agriculture is the theoretical definition of the term sustainability. Through the development of this research will be realized a series of empirical measurements which as a conclusion will be presented the level of sustainability of Kosovo farms. The term will be defined at the level of Kosovo farms, adapting international terms.

Kosovo is a new country and in economic transition, as well as the agriculture sector is estimated to have a significant impact on the overall local economy. Nonetheless, because of the economic turmoil during the war in the past decades, the general state of the agriculture sector has been destabilized. Besides this, Kosovo has gone through a transition of agriculture approaches from traditional (extensive) to modern (intensive). The introduction of high-quality agricultural production is one of the aims that our country has in order to improve the sector. On that note, sustainability is of key importance in order to ensure the longevity of the significance of the sector for the economy. Therefore, such evaluations and research that result in important findings for the agricultural sector are evaluated at the national level, as by farmers, researchers and policy makers. This method has been able to identify gaps and advantages to the basic level of a particular aspect, which is easier to intervene.

1.1 Formulation and justification of problem

Among the goals and objectives of the EU, respectively, the EU Sustainable Development Strategy are; achieving a continuous long-term improvement in the quality of life through the creation of sustainable communities, capable of managing and using resources efficiently, and the innovative social potential of the economy and ultimately capable of ensuring prosperity, environmental protection and social cohesion (European Commission, 2017). Similar development objectives have been set for the state of Kosovo, as an EU candidate member.

Sustainability in agriculture as a term has so far been analyzed and defined theoretically. On the other hand, the measurement of sustainability in the practical aspect, as a system of indicators has not been practiced before. This is a research that was not previously realized in Kosovo, neither in the region. Consequently, the study aim is to develop agricultural policy proposals that intend to ensure sustainability and efficiency of agricultural production. The research as the main goal had to measure the indicators and to bring the term sustainability as an important part of this concept, apart from the theoretical concept. The method and work of this research focus on conducting questionnaires on selected farms for testing the indicators.

Singling term sustainability, in fact manage to summarize a number of factors or elements that are the building part of this unifying term. These highlighted factors, together with other constituent factors, construct and define the term sustainability. So, only after testing and

calculating the points according to the IDEA method, it will be possible to conclude the impact of each factor on sustainable development in agriculture.

Among these factors we can mention:

a) arable agricultural area: size of parcels, land leased or owned by farmers, ecological regulatory areas, land use destination, bare land, crop rotation, use of sanitary and phytosanitary products;
b) level of employment: number of workers on a farm, number of males and number of female farm workers, age of workers, working hours, contracts;
c) government financial support: amount supported, direct payment or investment grant;
d) economic specialization of the farm: diversity of planted crops, diversity of animals, form of sale of products, destination of farm products;
e) economic efficiency: economic transferability, financial autonomy, efficiency of the production process; etc.

Taking into account all these constituent factors, which constitute the term sustainability, macroeconomic factors such as unemployment, economic growth, etc., low level of production and trade, volatility of input and output prices, lack of education and training farmers about new approaches, new technology and how to use natural resources. Based on these we can conclude and justify the importance of conducting this research in the field of agriculture.

1.2 The main objective and the specific objective of the research

The main objective of the research is to measure sustainability at the farm level. The IDEA method is a new method for practical sustainability assessment, which consists of or is classified into three aspects or scales by which the research will be conducted.

Within this research it is intended to achieve the testing of some specific research objectives:

- measurement of sustainability in the agro-ecological aspect
- measurement of sustainability in socio-territorial aspect
- measuring sustainability in economic aspect
- differences in sustainability between small and medium farms.

2. MATERIALS AND METHODS

An important part of any research is also defining or defining research methods and methodology. Many terms have been used in the literature to describe the term sustainability through various tools such as methods, methodological approaches, frameworks (M. de Olde E. et al., 2016).

IDEA Method (Zahm F. et al., 2008), is a modern practical method which was first developed in 1998. This method is based on objectives which are grouped into three levels of sustainability: economic, agro-ecological and socio-territorial. These objectives are based on agricultural principles, which represent a system where economic activities must be efficient.

Economic efficiency directly affects the ecological aspect, and it should be at minimal cost. In addition, economic efficiency is also related to the social aspect, which is related to ethics and human development, which is considered as a developmental function of a farm (Gavrilescu C.

et al., 2012). According to Gavrilescu (2012, f. 128) the comparison of the indicators that will be tested will be limited for a number of reasons:

- Different reference systems for the current calculated indicators, which generally meet only the minimum measurement standards;
- Lack of time series that allow the analysis of changes in specific indicators; therefore, at present, no sustainable indicators of sustainability can be developed;
- Lack of a national representative data set as well as a consensus on weight index, both nationally and internationally.

The lack of studies on sustainability in agriculture and sustainability at the farm level in Kosovo is a shortcoming to present the real situation of three interrelated aspects. Therefore, it is necessary to apply the survey method to collect data for research. This method will be realized by testing the indicators according to the IDEA method. Initially, a questionnaire was compiled which aims to collect data on the 41 indicators that will be tested. After compiling and testing the questionnaire, the survey method was carried out by completing field questionnaires where the necessary data were collected directly with small and medium farm farmers.

Basic data about farm activities were provided by FADN[15] questionnaire data. FADN questionnaires provided detailed data on farm area, spatial arrangements, diversity of activities, animal diversity, use of sanitary and phytosanitary products, level of equipment, sales, revenues, state support, etc. But, due to not completing the necessary data for the method defined in the study conducted direct interviews with farmers. Additional data needed to provide complete information were collected from interviews with 40 farms in the Prishtina region. The questionnaire which was used for the purpose of data collection is formulated in three modules: the part for agro-ecological, socio-territorial data and for the economic part. The questions are structured in order to gather specific data needed for the IDEA method.

Below, a figure is presented which describes in detail each indicator:

Table 1. Indicators according to the IDEA method

DEGREE OF SUSTAINABILITY	CONSTITUENT ELEMENTS	MAXIMUM POINTS
Agro-ecological sustainability	Agricultural diversity	33
	Agricultural spatial arrangements	33
	Agricultural practices	34
Socio-territorial sustainability	Quality of products and soil	33
	Socio-economic spatial arrangements	33
	Ethics and human development	34
Economic Sustainability	Economic sustainability	30
	Financial independence	25
	Economic transmissibility	20
	Economic efficiency	25

(Gavrilescu C. et al., 2012)

The methodology used in this research lies in calculating the weight of each indicator that is

[15] Farm Accountancy Data Network

tested. The IDEA method itself includes 41 indicators that are classified in three dimensions or three aspects. The economic, socio-territorial and agro-ecological aspects are the areas that has been studied and the sustainability of each other's impact on the farm level in Kosovo has been measured. The total value of a scale is a maximum of 100 points. According to the IDEA method, the higher the value collected within the sustainability scale, the higher the level of stability in farms. Also, the link between one aspect and the other is determined by the total value finally calculated as a result of testing these indicators.

3. RESULTS AND DISCUSSIONS

Structuring the indicators is done based on the specifics of the sustainability dimensions in agriculture in the local context. The scoring or evaluation of all indicators has resulted in an expectation with the level of Kosovo's farms. Evaluating all farms, without splitting the size and aspects results are interpreted below. The Economic aspects show more stable at the farm-level of all tested farms. Out of the total of 100 points within the dimension; this aspect has resulted in 52.8 points. Following it, the Socio-Territorial aspect is below the desirable average sustainability. Out of the total of 100 points within the dimension, this aspect has resulted in 47.8 points. And finally, the Agro-Ecological aspect shows a desirable level of sustainability in agriculture, where the maximum valuation within dimension is 41.2 points.

Below is presented the figure by maximum points of each aspect of sustainability:

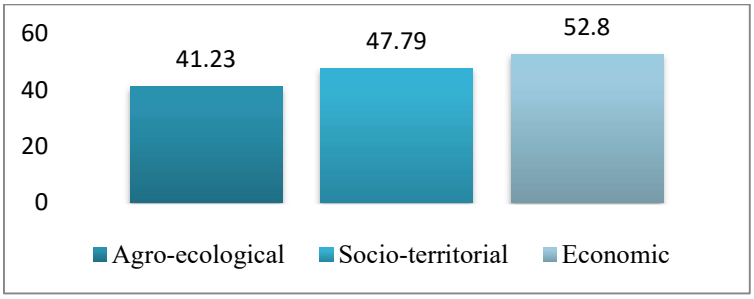

Figure 1. Assessment of sustainability aspects

The other results found by this study are the comparison of the difference between the levels of sustainability between the two groups of farms. Farms with a surface area of more than 5 ha are found to be more sustainable in all three aspects. While the group of farms with a surface area (> 5 ha) appears to be less sustainable in all three dimensions of sustainability in agriculture. The agro-ecological aspect represents the aspect where farm stability is lower for both groups. According to the survey, small farms are less ecologically contributing to the development of agricultural activities. A low contribution rate during the development of agricultural activities also gives socio-territorial aspect, where out of a total of 100 points, the total for all indicators is 45 points.

This form of assessment is very understandable starting from the farmer itself, where the basis of the intervention for change is also started, but also for researchers and policy makers. Through the testing of indicators through the IDEA method, a realistic picture of Kosovo farms has been created. It is necessary and priority to identify problems as well as solve problems related to sustainable development. This data is important and should be evaluated first by the

farm managers, where the most important direct intervention is made. Then the researchers and policy makers, whose task is to draft strategic policies enabling the creation of sustainability within farms, which primarily have the development of agricultural activities.

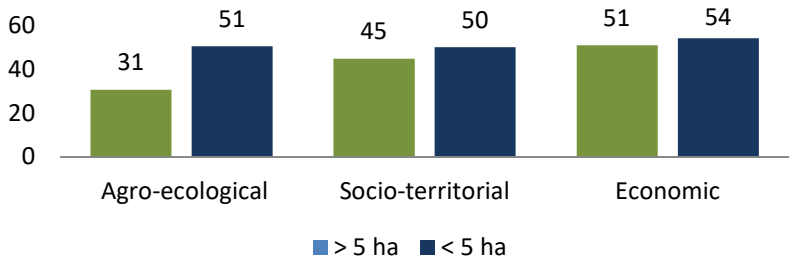

Figure 2. Level of sustainability between two groups of farms, *Correlations of sustainability scales*

The correlation technique is used in order to describe or present the impact of each aspect on each other within the group of farms by size, as well as the impact or compatibility of aspects of one group with the other in general.

Table 2 shows the dual matrix of variables matching each other.

Table 2. Correlation matrix between sustainability scales for two groups of farms

	> 5 ha			< 5 ha		
	Agro-ecological	*Socio-territorial*	*Economic*	*Agro-ecological*	*Socio-territorial*	*Economic*
Agro-ecological	1			1		
Socio-territorial	-0.20072	1		0.462585	1	
Economic	0.209947	0.157903	1	-0.13296	0.166581	1

Source: Research survey

Starting from the first group of surveyed farms, which are farms under 5 ha in size, we see that the correlation between the socio-territorial and agro-ecological aspects is inverted. That is, with the increase of one of the components of the social aspect in order to sustainable development of agricultural activities, it results in a decrease of sustainability in the social aspect. The correlation of the economic aspect to the socio-territorial and agro-ecological aspect is in the normal form, where with the increase of economic sustainability, the ecological and social sustainability also increases.

The group of farms with a size larger than 5 ha, has turned out to be more stable during the development of agricultural activities. According to the correlation matrix, the compatibility between the social and ecological aspect is in the normal form. The more sustainable the farm is socially, the more ecologically sustainable it will be. There is also a positive correlation between the economic aspect and the social aspect. Large farms are characterized by more sustainable development in economic terms whereas a result is the investment in social welfare. An inverse or negative correlation is presented between the economic and ecological aspect. According to the correlation matrix, the larger the female in economic terms, the less there will be a positive impact in agro-ecological terms.

According to the survey, we have resulted in realistic findings of the level of sustainability within the farms of both groups. Both small farms and large farms are important in the development of agricultural activities and the agricultural sector in general. It is very important to identify the problems that arise during the development of agricultural activities and rural development on farms in Kosovo. The correlation matrix is a simple technique but of great importance to address problems on a large scale. According to the findings realized by the IDEA method, development policies can be created to create optimal agricultural development resulting in optimal impact on the three dimensions of sustainability.

Table 3 presents the evaluations or scoring of indicators of the IDEA method, adapted to the level of Kosovo farms. Indicators that did not match the nature of Kosovo's agriculture were removed from the overall assessment.

Table 3. Evaluation of indicators according to the IDEA method

Aspects	Components	Indicators	The original IDEA	The adopted IDEA	Maximum rating for each component
Agro-ecological	Diversity	(A1) diversity of annual and temporary crops	13	9	33
		(A2) diversity of perennial crops	13	9	
		(A3) diversity of accompanying vegetation	5	removed	
		(A4) animal diversity	13	9	
		(A5) enhancement and conservation of genetic heritage	6	6	
	Spatial arrangements	(A6) crop rotation	10	9	33
		(A7) dimensions of parcels	6	4	
		(A8) organic matter management	6	4	
		(A9) ecological buffer zones	12	10	
		(A10) contribution to the environmental value of the area	4	2	
		(A11) animal load	5	3	
		(A12) forage space management	3	1	
	Agricultural practices	(A13) fertilization	10	9	34
		(A14) effluent processing	10	removed	
		(A15) pesticides	10	9	
		(A16) veterinary treatment	3	3	
		(A17) soil resource protection	5	5	
		(A18) water management	4	removed	
		(A19) energy dependence	8	8	
Total scale of Social-territorial					100
Socio-territorial	Quality of the products and land	(B1) the quality process of the products produced	12	11	33
		(B2) assessment of building heritage and landscape	7	6	
		(B3) processing of non-organic waste	6	5	
		(B4) accessibility of space	4	3	
		(B5) social involvement	9	8	
	Employment and services	(B6) short trade	5	5	33
		(B7) services, multi-activities	5	5	
		(B8) contribution to employment	11	11	
		(B9) collective work	9	9	
		(B10) probable farm sustainability	3	3	
	Ethics and human development	(B11) contribution to world food balance	10	9	34
		(B12) training, education	7	6	
		(B13) labor intensity	7	6	
		(B14) quality of life	6	5	
		(B15) isolation	3	3	
		(B16) the quality of the buildings	6	5	
Total scale of Agro-ecological					100
Economic	Viability	(C1) economic viability	20	20	30
		(C2) economic specialization rate	10	10	
	Independence	(C3) financial autonomy	15	15	25
		(C4) sensitivity to subsidies and allowances	10	10	
	Transmissibility	(C5) transmissibility	20	20	20
	Efficiency	(C6) productive process efficiency	25	25	25
Total scale of Economic					100

4. CONCLUSIONS

Measuring sustainability at the farm level is one of the goals not only in Kosovo and the region, but also in developed countries. Assessing the sustainability of farms is a very important factor to take steps in the process of development and decision-making on farms. The data or results after testing the indicators at the farm level present a clear picture of the strengths and weaknesses, risks and challenges within a small, medium or large farm. Identifying the problem during the short- and long-term development process enables early intervention initially by the farmer, researchers and policy makers.

Agriculture in Kosovo, although it has always been the primary activity of rural areas, has not been treated or used adequately for the purpose of financial gain but only for the needs of

household consumption. Following the implementation of European policies by the relevant institutions through financial support, agriculture in rural areas has begun to change its form of development. In addition to rural areas and existing local rural farmers, interest in the development of the agricultural sector or engagement in agricultural activities have also been expressed by the middle urban area as well as young and educated farmers. Agriculture plays a multifunctional role in terms of economic, social and ecological aspects, but also affects the function of ecosystems in terms of biodiversity and soil quality (Miftari, 2017).

During the study, 40 farms in the Prishtina region were observed. Based on the size of the utilized agricultural area, they are classified into two groups: on farms with an area of less than 5 ha, as well as farms with an area of more than 5 ha. The purpose of such a classification has been to compare the level of sustainability at the level of small farms with those of large ones. In addition to comparison at the farm level, these farms have also served to measure or test key indicators for measuring the impact of agricultural farms on three dimensions of sustainability: the agro-ecological, socio-territorial and economic dimensions.

Based on the study observation, after testing the indicators through the IDEA method, a number of conclusions were reached regarding the level of sustainability at the farm level. After testing the indicators and evaluating the components of each dimension, we conclude that the size farms (> 5 ha) are more stable compared to small farms. This conclusion was reached after comparing the impact of agricultural activities of the two groups of farms on the three dimensions of sustainability. Apart from the economic aspect, where the difference in sustainability for the two farms is almost small, i.e., in the development of agricultural activities both groups of farms have turned out to be stable in economic terms. The social aspect is below the desired level of sustainability, where according to the testing of indicators the key points to intervene have been reflected in order to create the optimal level of sustainability within the farms.

Finally, is the agro-ecological aspect, where the level of sustainability after testing the indicators has left room to be desired. According to the study observation, during the development of agricultural activities in both groups of farms, they have a negative impact on the ecological aspect or their contribution in this aspect is low.

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

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CENTRALIZATION VS DECENTRALIZATION - SUPPLY CHAIN NETWORKS AND BLOCKCHAIN IN THE AGRI-FOOD BUSINESS

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Abstract

Hierarchically organized businesses have been dominating our economy for centuries. We follow this structure for so long now because it is very efficient to allocating resources, performing coordination activities, and building relationships. However, potentially disruptive technologies such as Blockchain Technology (BCT), Artificial Intelligence (AI), and Internet of Things (IoT) have the potential to transform the centralized agri-food supply chain networks (SCN) into decentralized digital ecosystems, which will impact business processes and workflows alike. Still today the traditional agri-food SCN is characterized by a pyramid-hierarchic structure where decisions are being made by a central authority. It is typically headed by a focal firm which is responsible for the coordination of the network while determining the strategy and goals of the SCN. We investigated BCT use cases both in the agri-food industry and across several industries. Our literature- and use case-based research unveiled that supply chain use cases which have significantly higher operational implementations compared to their peers exhibit predominantly the following characteristics: they operate in a vertically coordinated ecosystem, they are dominated by a focal firm, and participation of suppliers is mandated by a central authority. The use cases displaying the mentioned characteristics have been found predominantly with consortium type of BCT platform implementations. As agri-food SCNs operate in vertically coordinated ecosystems we suggest that solutions such as provenance or traceability in agri-food SCNs should be implemented based on consortium BCTs as those seem to support best the traditional agri-food SCN structure.

Key words: Vertical coordination, digital transformation, blockchain, supply chain, food industry.

1. INTRODUCTION AND RESEARCH QUESTIONS

Historically the organization of a firm has been characterized by hierarchies and centralization to efficiently allocating resources, performing coordination activities, and building relationships. Coordination and cooperation represent major attributes of inter-firm relationships and are of significant value for the efficiency of the management of vertically cooperated food supply networks, which are typically managed centrally with a focal firm being responsible for the coordination of the network (Hanf and Dautzenberg, 2006a). The objective

of the supply network is to maximize its value by improving the overall efficiency of the network by for example reducing the cost of transactions. Secure transactions, tracking and tracing including monitoring of transport and storage conditions relevant to food safety, as well as provenance information could lead to an increase of the value of the SCN. Driven by the digital transformation, vertically cooperated agri-food value chains have the potential to transform into decentralized, networked ecosystems. One of the key enablers in this process could be the BCT which forms the basis of the Bitcoin cryptocurrency ecosystem (Nakamoto, 2008). Its applications have already been adopted by several industries including but not limited to agriculture, finance, health care, manufacturing, and logistics. BCT with its decentralized architecture has the potential to significantly change the supply chain management (SCM) (Treiblmaier, 2018).

When referring to blockchain or BCT in this paper we use these as umbrella terms for the different BCT systems with their individual characteristics. Typically, the application of BCT in supply chain economics has been researched with an understanding of blockchain representing a single technology based on a single platform solution. We consider it as mandatory to distinguish between the three types of BCT platforms, which are public, private, and consortium because their differing attributes could have a profound effect on the efficiency of the agri-food SCN. We hypothesize that the choice of the BCT platform in strategic networks has an effect on coordination and cooperation of the network. Despite the increasing attention blockchain is getting, there is only limited scientific research about its economic effects on firms and on the efficiency of supply chains. The application of BCT in the agri-food supply chain has so far been predominantly researched from a technical point of view (Zhao et al., 2019a).

The aim of this paper is twofold. First, we want to contribute to the proper differentiation of the term blockchain and its platform typologies for the application in SCNs and second, we want to gain a better understanding of the economic impacts of the different platforms on coordination and cooperation of vertically cooperating agri-food supply chains through the comparison of their respective attributes.

RQ1: What are the implications of BCT platforms on the management of agri-food SCN?

RQ2: What are the key characteristics of the platforms causing these implications?

2. VERTICAL COORDINATION IN AGRI-FOOD SUPPLY CHAIN NETWORKS

Over the past few decades the agri-food business changed from vertical integrated to vertical cooperated networks. The redefinition and change of food quality – also driven by the food scares in the early 2000s – further stimulated the transfer towards vertical cooperation in SCNs coordinated by a focal firm (Hanf and Dautzenberg, 2006b). Hanf and Dautzenberg developed a managerial framework for supply networks in the agri-food business introducing the aspects of cooperation and coordination in combination with the three levels of management consisting of the firm, dyadic, and network level. Food networks have been classified as strategic networks (Hanf, 2005a) which are being characterized as pyramidal-hierarchical collaborations (Jarillo, 1988). Attributes of strategic networks are the hierarchical coordination through a focal firm, the intensity of relations, and the coordination mechanisms, which are all drivers of the chain management. Coordination can be understood as the alignment of actions to mutually achieve

goals between intentionally chosen partners (Gulati, 2005). Coordination mechanisms in supply chains can be broadly divided into six groups: power, contractual relationships, information sharing, joint decision making, collective learning, and building routines (Belaya and Hanf, 2012; Handayati et. all, 2015). Pietrwicz examined consensus building and coding and executing smart contracts as coordination mechanisms for online transactions (Pietrwicz, 2019a).

The focal firm acts as a "chain captain" (Hanf, 2005b) defining not only the target market for the SCN but also setting the joint strategy. It is also selecting the members that are becoming part of the network and manages the single relationships. Thus, the focal firm carries the overall responsibility for the network management. With this the focal firm is also taking responsibility for the food item and is standing in with its brand to ensure high product standards and product safety. The responsibility that a focal firm is taking by providing its brand and standing in for the quality and the safety of the food is a driver of vertical cooperation (Hanf, 2005c). Consumers are nowadays requiring detailed information about the food products in the supply chain which asks for agri-food firms to provide information such as provenance with the objective to increase trust which could increase customer loyalty. Hence, vertical cooperation in the agri-food industry are driven by trust and credence attributes such as food quality, provenance, and safety. Trust is a central driver for achieving cooperation in vertical cooperation (Rindfleisch, 2000) and trust and cooperation are also the most important organizational factors of the dairy food sector (Fink-Hafner et al., 2010). As trust in the agri-food supply chain is also being used to manage the risk of cooperation problems it is yet another driver of vertically cooperated supply chains (Hanf and Dautzenberg, 2006c).

3. DISTRIBUTED LEDGER TECHNOLOGY AND BLOCKCHAIN

Distributed Ledger Technology (DLT) is a shared ledger network of nodes connected peer-to-peer and distributed diversely across locations where the network is keeping ownership of all the records with identical copies of the ledger being distributed to and stored in all network nodes. Its key task is the validation of transactions in the network through joint consensus and also to determine the legal owner of a certain asset. DLT enables the real-time transfer of assets whereas the Internet enables only the transfer of information. It is a network of distributed nodes connected peer-to-peer and distributed diversely across locations. The self-organizing peer-to-peer data-sharing technology operates without a central authority or intermediaries such as banks or brokers authorizing or coordinating transactions. DLT is an umbrella term that encompasses all BCT. It could act as a key enabler in the current transition from centralized to decentralized SCNs.

BCT is a distributed ledger system and a specific type of DLT enabling bi-lateral collaboration between participating entities. It utilizes hashing, a method to create immutable, encrypted, and time-stamped records of transaction data. In this shared ledger system records can only be updated if each party involved in a specific transaction authorizes the updates. The chained data blocks are managed by distributed individual networked entities that are not owned by an intermediary or central entity thus eliminating the need for any intermediaries. In contrast to BCT distributed ledgers do not require such a chain and by their nature they also do not require proof of work (PoW) as consensus mechanism. It can be viewed as a meta-technology as it

comprises of various existing technologies that are, intelligently combined, creating a new technology (Kamble, 2018). DLT and BCT are oftentimes used as being interchangeable. A clear distinction between the two terms as well as a clear definition of BCT and its capabilities is vital to further analyze the impact of BCT on coordination processes in the supply chain. Various and mostly overlapping definitions of the BCT exist today, most of them having their roots in the technology space. Obviously, due to the nascent state of this technology there has not yet been agreed upon a general definition of BCT. We therefor use the following definition in this research that encompasses economical as well as technical aspects:

Blockchain is a software protocol that governs the rules for securely transferring assets incorruptibly over the Internet. It enables peer-to-peer collaboration in decentralized networks eliminating the need for third-party intermediaries or a centrally coordinating trust entity. Transactions are verified by the participating entities and the contents of its shared ledger is constantly synchronized across all nodes of the network. Immutability of data, security through cryptography, mass consensus, and transparency of transactions acts as its trust attributes.

BCT also enables software-coded smart contracts that autonomously perform transactions accelerating and automating business processes. Smart contracts are software programs that are based on BCT with fixed rules for automatically executed transactions based on a set of predefined conditions that have to be met (Kõlvart et al., 2016). Tasks such as the payment of a good when the good arrives according to the agreed upon contractual conditions are being executed autonomously without a monitoring authority. Key benefits of smart contracts are the increased transparency and trust in a decentralized system with no single ruling authority (Zhao et al., 2019b) and the reduction of ex-ante and ex-post transaction costs (Ciatto et al., 2020). Smart contracts in BCT can be seen as coordination mechanisms applying an institutional perspective over coordination (Frantz and Nowostawski, 2016). A token, the digital, alphanumerical representation of a physical asset, are the simplest form of a smart contract.

BCT with its trust attributes immutability of data, cryptographic security, mass consensus, and transparency could create a new trust platform for business transactions as the application of disruptive technologies such as BCT to the agri-food supply chain management can increase trust by generating closer relationships between the firms (Aste et al., 2017).

4. BLOCKCHAIN - AN INSTITUTIONAL TECHNOLOGY

Some scientific literature categorizes BCT as a disruptive technology (Furlonger and Unzureau, 2019), others as institutional technology (Davidson et al., 2018a) or it is being declared as foundational or general-purpose technology (Pietrewicz, 2019; Kamilaris et al., 2019). In addition, there is a shift in positioning BCT as a foundational rather than a disruptive technology as one of the most important digital trends (Panetta, 2018). However, even research on BCT as a foundational technology addressing economic and business aspects is scarce (Risius and Spohrer, 2017). There is also the discourse positing it as an institutional technology (Davidson et al., 2018b). In their research Davidson et al. conclude that DLT can be approached by two economic theories: through Schumpeter's Neo-Classic Economics or through Williamson's New Institutional Economics. Following Schumpeter, BCT could be looked at as a new technology which increases productivity, inducing a destructive effect on firms, economy, and society. Schumpeter examines disruptive technologies as a technology which increases total

factor productivity in existing economic operations which has "creative destruction" effects on firms and markets. BCT is revolutionizing governance and are competing with the traditional economy and following Williamson's NIE theory, BCT and DLT are being viewed as institutional technology (Akansel, 2016). Davidson et al. elevate BCT beyond just being a disruptive technology but rather as being "a new institutional technology of governance that competes with other economic institutions of capitalism, namely firms, markets, networks, and even governments" (Davidson et al., 2018c). As the change in governance is key to our research, we will follow the institutional view of Davidson et al. and view BCT as an institutional technology utilizing aspects of the transaction cost theory.

5. BLOCKCHAIN PLATFORMS

Three different BCT platforms exist today: the public, private and consortium BCT platform. They are differentiating through access rights and rights to read and write in the ledger. What all BCT platforms have in common is the distributed ledger technology, peer-to-peer transactions, as well as a consensus mechanism. In the public blockchain consensus is achieved through the majority of the participating entities utilizing the Proof of Work (PoW) algorithm. The public BCT network is open for participation to everyone and everyone can access the transaction data, validate it, and participate in the consensus process. This type of BCT platform is called permissionless as no permission from an authority is needed to participate in the network. Transaction data, once validated, is secure and immutable. In a private BCT platform only approved and authorized members can participate in the network. A single ruling authority is coordinating the permissioned access and validation of transactions. Private BCT platforms are mainly used in enterprise environments. As the decisions are being made by a central authority network consensus remains in one hand and is as a consequence much faster compared to those in public BCT platforms. As a result, transaction throughput can be much higher. A consortium BCT is also a permissioned technology as only authorized participants will be granted access to the network. In contrast to the private platform the network is being controlled by a group of entities, such as several firms, having equal rights and maintaining the network and system technology. The system is decentralized, permissioned and only authorized users will be granted access. Its aim is rather collaboration than competition between the participating firms. Cost savings, accelerated learning, and sharing risks are the top benefits organizations expect from a certain consortium according to a recent research conducted by Deloitte (Pawczuk et al., 2019).

6. DISTINCTIVE REQUIREMENTS OF AGRI-FOOD SUPPLY CHAINS

The current agri-food supply chain systems are lacking transparency and are highly inefficient. It is estimated that two thirds of the final cost of the agricultural goods are needed to operate the supply chain (Tripoli and Schmidhuber, 2018). Processes in the supply chain are also being impacted by the multitude of intermediaries. Traceability is becoming an increasingly urgent requirement and a fundamental differentiator in many supply chain industries including the agri-food sector (Costa et al., 2013). The distinct requirements of agri-food supply chains are transparency of the food products in the supply chain to enable tracking and tracing and rapid product recalls, which are enterprise driven requirements. Consumers are expecting provenance

information about the origin of the products, which will in return increase the trust with the brand. The requirement for supply chain transparency can be met by implementing BCT and DLT based solutions (Blossey et al., 2019). In order to assess BCT opportunities Carson and Higginson performed an analysis of the use-cases for several industries including agriculture. The impact of BCT proved to be very high in the agricultural supply chain while food safety and origin even surpassing the high impact level (Carson and Higginson, 2018). Gartner unveiled in a survey conducted in 2019 that the most successful use cases are those that address an urgent business need (Groombridge, 2020). They also showed that provenance and traceability are amongst the fastest growing use cases for BCT.

7. MATERIALS AND METHODS

We based our research on extensive literature review both concerning vertically coordinated agri-food supply chain as well as review of BCT in agri-food SCNs. Two case studies in the German agri-food industry were identified and formulated. Two further case studies were identified within the US American agri-food sector.

8. RESULTS AND DISCUSSIONS

Our paper focused on the proper differentiation of the various BCT platform typologies and how the different platforms impact the management of vertically cooperating agri-food SCNs. Strategic networks in the agri-food business need a focal firm because this central authority is responsible for the strict vertical coordination of the food supply chain and ensures that credence attributes such as product quality, information about provenance, transparency of activities in the supply chain, etc. will be transferred to the consumer reliably and uncompromisingly.

Or research shows that the choice of the BCT platform has an impact on coordination and cooperation in agri-food SCN. We identified six coordination mechanisms in the agri-food supply chain and applied those to the three BCT platforms. The comparison shows that each platform addresses the way how power is being exerted, the way how information is shared, joint decision making, and collective learning differently. Solely the mechanisms of how contractual relationships are being managed and how building routines is being addressed can be viewed as being similar for all platforms. Use cases based on private BCT solutions, which are being managed by single enterprises are a centralized solution with a single authority exerting power on the participants, controlling the transaction data, and making decisions in the supply chain. Such a private BCT provides a similar solution as a cloud platform. A key difference is that data that is being written to the BCT ledger remains immutable. Provenance based as well as tracking and tracing use cases have been identified with the cases we investigated. The first one is a coffee producer, which provides consumers with access to provenance information. The business challenge was to provide trusted information about the coffee products in the supply chain in their quest to further increase customer loyalty as consumers are increasingly asking producers to make the supply chain processes more transparent to them. The other agri-food use case investigated is operated by a producer of frozen food products including fish, and vegetables. Their business requirement is to further increase trust in their frozen fish products and as a result increase customer loyalty by providing

reliable provenance data about the place where the fish was captured. The BCT based solution provides provenance data and enables consumers to verify provenance information. Both use cases are based on private BCT solutions which could be transformed into consortium BCTs when they are opened to include external firms. Power in consortium BCTs is being held by a few firms rather than by a single one as in private ones. The information in the supply chain is being shared between all participating entities and decisions are being made jointly. At the same time all participants benefit from the experience of other network members and through joint learning. We found that BCT use cases that have successfully reached the operational stage follow a certain pattern. First, and foremost the use cases operate in a vertical ecosystem similar to the traditional vertically coordinated agri-food supply chain represents. Second, a focal firm takes responsibility for the management of the SCN. And third, participation in the BCT enabled SCN is required by the focal firm from its suppliers. The progress is fastest in those cases where adoption is pushed on the participants by the focal firm. Walmart for example obliges in its Food Traceability Initiative, which is based on IBM's Food Trust network, its suppliers of fresh leafy greens to participate in their BCT to enable transparency and provenance in their quest to increase food safety by radically reducing the time to recall products. Another consortium-based use case is the Food Trust solution. IBM started Food Trust back in 2017 and connects participating firms in the food supply chain to share food system data of their products. The driving force to develop Food Trust was to provide a platform that would be able to rapidly activate food recalls if needed and to keep the lot of recalled products as small as possible in order to eliminate unneeded and excessive waste. In contract to private BCT use cases these consortium-based ones integrate different firms in the food supply chain ecosystem.

9. CONCLUSIONS

The choice of the BCT platform will have a profound effect on the efficiency of the agri-food SCN because coordination mechanisms are being addressed differently by the various platform types. The use cases we researched have in common that they operate in permissioned systems that are centrally coordinated. With BCT induced solutions participating members of the SCN should perform transactions peer-to-peer with each other without any central authority coordinating the SCN. We identified the use cases that have shown a higher proportion of operationalization compared to other use cases. We conclude that successful implementations need a vertically coordinated ecosystem and revolve around providing provenance as well as tracking and tracing information, both needed as credence attributes in the agri-food industry. We found that the current BCT use cases are predominantly successful when the participation of firms is mandated by a centrally acting entity. With the introduction of tokenization smart contracts could not only further increase the transparency in the supply chain but also enable autonomous transactions based on electronic contracts which has the potential to reduce ex-ante and ex-post transaction costs. However, the current solutions do not include tokenization of assets. Further research has to show how the introduction of smart contracts impact the remaining two coordination mechanisms in supply chains which are contractual relationships and building routines.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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EFFECT OF IRREGULAR MIGRATION FLOW ON AGRICULTURAL PRODUCTIVITY IN KOSOVO

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Abstract

This paper examined the effects of irregular migration flow on agricultural productivity in Kosovo. Data were obtained using a mixed-methods approach comprising of desk research and field research data. Seven regions were selected based on the population size, agricultural labour availability, land accessibility and availability and agricultural performance in rural areas. From seven regions up to 1151 migrant/ households are sampled for the study. The results show not much evidence of effects migration on agricultural labour, suggesting that households whose members engaged in irregular migration had significantly reduced farm production while other households whose members are not engaged in migration had no significant effect on production. Our analysis builds on an improved database of migration stocks and flows for the last three year period, as well as migration facilitates investment, remittances and labour supply. A descriptive statistic is used to categorize the effects of irregular migration flow on agricultural productivity in Kosovo.

Key words: irregular migration, remittances, agriculture productivity.

1. INTRODUCTION

Kosovo has long history of migration. More than 50 years ago, large numbers of Kosovar migrants moved to Europe. Much emigration has been motivated by economic reasons and by the armed conflict in the late 1990s (World Bank, 2011). After the conflict ended in 1999 and Kosovo became an independent country in 2008, it appeared that migration had come to an end. However, emigration intentions have quickly risen when Germany announced a new open-door policy for migrant crisis in 2014 (GIZ, 2017). Thus, new migration flow was observed in 2014-2015. Unfortunately, Kosovo citizen's mobility at this time was linked with high unemployment rate, lack of visa liberalization with the European Union and the issues of border management. Up to 100,000 people have illegally crossed the EU borders, while just in Germany more than 37,000 Kosovars registered as asylum seekers in 2015 (Eurostat, 2017).

In 2014, the Kosovo Government attempted to estimate the numbers of irregular migrants and published the Kosovo migration profile which is updated annually (MIA, 2014). Although this estimate has been a useful contribution to the evidence base on irregular migration in Kosovo, not much attempt has been shown to address the *links* between *migration* and agriculture as one

of the biggest labor sector in Kosovo's economy. Migration and the resulting remittances have been a safety valve for many families living in Kosovo. Around one fifth of households are involved in labor migration, with the rate slightly higher in rural areas (Möllers and Meyer, 2014). In general, the importance of migration for the Kosovar economy is reflected, among others in the size of the diaspora as well as the flow of remittances (World Bank, 2011). Despite the significant role of migration in Kosovo's economic, the policies addressing its contribution to economic development are minimal at best. No government strategic document contains policies that recognize and build on the economic aspects of migration (GIZ, 2017). For countries such as Kosovo, integrating migration-related policies into national development strategies is of vital interest in order to promote economic and social development. In this context, improving economic conditions and providing information on investment opportunities for potential migrants would expect migration to be more likely to occur from more productive households and have better employment opportunities.

The overall objective of this paper is to investigate the relationship between migration and agricultural productivity in Kosovo. Kosovo is an interesting case study as a relatively large proportion of the population continues to live in rural areas. More specifically, we address the irregular migration effects on agriculture households left behind and the socio-economic situation. In addition, we also provide recommendations on how the needs of returnees can be addressed towards positive rural development.

To meet the objective of the paper, it proceeds as follows. The next section describes a brief survey of the literature. The third section describes the methodology and data. The fourth section provides a descriptive statistic relating migration and agricultural productivity. The fifth section examines the migration impacts and the remittances effect on the rural household income distribution and agriculture productivity. The sixth section provides conclusions and recommendations on how migration can be addressed and contributes to a positive rural development in their communities.

2. A BRIEF SURVEY OF THE LITERATURE

This section briefly introduces migration and the agriculture related facts about Kosovo and presents some key results and arguments of the discussion on the effect of irregular migration on the agriculture productivity. The primary sector, agriculture in particular, is the main source of livelihood in the rural household income. Kosovo's agriculture sector GDP share is 11.9% with potential for economic development of the country by generation employment (SOK, 2016). The role that migration and remittances might play in Kosovar households is reflected in the fact that nearly one in ten households in Kosovo indicates that remittances are their main income source (Möllers et al. 2013; GIZ, 2017; World Bank 2011). There is also evidence that the share of the population which receives remittances mainly in rural areas enjoy higher average amounts of remittances than the urban areas (World Bank 2007). A number of studies presented migration as one of three (complementary) pathways out of rural poverty, farm intensification and entering local non-farm labor (Haxhikadrija, 2009; GIZ 2017, Adams and Page 2005; Mosse et al. 2002). For Kosovo, even though migration should be poverty reducing, its relationship with agricultural production at the household level may be complex. There are no indications that significant amounts of remittances are used for this purpose (Möllers et al.

2013; Gashi and Haxhikadrija 2012). The causal link between migration and the agriculture productivity has direct implications for agricultural production or productivity effects. If households engaging in agricultural product are in a position to migrate (and increase their income) because of better off in the first place, then productivity effects will vary. Several factors can play a role in determining household participation in migration (De Braw et al. 2013). Thus, households may run non-agricultural businesses, they might work locally for wages, or they might do a combination of all of those activities. All of these activities could lead to additional migrant opportunity for household members, since they could all affect the productivity (De Braw et al. 2013; Mansoor and Quillin 2006). Further, they could also affect the labor constraint; for example, if the individual within a household who would be best candidate for producing labor intensive crops would likely migrate for a better choice or work off-farm for a wage, the individual affect the traditional households producing these crops, at least during key parts of the agricultural season (Möllers and Meye, 2014; De Braw et al. 2013; Corbanese and Rosas, 2007). However, a clear causal link cannot be made for the case of Kosovo, because the drivers and impacts of migration in agriculture production are complex. Remittances flows in Kosovo depend on different underlying motives for getting involved in migration and for remitting (GIZ, 2017; Elezaj et al. 2012; Havolli, 2011). Whether or not migration and the sending of remittances effect agriculture productivity and increases the income this has not yet been fully clarified. Some researchers expect an increased productivity, for instance if agricultural production takes on a prominent role in household income generation (De Braw et al. 2014; Göbel, 2013). Others argue that remittances contribute to a more equal income distribution, since most of them are spent on basic items such as food, clothing, housing, durable goods, health and education (UNDP, 2014; ESI, 2006).

In summary, the literature does not provide clear directions for the effects of migration on agriculture household productivity. We base our analysis of Kosovo on the widely accepted hypothesis that migration has positive direct effects on farming practices, transmission of agricultural technical knowledge, education and wealthier households. Thus, we expect remittances to support the production and become a factor of more economic recovery of the country agriculture sector. We further expect remittances to expand the market with local agriculture certified product and open more opportunities towards improvement of employment in this sector.

3. METHODOLOGY

The study draws from a combination of desk research and field research. Desk research comprised a review of existing literature, empirical studies, reports, surveys, carried out by the government bodies and other international organizations. The field work draws mainly on a quantitative survey. Its main target group were migrant/ households in mostly rural areas of Kosovo. The field study took place in seven regions: Mitrovica, Prishina, Gjilan, Prizren, Peja, Gjakova and Ferizaj. The main selection criteria were based on the population size, agricultural labor availability, land accessibility and availability and agricultural performance in rural areas. Further, up to 165 migrant/ households are sampled from each region. The selection also considered and ensured that all concerned ethnicities, gender and age groups were included. Most of these migrants/households included were from the 2014-2015 migration wave, but there are also other migrants that left Kosovo end of 2013 and the recent returnees. Data

collection was done in a timeframe of about three months from January till April of 2017.

The survey tool used was a classical *questionnaire* that covered the following: household demography, migration/immigration of family members and remittances, employment, family business, agriculture (land use, agricultural income and productivity), non-agricultural family business (self-employment) and paid labor force. The obtained data were processed using descriptive statistics (StatSoft 12).

4. MAIN FINDINGS

The objective of this section is to present important differences in the socio-economic conditions of Kosovar households with and without migrants based on a sample of 1,151 rural households of the collected data, as well as to provide evidence about the effects of remittances on agriculture productivity. Percentage of the total *number of household migrants* and *non-migrants vary from region to region.* As shown in Figure 1, our results indicate that there was a greater tendency for household to migrate in most of the regions.

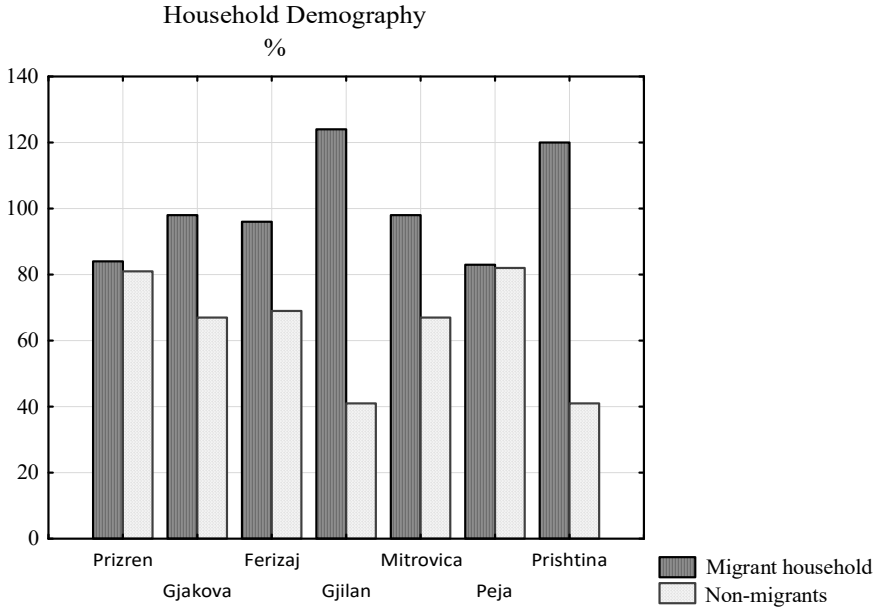

Figure 1. Household demography: Migrant household and non-migrants per regions

The households included in the study have an average of five family members. The average age of the household head is 49 years. Around 38 percent of the households are categorised as migrant households, meaning that they have at least one family member living abroad. On average the number of migrants is 1.99. The proportion of male household migrants fell from 47 to 48 per cent, while there is evidence that the number of female non-migrant household was increased (GIZ, 2017). Women migrate mainly for reasons like marriage or family reunification and less for jobs (World Bank, 2014). Education is considered as an essential component for migrant integration into the community. The data show that the educational attainment of the rural household heads is generally high (almost eleven years of schooling) and it does not differ significantly between migrant and non-migrant households. The same education rate applies

for the secondary and university level of education within the households. The Socio-economic characteristics are presented in Table 1.

Table 1. Socio-economic characteristics of rural households with and without migrants

	All households	Migrant household=1		Significance
		1	0	
Number of rural HH sampled	1151.00	443.00	703.00	--
HH size	5.21	5.02	5.41	
Age	47.25	48.00	46.50	***
Male households (%)	49.85	52.47	48.85	***
Number of migrants	0.94	1.99	0.00	***
Educated household heads (years)	10.95	10.68	11.06	***
- None/only internship	2.12	2.10	2.14	***
- Eight year school (~ 8 years)	8.17	8.14	8.20	***
- Only short courses	2.52	2.90	2.14	**
- Vocational or Agricultural School ~12 years	46.50	43.60	49.41	***
- University degree	2.23	2.32	2.15	***
Household income (€)	4,841	5,100	4,582	***
Household income incl. remittances (€)	5,150	6,775	4,592	***
PC income, equivalised (€)	1,913	2,005	1,821	**
PC income incl. remittances, equivalised (€)	2,191	2,599	1,783	***
Income shares (%)				
- Waged employment	62.55	49.97	75.13	***
- Self-employment	8.84	6.77	10.92	**
- Remittances	6.61	13.20	0.00	***
- Other income	14.58	17.05	12.11	***

Source: Own calculation based on survey collected data.
Note: N=1,151 rural households; HH=household; PC = per capita
Significance Test: **:very significant (p<0.01);***:highly significant (p<0.001).

The key reason for the migrants leaving Kosovo in 2014-2015 is jobs and insufficient family income, though previously war was a major cause of migration (GIZ, 2017; UNDP 2010). According to respondents since the beginning of 2014, 44 percent of migrants left Kosovo for economic reasons and personal family problems (death and health issues), 15 percent left due to the dissatisfaction with political situation (visa liberalization, etc.) and around 10 percent left for education (Figure 2).

The results show that the average annual household income (excluding remittances) lies at around € 4,528 per annum for rural households. Figure 3 shows that when remittances are not considered in the household income, differences between migrant and non-migrant households are not significant. Further, when remittances are included, migrant households have significantly higher household and per capita incomes (€ 6,775).

In Kosovo remittances are considered as the largest source of external financing, were about 60 percent of the migrant households receive remittances, contributing on average 13 percent of their income. The main findings of the survey and the views of the respondents are almost similar with the findings of Möllers et al. (2013).

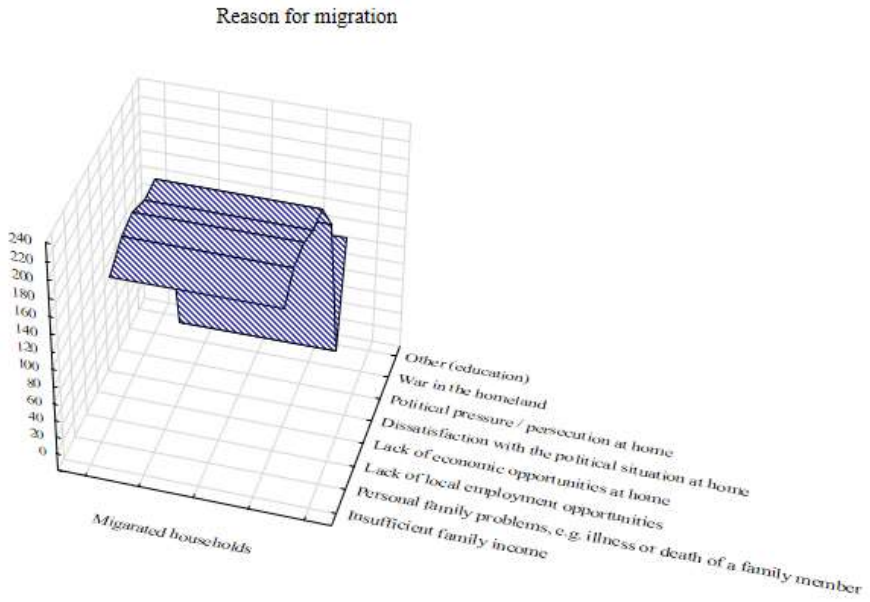

Figure 2. Migration reasons

The major shares of the rural income stems from emplyment, while up to 70 per cent of the rural households have waged employment as their primary income source. The income share is lower for migrant households (49.97 per cent). Self-employment is the primary income source of around 10.92 per cent of all rural non migrant households and around 6.77 per cent for rural migrant households.

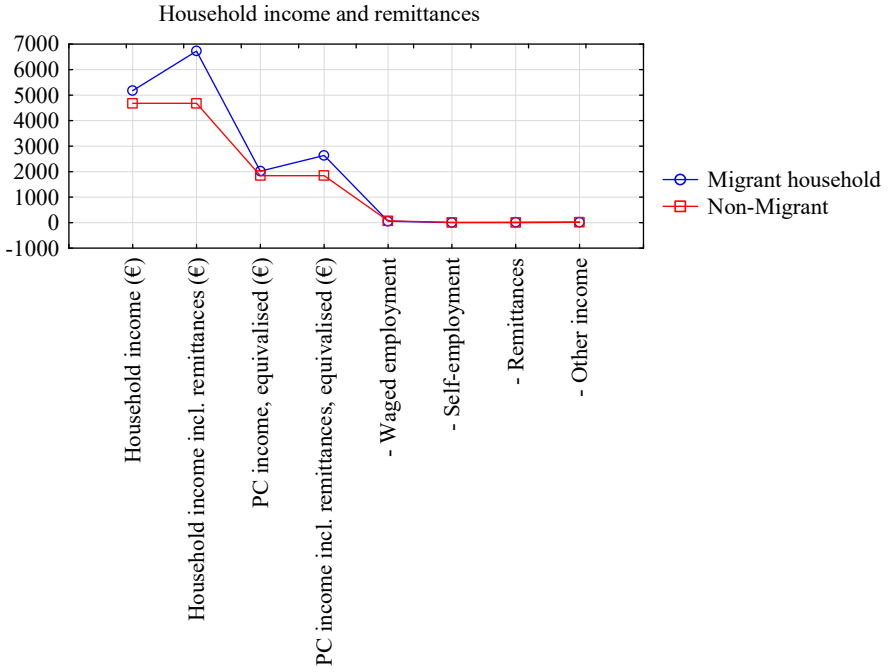

Figure 3. Household income and remittances

The bulk of remittances are used for immediate consumption. Over 83 percent of households mention food and clothing; 18 percent invest part of remittances in business; 6 percent use for health care; 5 percent in agriculture; 23 percent use some part to repair or build homes; up to 10 percent invest in education; and 6 percent use to repay loans (Figure 4).

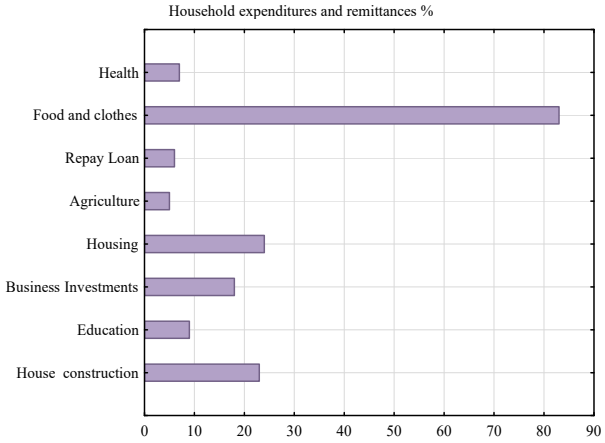

Figure 4. Household remittances uses

Table 2 shows that differences exist in agriculture characteristics by migrant and non-migrant households. Non-migrant household incomes are significantly higher compared with the migrant households. Differences also exist in terms of land use and productivity. There is no significant difference in vegetable production between migrant and non-migrant households, however the non-migrant households have more livestock holdings than migrant households. Crop output: In Kosovo, non-migrant households show higher crop output than migrant households, while the reverse holds in the case of fruit production. The survey also reveals that the vineyard production is much lower in both levels; migrant households are almost exclusively involved in other labor activities.

Table 2. Agriculture characteristics of rural households with and without migrants

	All households	**Migrant household=1**		**Significance**
		1	0	
Agriculture (%)	15.5	5	26	**
Agriculture wages (€)	3.900	4.300	3.500	**
Livestock (%)	27.00	10.00	44.00	***
Crop production (%)	35.50	15.00	56.00	***
-Cereals (%)	1.90	0.50	3.30	***
Vegetables (%)	0.30	0.20	0.40	***
Orchards (%)	0.055	0.01	0.10	***
Vineyards (%)	0.05	0.03	0.07	***
Fruits (%)	0.135	0.15	0.12	***
Agriculture land (ha)	28.000			**
Agriculture machinery		6.000	50.000	

Source: Own calculation based on survey collected data.
Note: N=1,151 rural households.
Significance Test: **:very significant (p<0.01);***:highly significant (p<0.001).

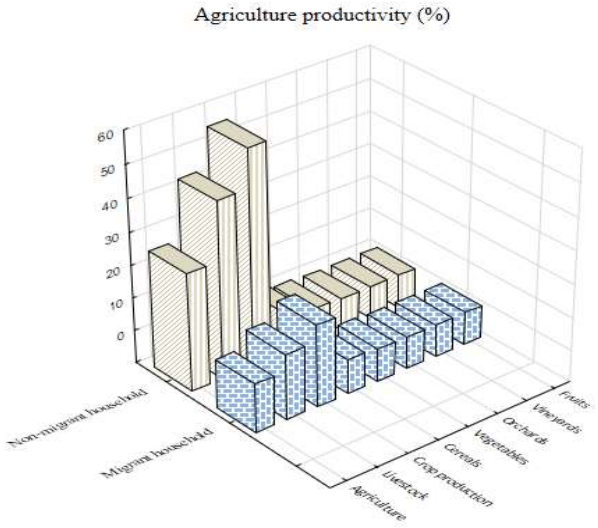

Figure 5. Agriculture productivity of rural households with and without migrants

Therefore, migration has no significant impact on total household expenditure and agriculture production, indicating that remittances are hardly used to invest in the farming and productivity. Furthermore, Fig.5 shows that the income shares earned from agriculture and livestock differ significantly between migrant and non-migrant households.

5. THE IRREGULAR MIGRATION IMPACTS ON THE AGRICULTURE PRODUCTIVITY

This section discusses about the impact of irregular migration on agriculture productivity. The impact of migration on agricultural production between migrant and non-migrant households is quite dissimilar and probably reflects differences in migration patterns and the share of remittances. In many countries migration provides opportunities to make significant contributions to improve the agricultural sector, therefore the results indicate that the migrant households in Kosovo are less willing to invest in agricultural production. It is a little surprising to find that migrant household income from rural areas has a negative effect on productive investment in agricultural production. Therefore, the migrant household incomes are mostly shared for investing more in household consumption other than agriculture production. The results also suggest that there is an increasing female non migrant household in the agriculture sector resulting from a shortage of male laborers. One possible reason is that male household members, more than women, take advantage of the improved income and to get involved in non-agricultural activities. Another result relates to the education where more educated migrant households tend to work less in agriculture due to the wage inequality. Thus, more educated household are more likely to find better off-farm opportunities (World Bank, 2014). In addition, the non-migrant households with more land, crop and livestock resources invest more to agriculture. Similar characteristics are observed across orchard, vegetables and fruits production with the exception of the vineyards. With greater migration opportunities, rural areas were beginning to face labor shortage and lose the interest in agriculture investments. Therefore, there is an urgent need for a socio-political framework to provide more supportive instruments, improve economic conditions and provide information on investment

opportunities within which migrant households can make significant contributions to improve the agricultural sector. To summarize, the migration will continue to be an important part of Kosovo‘s economy. The emigration and remittances have helped receiving households enjoy a better standard of living—even, however strengthening engagement with the migrant household and better utilizing Kosovo‘s migration potential into the agriculture sector could make a significant contribution to its economic development.

6. CONCLUSIONS

Based on these findings, the following conclusion can be drawn:

- Migration has no positive effects on the agriculture productivity, non-migrant household were more involved than the migrant households.
- There were no significant differences in some of the socioeconomic characteristics such as age, household size and education. On the other hand, there were significant differences in agriculture productivity level between the migrant and non-migrant households. Therefore, the level of production in the study area was affected by the lower incomes, remittances expenditure and luck of job market in rural areas.
- Migrant remittances make no significant contribution to agriculture productive investment in rural areas, but migrant households are indeed better off on their incomes compared with non-migrant families.
- In general the agriculture labor effort in rural areas, seem to decline as a result of migration and the loss of the working force. However, looking from a development perspective, it may be reasonable for policy-makers to put a considerable effort to protect migrants by promoting their social and personal protection and access to agriculture market.

With regard to the policy, we stress that the significant share of Kosovar emigrants retain a link to their home country mainly in improving the housing economic conditions. Therefore, it is necessary to provide information on investment opportunities that could encourage migrant household to invest in agriculture activity. Measures could be adapted, for example, to:

- Promote and disseminate the effective information about the agriculture business opportunities and offer support on how to access the credit for entrepreneurial activities, start-up funds and other guarantees towards employment opportunities.
- Offer the migrant returning programs that promote the agriculture labour markets with low entry costs and close to zero upfront investments.
- Reduce transfer remittances fee to facilitate the initiatives for the development of rural areas investments.

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SYNERGISTIC EFFECT OF DIFFERENT DISPERSANTS ON RHEOLOGICAL PROPERTIES OF HIGHLY CONCENTRATED ALUMINA SUSPENSIONS

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Abstract

This study aims to develop highly concentrated alumina suspensions, stabilized with three different dispersants Darvan C-N, 4,5-dihydroxy-1,3-benzenedisulfonic acid disodium salt monohydrate (Tiron) and citric acid monohydrate. Alumina suspensions were prepared with 70 wt, % of high purity alumina (Al_2O_3) powder, with the average particle size 300-400 nm. To achieve this objective, the formulations were prepared by using the simplex lattice mixture design to evaluate the effect of different amounts of dispersants on rheological properties of highly concentrated alumina suspensions and their synergistic effect. Based on a simplex lattice design, a cubic model was established as a function of the compositions of prepared Alumina suspensions. The use of a simplex lattice design allows us to study the influence of different dispersants and factors of formulation of the manufacturing process of concentrated alumina suspensions.

Key words: alumina suspensions, Darvan C-N, 4,5-dihydroxy-1,3-benzenedisulfonic acid disodium salt monohydrate (Tiron), citric acid monohydrate, simplex lattice design.

1. INTRODUCTION

Alumina is widely used oxide ceramic due to its various properties such as hardness, high strength, temperature and chemical stability, high wear, corrosion and oxidation resistance (Sever et al. 2018). The range of industrial applications is constantly growing (Shivaprasad et al 2018; Li et al. 2016). Owing to good chemical durability, thermal conductivity and refractoriness, alumina ceramics are used in metallurgy in steel ladle linings (Zhang et al. 2018). In need for more effective catalysts for the hydrodesulfurization process, different carbon nanofiber doped alumina is prepared and studied (AL-Hammadi et al. 2018). The effect of alumina support for Fischer-Tropsch synthesis Co catalyst was investigated and demonstrated better catalytic activity in comparison to Co itself (Rahmati et al. 2018). Alumina is also used in modelling the radiation properties of aircraft plume (Li et al, 2018). It has been examined as a suitable material for water defluoridation due to its superior properties in comparison to other

nanomaterials such as magnesium oxide, hydroxyapatite and composites Shivaprasad et al 2018).

In the past two decades, there has been a growing need for different techniques to produce monolithic and composite ceramics (Sever et al. 2018). With this growing need, colloidal processing has been applied. This concept enables control and manipulation of the interparticle forces in suspensions to improve homogeneity and optimize the suspension properties. Different methods are available such as dry-pressing, slip casting, tape casting (Maric et al. 2017), gel casting, pressure casting and injection moulding (Lewis, 2009).

Slip casting is one of the most adequate methods for manufacturing both monolithic and composite ceramics with high green body density and microstructural homogeneity even for complex geometries (Baptista et al 2015). It is a simple and reliable procedure, cost-effective and pollution-free, but requires a certain knowledge of colloid suspensions and their behaviour (Majić Renjo et al, 2012). The process includes filling a porous mould (usually a gypsum one) with a slip. The slip consists of a suspension of ceramic powder mixed with a liquid (usually water). The pores in the mould withdraw liquid from the slip by capillary forces. The properties of the final ceramic product depend on the microstructure of the produced green bodies, Colloidal stabilization of the slip results in better structural homogeneity and less particle aggregation (Xu t al. 2017).

To achieve better colloidal stabilization, different additives are added to ceramic suspensions such as dispersants, binders and others (Ozdemir et al. 2017). Their purpose is to stabilize ceramic particles in the suspension electrostatically, sterically or electrostatically. The most common method is electrostatic stabilization. The basic principle is creating enough potential difference to cause repulsive forces between ceramic particles (Cruz et al. 2017). This can be achieved by adding polyelectrolyte dispersants which attach themselves to the particle surface (Mori & Kitamura, 2017). Many researchers are conducted to find appropriate additives for colloidal stabilization. Therefore, a wide range of different dispersants was investigated such as Darvan (Stanciucet al. 2018), Dolapix (Markandan, 2017), Tiron (Khan et al.200; Gulicovski et al.200), citric acid (Hidber et al.1996), organic dispersants (Gocmez, 2006; Mohanty et al. 2013) and others.

The term rheology refers to the deformation and flow characteristics of matter (Lee, 1996). Rheological properties of colloidal suspensions depend upon viscosity of dispersing media, particle concentration, size and shape of particles and interactions between them as well as the interactions between particles and dispersing media (Marani et al. 2015). A flow curve or rheogram is used to describe rheological properties of fluids. Rheograms are constructed by plotting the following rheological data: viscosity versus shear rate, and shear stress versus shear rate. They can be used to predict the nature of interactions between ceramic particles in the suspension (Majić Renjo et al. 2012).

An interaction between two or more dispersants causes the total effect of the dispersants to be greater than the sum of the individual effects of each dispersant. To optimize the process of investigating these interactions, a statistical technique like the design of experiments is often used. The design of experiments (DOE) consists of various methodologies. Mixture designs are a form of response surface designs where the proportions of the components or factors are considered important rather than their magnitude. In a mixture experimental design, the total

amount of dispersants is held constant because the response surface depends on the relative proportions of dispersants in the mixture and not on the amount of the mixture. The purpose of the experiment using a mixture design is to model the blending surface with a mathematical equation. That way, the predictions of the response for a combination of dispersants can be made empirically. Our mixture is made of three components (three dispersants: Tiron, Darvan C-N, Citric acid) thus the mixture space is a triangle with vertices that correspond to formulations that are 100% of a single dispersant (Rao & Baral, 2011).

2. MATERIALS AND METHODS

2.1.Suspension preparation

Alumina suspensions were prepared with 70 wt, % of high purity alumina (Al_2O_3) powder, with the average particle size 300-400 nm (Alcan Chemicals, USA). Three different commercial dispersants were used: Darvan C-N, which is an ammonium polymethacrylate water solution (Vanderbilt Chemicals, LLC, USA), 4,5-dihydroxy-1,3-benzenedisulfonic acid disodium salt monohydrate (Sigma-Aldrich Chemie GmbH, Germany) and citric acid monohydrate, >99,7 % purity (VWR Chemicals, BDH Prolabo, Belgium) to stabilize highly concentrated alumina suspensions.

Different amounts (Table 1) of dispersants were mixed with deionised water and added into the grinding jar of the planetary ball mill, after which 70 wt. % of dry monolithic alumina powder was added into the grinding jar. Ten alumina balls were used for the mixture homogenization, which lasted for 90 minutes at a speed of 300 rpm. Alumina balls are separated from the suspension after the homogenization using a sieve. The suspension underwent an ultrasonic treatment for 15 min in an ultrasonic bath – BRANSONIC 220 (Branson Ultrasonics Corp., USA) to remove the air bubbles and achieve better homogeneity. After the homogenization, the pH-value was measured. For each dispersant the pH-values were around 6-8 (Table 2).

2.2. Experimental design

Preliminary experiments gave the range of optimum concentrations for each dispersant. The simplex lattice mixture design (Fig. 1) was used to evaluate the effect of different amount of dispersants: Tiron (x_1), Darvan (x_2) and citric acid (x_3) on rheological properties of highly concentrated alumina suspensions. Concentrations of each dispersant were expressed as fractions of the mixture, 10 points were 3 single-dispersant, 3 two-dispersant and 4 three-dispersant mixtures. The compositions of prepared suspensions are presented in Table 1.

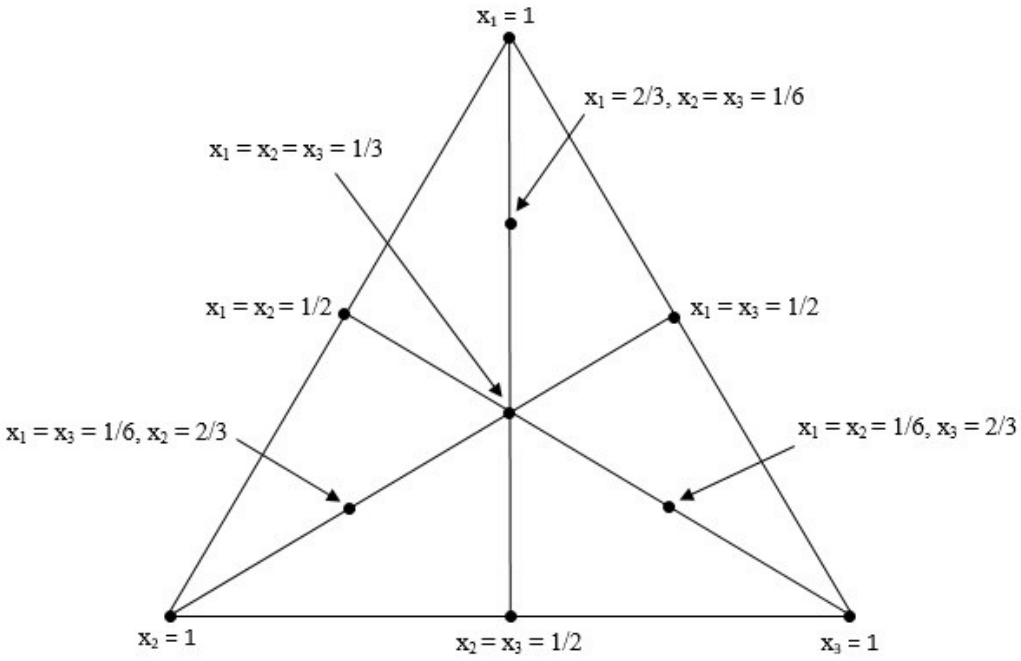

Figure 1. 10 points augmented simplex lattice mixture design for the effect of different amount of dispersants

Table 1. Amounts of dispersants (Tiron, Darvan C-N and Citric acid) in 70% alumina suspensions in a simplex lattice mixture design

	wt,%		
	x_1 = Tiron	**x_2 = Darvan**	**x_3 = Citric acid**
1	0.5	0	0
2	0	1	0
3	0	0	0.3
4	0.16	0.66	0.23
5	0.3	0	0.2
6	0.36	0.66	0.13
7	0.3	0.8	0
8	0.16	0.86	0.13
9	0	0.8	0.2
10	0.23	0.73	0.16

2.3. Determination of rheological properties

Rheological properties were determined using a rotational viscometer DV-III Ultra (Brookfield Engineering Laboratories, Inc., USA) in a small sample chamber with spindle SC4-18. Pre-shearing lasted for 2 min at a shear rate of 100 s^{-1}. The shear rate was gradually increased from 0.1 to 180 s^{-1}, and then reduced back to 0.1 s^{-1}. The shear rate increase/decrease interval was

divided into 50 equal time frames, which lasted for 3 seconds each. Rheological measurements were conducted just before each shear rate change.

The temperature was kept constant at 25±1 °C using a thermostatic bath Lauda EcoRE 415 (LAUDA-Brinkmann, LP, USA). Flow curves were recorded for each dispersant type and each dispersant concentration.

3. RESULTS AND DISCUSSION

3.1. The viscosity of highly concentrated alumina suspensions

This work aimed to determine the optimal amount of three commercially available dispersants to stabilize highly concentrated alumina suspensions using the design of experiments. The prepared suspensions contained 70 wt.% of pure alumina powder, 30 wt.% of deionised water and different amounts of dispersants (Table 1). Suspension stability was estimated by viscosity measurements at three shear rates, γ: 50, 100 and 180 s^{-1}. Obtained values are presented in Table 2.

Table 2. Measured pH values and viscosity (at three different shear rates: 50, 100 and 180 s^{-1}) of all prepared suspensions

		η, mPas		
	pH	**γ = 50 s^{-1}**	**γ = 100 s^{-1}**	**γ = 180 s^{-1}**
1	6.74	23.9366	17.0836	13.0432
2	8.70	13.6231	11.5753	10.2278
3	6.06	15.0854	11.8547	9.8979
4	5.63	13.7770	11.5753	10.1398
5	6.23	22.2433	16.3651	12.7573
6	6.20	14.8545	12.653	11.1956
7	7.75	12.1607	11.256	10.5577
8	6.57	12.6225	10.9367	9.8759
9	6.20	13.0073	11.2161	10.1398
10	6.15	13.6231	11.4955	10.2278

The shear rate of 50 s^{-1} is the exact shear rate usually achieved during the gravity slip casting. For all suspensions the viscosity decreased with the increasing shear rate, that is, all suspensions show typical pseudoplastic behaviour, characteristic for non-Newtonian fluids (Kumar e al. 2018). Measured pH values are around 6 for almost all suspensions, except suspension 2 with pH value 8.70 and suspension 7 with pH value 7.75.

The effect of different amounts of dispersant on the viscosity of prepared suspensions at different shear rates is shown on Fig. 2.

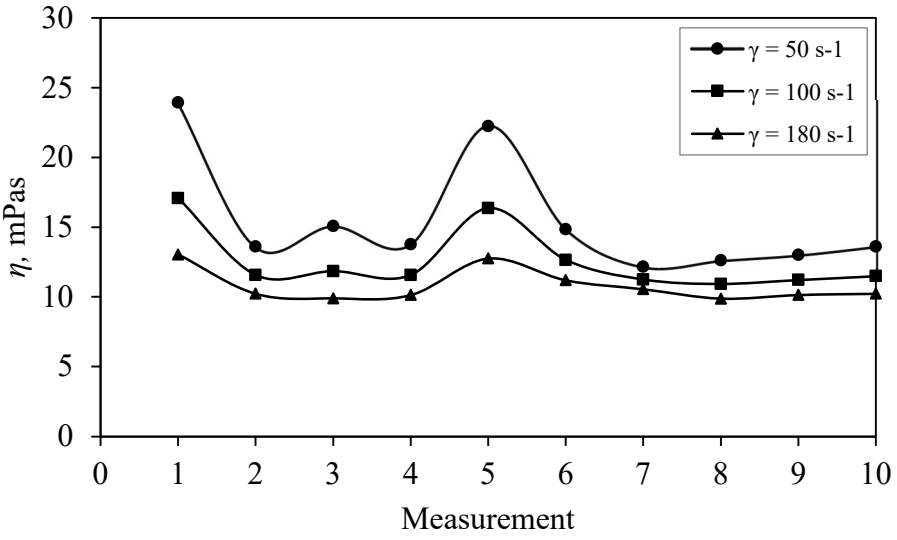

Figure 2. Dependence of viscosity (η) on different amounts of dispersants at three different shear rates (γ: 50, 100 and 180 s^{-1})

Results presented in Table 2 and Fig. 2 indicate that lowest viscosities are achieved in suspensions 7 (0.3 wt.% Tiron, 0.8 wt.% Darvan), 8 (0.16 wt.% Tiron, 0.86 wt.% Darvan, 0.13 wt.% Citric acid) and 9 (0.8 wt.% Darvan, 0.2 wt.% Citric acids) distributed lowest viscosities for the shear rate of 50 $^{s-1}$. These results go in support of the synergistic effect of two or more dispersants. Highest viscosities show suspensions 1 and 5.

4. CONCLUSION

Three commercially available dispersants were used for the analysis: Darvan C-N, 4,5-dihydroxy-1,3-benzenedisulfonic acid disodium salt monohydrate (Tiron) and citric acid monohydrate. The results show variations of rheological curves recorded to determine the optimal content of each dispersant with the lowest viscosities achieved at suspension 7 (0.3 wt.% Tiron, 0.8 wt.% Darvan), 8 (0.16 wt.% Tiron, 0.86 wt.% Darvan, 0.13 wt.% Citric acid) and 9 (0.8 wt.% Darvan, 0.2 wt.% Citric acids). The obtained results show that the most effective dispersant is citric acid monohydrate with only 0.13 wt. % required to stabilize the

70 wt. % Al2O3 suspension.

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WASTE MANAGEMENT AS A SIGNIFICANT ASPECT OF ENVIRONMENTAL PROTECTION

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Abstract

Problems and threats which waste generates, directly or indirectly, are large and include social, economic and other impacts on life and the environment. Industrialized human society produces a huge amount of material. Most of it ends up as waste or garbage. The nature of this waste has changed especially in the last 40 years, due to the intensive production and use of synthetic materials, especially plastics. Waste management in accordance with environmental principles is a complex process that includes a total control by the waste management system (generation, sorting, collection, transport, disposal and treatment of waste). In order to solve this problem of inadequate treatment, the process must be financially supported, strategically planned, institutionally organized and regulated by law. Investing in waste management is financially profitable as it is based on the fact that adequate waste management brings high savings and significant profits at various levels, developing so-called "green economy". One of the important preconditions is the involvement of the population in the process of planning and decision-making about problems in this field. It is necessary to work on development of environmental awareness at different levels as industrial and municipal waste can become a significant energy resource of raw material, as well as a source of new jobs.

Key words: management, waste (garbage), financing, economic benefit, environment.

1. INTRODUCTION

Urbanization and industrialization have contributed to the increase in the amount of waste generated, which is becoming a global problem and one of the priorities to be solved. The increase in the number of inhabitants, but also in the standard of living, has also resulted in an increase in the quantities and types of waste. In this regard, the problem of inefficient waste management in almost all its phases has been identified, which has negative consequences for health, disorder and environmental damage.

Environmental pollution knows no state borders, so this area is one of those that requires the highest degree of international cooperation. This problem has thus become primary, so national regulations regarding the prevention of waste pollution are joining the international ones.

Using the limited resources of our planet to produce as many products as possible, most of which, unfortunately, will end up as waste, has unforeseeable consequences. Turning waste into a resource is key to developing a society's economy that can boost competitiveness, open up new markets for new products and services, and improve employment. The circular economy is an industrial economy based on reuse. It represents a new approach that integrates the economy and the waste management system.

The UN forecasts that the global population will increase and that in 2050 there will be 9.7 billion people and over 11 billion by the end of the 21st century (UN DESA, 2015).

With today's 7.6 billion inhabitants, the planet is already facing a serious problem to meet the needs of the population and other living beings for land, food, natural resources and the absorption of waste.

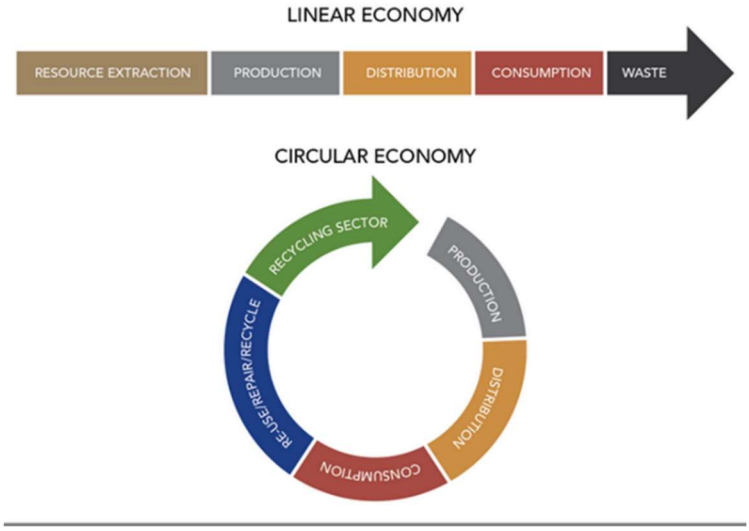

Figure 1. Linear and circular economy

Source: https://www.porta3.mk/ecomondo-izlozhba-na-zeleni-tehnologii/

We throw more than 1/3 of the food produced through waste, 60% of the ecosystem is already degraded or used unsustainably, 7 million and more people a year die prematurely as a result of air pollution (in the EU about half a million) Given the global problem, in 2015 the European Commission adopted a single comprehensive Strategy, a circular economy package, which aims to introduce measures to cover the entire life cycle of products and materials - from production and consumption to waste management and its reuse as secondary raw materials. The practices of the EU accession countries show how much attention is paid to this issue and how necessary it is to show the public the impact of mismanagement of waste on the environment, the community in which we live and finally, in the long run, on our health and quality of life. Circular economy is an alternative to linear economy, which is based on the postulate - take from nature, make, consume, throw away.

2. WASTE MANAGEMENT IN ACCORDANCE WITH ENVIRONMENTAL PRINCIPLES

Waste means any material or object that is generated during the performance of production, service or other activities; items excluded from use, as well as waste materials that are generated in consumption and which, from the aspect of the producer or consumer are not for further use and must be discarded.

Waste management in accordance with environmental principles means separate collection of components and selection at the place of origin. This allows the maximum possible return of separately collected components for reuse, through new forms of use. In this way, many problems are solved, since for permanent disposal, ie. landfilling remains only one tenth of the waste, mostly non-hazardous and inert. Special mention should be made of the problem of municipal waste with hazardous characteristics, which, in this conception, must be stored in a controlled manner, possibly recycled or destroyed.

The concept in which different types of waste are collected together and so mixed are disposed in a landfill is completely wrong. Doing so loses space, destroys the environment, endangers existing natural resources: land, water and air, and permanently loses the value of degraded substances that decay in the mixed mass of waste. The solution to the problem is to collect individual components of waste separately in order to process them into new forms of use and thus avoid a large number of environmental problems. The indicators presented in Table 1 show the quantities of generated waste and the quantities of generated waste (municipal, industrial, hazardous) by types and activities in which they are generated. In this way, the achievement of the strategic goal is monitored - avoidance and reduction of waste generation.

Table 1. Indicators related to municipal waste *

	2011	2012	2013	2014	2015	2016	2017	2018
Total amount of generated waste (mil t)	2.71	2.62	2.41	2.13	1.84	1.89	2.15	2.23
Amount of waste collected and disposed by municipal PUCs (mil t)	2.09	1.83	1.92	1.67	1.36	1.49	1.80	1.95
Average coverage of waste collection (%)	77	~70	80	~80	82	~82	83.7	87.2
Average daily amount of municipal waste per capita (kg)	1.01	0.99	0.92	0.81	0.71	0.73	0.84	0.85
Average annual quantity per capita (t)	0.37	0.36	0.34	0.30	0.26	0.27	0.30	0.31

* Estimation performed based on the number of inhabitants in 2015

Source: http://www.sepa.gov.rs/download/Izvestaj2018.pdf

Table 2. Manner of handling the generated waste in 2018

Character of waste (t)	Produced (t)	Handed over for storage to another company (t)	Handed over for disposal (t)	Handed over for treatment (t)	Export (t)
Dangerous	92.450	20.331	30.778	32.500	2.002
Non-hazardous	9.273.780	296.748	643.507	872.651	40.113

Source: http://www.sepa.gov.rs/download/Izvestaj2018.pdf

According to the data of the Environmental Protection Agency, in 2018, the reports were submitted by 100 PUCs. Table 1 shows the increase in the amount of generated and collected municipal waste. Based on the received reports, during 2018, 11.6 million tons of waste were

produced in the Republic of Serbia, of which 2.23 million were municipal waste reported by the PUC. Business entities that report to the Agency on generated waste during their activities and the manner of handling the generated waste reported 9.37 million tons of waste. Of that, 92 thousand tons is hazardous waste. The method of handling the generated waste in 2018 is shown in the following table and presented in Figure 3.

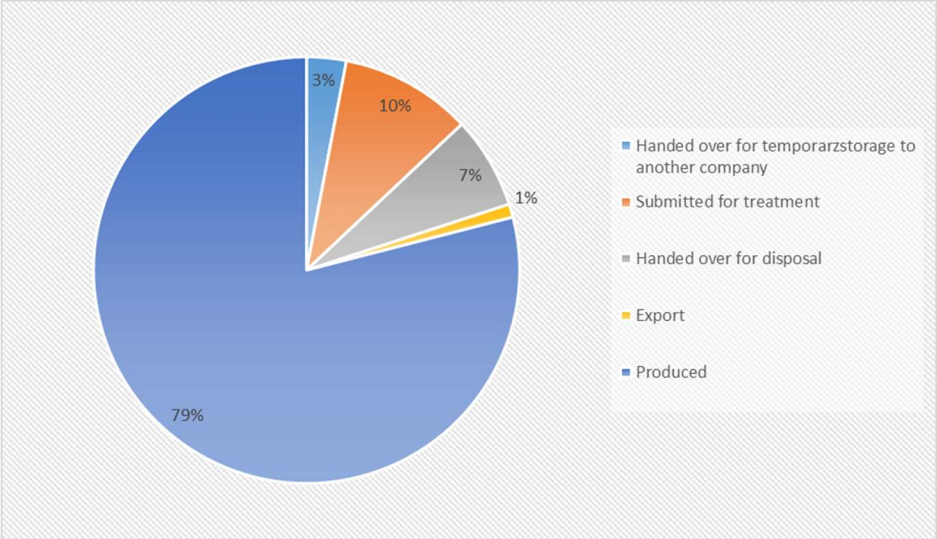

Figure 2. Manner of handling the generated waste

From the total amount of waste produced, the manner of handling is reported for 1,939,620 t (21%) while 7,426,610 t (79%) remained at the locations where the waste was produced.

2.1. Strategic planning and waste management policy

Waste management is the implementation of prescribed waste management measures in the collection, transport, storage, treatment and disposal of waste, including the supervision of these activities and the care of waste management facilities after closure.

Serbia's integration into the European Union (EU) brings to the central levels of government the obligation to complement with the EU system. The essential logic of integration is in fact a real change of the existing situation and acceptance of European standards and values within the communities in which we live. The implementation of environmental policy, given the increasing obligations imposed by European integration and the shorter deadlines for their fulfillment, represents a serious challenge for the competent ministries and parliamentary committees.

On the other hand, it should be pointed out that the society in Serbia, however, is slowly beginning to understand the problem of waste. However, all interested parties do not perceive the problem of waste management as their own but as someone else's, for the solution of which someone else is always responsible - the state, local self-government, industry, and in most cases the neighbor is responsible. The local administration is unmotivated to engage in activities aimed at developing public awareness, considering it an additional, unnecessary and overburdening activity and a waste of time.

Civil society organizations primarily concerned with waste management are essentially not concerned at all with developing public awareness of this process in a strategically designed way. Communication activities and awareness raising in this area are of interest to civil society organizations, especially if they are on the list of priorities of the donor community. Outside of strictly defined project cycles, communication of civil society organizations with other actors (especially local governments and other levels of government) on these topics is almost non-existent. The results achieved in this field are insufficient and unsatisfactory.

The Law on Waste Management ("Official Gazette of RS" No. 36/09 and 88/10) prescribes the obligation of the local self-government unit to adopt a Local Waste Management Plan in accordance with the Waste Management Strategy. The waste management strategy is proposed by the Ministry responsible for environmental protection in accordance with EU directives for a certain period. In January 2020, the twinning project "Support of the European Union to the development of a strategic framework in the field of waste management" was completed, implemented by the Ministry of Environmental Protection and the European Union together with project partners Agencies and Ministries of Austria, Sweden and Lithuania. The European Union, with the expert help of partners, invested 1.5 million euros in this project, which lasted 30 months. (RS Ministry of Environmental Protection)

Within this extremely important project financed from IPA pre-accession assistance, a new Draft National Waste Management Strategy for the period 2020-2025 has been prepared and other documents and instruments key to establishing a strategic framework for waste management in Serbia. The purpose of the project is to develop and improve the waste management system, through the completion of the strategic and legislative framework and planning documents in this sector, in accordance with the acquis communautaire.

Previous Strategy adopted for the period 2010-2019. In (Official Gazette RS 29/2010), in accordance with the then valid EU directives was based on the concept of regional sanitary landfills and gave appropriate results: nine regional sanitary landfills. The new Strategy, harmonized with the five new EU directives on the circular economy, marks the transition to the model of regional waste management centers, implying separate collection, separation and recycling of waste, which is immediately converted into a resource and raw material. Waste that cannot be recycled will go to composting, biological-mechanical treatment, anaerobic digestion, incineration, cogeneration.

The goals in the EU countries, which Serbia should also strive for, are to recycle 65 percent of waste by 2035, as well as to dispose of less than 10 percent of waste in landfills.

Originally, waste management is a communal service and as such an obligation of municipalities, so they have to implement regulations and adopt a Waste Management Plan, but they do not do that, partly because they do not have professional staff and money. The competent Ministry should not only deal with the preparation of the strategic and legal framework, it should start assisting municipalities in implementation by providing professional assistance, through donations (vehicles, buckets, containers).

The waste management plan is a basic document that defines medium-term goals and conditions for rational and sustainable waste management, taking into account the existing way of collecting, transporting and disposing of municipal waste and then providing an adequate way of waste disposal.

Local government unit in addition to the obligation to adopt a Waste Management Plan has the obligation to regulate, provide, organize and implement the management of municipal and non-hazardous waste on its territory, collection of services in that area and more.

The Waste Management Plan ensures the achievement of the objectives of the Strategy through:

- better organization of collection, transportation and disposal of municipal solid waste in a safe way
- establishment of a system of recycling and reuse of components from municipal waste,
- providing infrastructure for municipal waste management, as well as equipping bulk and other waste collection centers,
- ensuring stable financial resources,
- developing public awareness at all levels of society on waste issues, etc.

The analysis of available data (Author's research) organized waste collection by public utility companies covered over 70% of the population, or over 5 million inhabitants.

2.2. Developing environmental awareness and economic interests

Given the issue of general interest, the involvement of the public in decision-making processes on environmental issues is a legal obligation. Waste management is regulated by series of laws and other regulations governing the types and classification of waste, planning and management and other issues of importance in this area. However, although properly collected and disposed of, waste that is uncontrolled produced and not reused, not recycled, and not viewed as a resource, does not contribute to environmental protection, but damages it.

In order to solve the problems in this area, it is necessary to work on raising the level of public awareness of citizens, then on involving citizens and other actors in the selection and collection of waste, in order to avoid resistance and thus enable the realization of goals. In that sense, it is important to cooperate with line ministries, to implement projects of informative and educational character with an emphasis on the topic of primary waste selection and the importance of composting municipal waste. In this sense, campaigns to develop public awareness of citizens should ensure dialogue and access to information and especially participation in the planning and decision-making process. In that way, it is only possible to provide the support of citizens for changes and new processes in this area.

Accordingly, it is necessary to focus activities on:

- Training of employees in local government and utility company;
- Implementation of campaigns in order to raise the level of environmental awareness of citizens.

Education of all generations, from preschool age to adults, is of great importance for developing awareness of the importance of preserving the environment, as well as for developing a responsible attitude towards it. Education must be continuous, throughout life and through various forms of formal and non-formal education. (Environmental schools, sections, environmental gatherings, media support, non-governmental organizations….) And administratively, adult education is especially important, because parents are the ones from whom children adopt behavioral models, both in every other sphere and in terms of attitudes towards the environment in which they live.

The lack of professionally educated staff with specific knowledge and skills slows down the process of developing public awareness on waste management. For that reason, it is necessary to work on the adoption of adequate knowledge and skills in local self-government. Therefore, it is necessary to build quality cooperation of local governments with local media, business sector and civil society organizations. In this case, waste management without a developed public awareness program is most often understood as garbage collection and its disposal in a landfill, which is the most undesirable model.

The principle of sustainable development presented in the light of economy and ecology means the environment as a source of resources for economic activities, but it is also a recipient of waste. One of the ways to influence the preservation and care of the environment are economic instruments. Economic instruments applied in the Republic of Serbia in order to improve and cost-effective management of environmental protection and natural resources are fees (taxes and penalties) and incentives, ie measures.

Our legislation also prescribes fines for non-compliance with laws and regulations related to environmental protection. Unfortunately, the level of these penalties is insufficient to create an incentive for strict compliance with existing legislation. In order to provide financial resources for the encouragement of protection and improvement of the environment in the Republic of Serbia, the Environmental Protection Fund was established as a leading state institution in the field of environmental investments. Basically, the Environmental Protection Fund of the Republic of Serbia was established to provide financial resources for the encouragement and improvement of the environment in the Republic of Serbia, as well as their dedicated and systematic investment in environmental protection projects in accordance with adopted national and international strategies. Revenues of the Environmental Protection Fund from fees are purposefully returned to the environment through projects financed from the Fund.

Incentive measures for environmental protection have a number of direct and indirect economic effects, which are reflected in the following:

- Ensuring environmentally sustainable development through so-called “green economy” and creating a safe environment for existing and future generations involves investing in environmental protection, avoiding "hidden economic costs" based on damage to life (reduced mortality rate), damage to health (reduced morbidity rate)), damage to property and agricultural production and benefits to the ecosystem. At the same time, certain estimates indicate that investments could exceed costs by almost twice.
- Investments in environmental protection have multiplier effects on the economy and employees at the local level through the induction of new jobs, jobs and income, and thus the creation of additional demand. Namely, these investments enable the creation of additional jobs (working places), both during the construction period and during the period of operation.
- Recycling of municipal and industrial waste is an area where perhaps the greatest economic effects can be achieved in the field of environmental investment. Namely, the introduction of new technologies and management for the management of municipal and industrial waste recycling creates conditions for maximum utilization of generated waste, primarily through their economically viable disposal and recycling, while achieving significant financial effects. As a result, it is planned that the recycling industry will employ 10-12 thousand people in the near future, and the largest number of new

employees will be from the most endangered level of the population. Estimates of the Serbian Chamber of Commerce indicate that this industry could generate revenue of more than one billion euros a year.

Investments in this area cannot be considered exclusively as a cost, nor as an exclusively environmental issue, since the numerous direct and indirect economic effects are reflected in the creation of a safe environment for current and future generations, multiplicative effects of investment, reducing the risk of chemical accidents, the improvement of agriculture and tourism, and especially the development of the recycling industry.

The economic aspect of waste management is one of the important elements of the analysis when determining the future waste management strategy and the introduction of waste treatment technologies. Municipal waste management costs in developing countries, in most cases, lay on municipalities and households. Also for industry, waste disposal costs can be high. On the other hand, recycling and reuse of waste can provide an opportunity to improve the position of the endangered part of the population, e.g. Roma population as well as the possibility of developing small and medium enterprises (SMEs). However, for other recyclables for which there is limited demand, it may represent a higher cost of production than the financial benefit of those products. Given the limited financial resources in developing countries, financial assessment procedures for solid waste management need to be improved.

The most commonly used methods for economic evaluation of the waste management process in order to make future decisions are:

- "Cost-benefit" analysis and cost-effectiveness analysis "Cost-benefit" analysis is an economic method of evaluation, which includes all costs and all benefits related to the project and calculates the total value of a particular project. A very similar method of "cost-benefit" analysis is the analysis of efficiency and costs, which refers to the cost of the project, or the cost of the final outcome of the project or project benefits.
- Discounted cash flow methods, ie dynamic methods by which we estimate the investment in new waste treatment plants are:
    1. Net present value method (NPV),
    2. Internal rate of return (IRR) method
    3. Profitability index (profitability) (PI)
    4. Discounted return time (DPP)

The costs and benefits of future waste management systems should be converted to present value in order to make a more realistic estimate. This is especially important when comparing alternative systems with completely different cost-benefit distributions over time. NSV and IRR, are criteria that include the time value of money and represent a method of discounting cash flows.

- Full cost accounting (FCA) is a systematic approach for identifying, summarizing, and reporting the actual costs of solid waste management (EPA, 1999). This approach takes into account past and future costs, staff costs (supervision and ancillary service costs), and operating costs. This method was developed by the U.S. Environmental Protection

Agency (EPA), with the goal of making better decisions regarding solid waste management, improving service efficiency, and better planning in the future.

There are three basic types of costs related to waste management:

- Up-front costs
- Operating costs
- Back-end costs

Up - front costs include the initial investment and costs required to implement the solid waste management service. Operating costs are the daily costs of waste management. Back-end costs include the costs of properly closing operations after the end of the life of the plant and proper care of landfills and other facilities after the end of its life cycle. Employee costs, health care, and severance pay for workers also fall into this category.

3. CONCLUSIONS

Unsystematic and inadequate waste management, which should increasingly be considered a resource, represents one of the biggest problems in the field of environmental protection, and is a consequence of the undeveloped attitude of society towards waste, misunderstanding why it is important to manage waste and not understanding the positive effects of this process.

The lack of developing public awareness in the waste management process leads to a community in which rational and planned decisions related to waste management are replaced by hasty and wrong solutions that can significantly jeopardize the progress of the local community, environment and health of its members. Such an undesirable scenario also most often leads to the establishment of a system that does not lie on the waste management hierarchy at all, where there is no prevention of waste generation, its reduction at the source and the promotion of the concept of product reuse.

In order for the waste management process to be efficient, it is necessary to strive for the following steps: prevention of waste generation, reduction of waste and its hazardous characteristics, waste treatment, planning and control of waste management activities and processes, waste transport, establishment, operation, closure and maintenance waste treatment, monitoring and counseling and education related to waste management activities.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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ANALISYS OF STRESS STATE IN A PLANE ANISOTROPIC FIELD WEAKENED BY A CIRCULAR HOLE

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Abstract

It is the fact that mechanical parts with holes are often encountered in practice. A knowledge of stress distribution is of paramount importance for engineering practice. Therefore, the objective of this paper analyzes the impact of the circular hole as a source of stress concentration on the stress state of uniaxial strained orthotropic plate since the practice has shown that the largest number of structures is weakened by the hole shape. In this paper for obtaining the results of stress distribution in a plane anisotropic field weakened by a circular hole, numerical method was used. The methodology was applied enabling the determination of the values of the stress at each point of plate, as well as at points at the hole contour, which is based on the application of the basic equations of the theory of elasticity.

Key words: circular hole, finite element method, orthotropic plate, stress concentration, stress distribution.

1. INTRODUCTION

A large number of mechanical structures in order to ensure minimum weight or other structural requirements are made of parts that contain notches, grooves, chamfers, rounding, vents and holes. The same represent sources of stress concentration. The holes in machined parts, whether transverse or longitudinal, are typical sources of stress concentration. We find them in the areas of production machines and tools, construction, mining, transport and agricultural machinery, cranes, steel support structures, etc. In addition, they are predicted for the purpose of reducing weight, exercising interconnection of elements, conducting lubricants or other reasons. And precisely the holes are the places where there comes to the stress increase, and in the case that the opening is in the vicinity of the second opening or a source of stress concentration, the resulting stress can be higher or lower than the individual one, depending on the shape and position of the source of stress concentration and the type of strain. Due to it and the effect of

loads in parts of structures cracks are created and developed which in most cases lead to fracture.

In engineering practice, of great importance, is the knowledge of structural analysis that is performed via the simplified mechanical models. Analyzing simplified mechanical models were researched by the great amount of investigators in this field. So, (Ahmed et al., 2018) are used finite elements for analyzing stress concentration for composite laminate member with central circular. (Bathe, & Wilson, 1976) are introducing in structural analysis numerical methods and the finite element method. In analysis of supporting structure tool machine of composite materials, (Ćirković et al., 2015) are using the finite element method. For analysis stress concentration factor for composite materials (Makki, & Chokri, 2017) they use experimental, analitical and numerical methods. As numerical methods involve the use of computers and related program packages here for generation of finite element mesh was used software package (MSC/NASTRAN). Basic problems of the theory elasticity was researched by (Mushelishvili, 1964). (Nagpal, Jain, & Sanyal, 2012) are studing the stress concentration and they are suggesting its mitigation techniques for flat plate with singularities. Results for stress distribution in anisotropic plane weakened by an eliptical hole, we can find in the article (Nikolić et al., 2015). Influence of polygonal cut-out of complex geometry on the stress concentration in an infinite orthotropic plate are researched by (Patal, & Sharma, 2017). The stress strain conditions in the zones of geometric discontinuites of mechanical constructions elements it's the object of studing (Radojković, 2008). Fundimentaly equations of the theory of elasticity which are resolved similar problems, they can be found in (Rašković, 1985), and equations for the stress calculation in isotropic and anisotropic field which are weakened by holes different shapes (Savin, 1968).

In this paper, special attention will be devoted to the study of stress distribution in parts of the type of plate weakened by the circular hole, made of anisotropic or orthotropic materials and exposed to static load.

2. OVERVIEW OF THE EQUATIONS OF LINEAR THEORY OF ELASTICITY IN THE FINITE ELEMENT METHOD

Considering the type of problem discussed here, the equations related to solving the problem of the flat stress state will be given (Radojković, 2008).

The components of surface forces will be the components of the vector F_n:

$$F_n = \begin{Bmatrix} F_{nx} \\ F_{ny} \end{Bmatrix}. \tag{1}$$

At any point of the observed body, the displacement vector s with the displacement components u and v in the direction of the coordinate axes x and y, is shown as:

$$s = \begin{Bmatrix} u \\ v \end{Bmatrix}. \tag{2}$$

The links between the displacement vector s and the deformation vector ε can be represented by Cauchy's kinematic equations in the following form:

$$\varepsilon_x = \frac{\partial u}{\partial x},\ \varepsilon_y = \frac{\partial v}{\partial y},\ \varepsilon_{xy} = \frac{1}{2}\left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x}\right). \tag{3}$$

The Cauchy's tensor of relative deformations for small deformations is represented by a symmetric matrix, in the form:

$$\varepsilon = \begin{bmatrix} \varepsilon_x & \varepsilon_{yx} \\ \varepsilon_{xy} & \varepsilon_y \end{bmatrix}. \tag{4}$$

If it is known that gliding or shearing is γ_{xy}, is equal to the double value of the component of the tensor deformation ε_{xy}, the relative deformation tensor matrix can now be written in the following form:

$$\varepsilon = \begin{bmatrix} \varepsilon_x & \frac{1}{2}\gamma_{yx} \\ \frac{1}{2}\gamma_{xy} & \varepsilon_y \end{bmatrix}. \tag{5}$$

Thus, the state of deformation of the elastic body around some point is determined by three components: two dilatations (ε_x, ε_y) and one glide γ_{xy}. The deformation tensor, taking into account the symmetry, i.e. that $\varepsilon_{xy} = \varepsilon_{yx}$ can be written as a vector, i.e. as a column matrix with three elements, in the form:

$$\{\varepsilon\} = \begin{Bmatrix} \varepsilon_x \\ \varepsilon_y \\ \gamma_{xy} \end{Bmatrix}. \tag{6}$$

Dependence Eq. 5, with respect to Eq. 2, can be represented in the matrix form:

$$\varepsilon = d\ s\,. \tag{7}$$

The matrix of the differential operator d and its transposed matrix d^T have the following form:

$$d = \begin{bmatrix} \partial/\partial x & 0 \\ 0 & \partial/\partial y \\ \partial/\partial y & \partial/\partial x \end{bmatrix},\ d^T = \begin{bmatrix} \frac{\partial}{\partial x} & 0 & \frac{\partial}{\partial y} \\ 0 & \frac{\partial}{\partial y} & \frac{\partial}{\partial x} \end{bmatrix}. \tag{8}$$

The stress state at the observed point of the strained body is determined by three component stresses: two normal (σ_x, σ_y) and one tangential ($\tau_{xy} = \tau_{yx}$) that act in that point. The stress tensor can be written in the form:

$$\{\sigma\} = \begin{Bmatrix} \sigma_x \\ \sigma_y \\ \tau_{xy} \end{Bmatrix}. \tag{9}$$

The conditions of balance between the internal and external forces on the contour segment where the contour conditions are given by the surface forces are given by Cauchy's equations

(Cauchy's boundary conditions):

$$d_s^T \sigma = F_n, \tag{10}$$

where: $d_S{}^T$ - is a transposed matrix of the d_S matrix whose elements are the cosine of the angles that the normal n covers at the points of the contour surface with x and y axes. The d_S matrix has the form:

$$d_s = [d_s] = \begin{bmatrix} \cos(n,x) & 0 \\ 0 & \cos(n,y) \\ \cos(n,y) & \cos(n,x) \end{bmatrix} = \begin{bmatrix} n_x & 0 \\ 0 & n_y \\ n_y & n_x \end{bmatrix}. \tag{11}$$

The general form of the constituent equations, that is, the connection between the matrix components of the stress tensor and the matrix components of the deformation tensor for the elastic material is given by the following expression:

$$\sigma = D\,\varepsilon, \tag{12}$$

which represents the generalization of the well-known Hooke's law, where: D - a stiffness matrix of material which, in the case of homogeneous isotropic materials, is expressed through Young's modulus of elasticity E and Poisson's coefficient μ, hence the name for this matrix "matrix of elastic constants or elasticity tensor matrix". Its form in this case is:

$$D = \frac{E}{2(1+\mu)} \begin{bmatrix} \frac{2(1-\mu)}{1-2\mu} & \frac{2\mu}{1-2\mu} & 0 \\ \frac{2\mu}{1-2\mu} & \frac{2(1-\mu)}{1-2\mu} & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

(13).

3. RESULTS OF STRESS DISTRIBUTION OBTAINED NUMERICALLY

The results reached in this paper were obtained by using the finite element method (FEM) and relate to the distribution of stress σ_{max} in the uniaxial strained orthotropic plate. The plate dimensions in the examples were 120 × 120 × 1 m. The same were weakened by the circular hole in the middle of the plate, of radius r = 2 m. The load was uniaxial and acted in the form of surface tensile forces whose intensity in the examples was p = 1 N/m^2. The material from which the test plate were made was birch veneer with values of the elasticity modules in the directions of the main axes $E_{max} = 1{,}2 \times 10^{10}$ N/m^2 and $E_{min} = 0{,}6 \times 10^{10}$ N/m^2, the glide module $G = 0{,}07 \times 10^{10}$ N/m^2 and Poisson's ratios in these directions $\nu_{max} = 0{,}071$ and $\nu_{min} = 0{,}036$. The tests were carried out so that, in the examples, the main directions of elasticity of the material coincided with the directions of the coordinate axes x and y, and the load was acting along the x axis. In the above examples four-node 2D finite elements were used, because by checking the accuracy of the selected finite elements using the trial „patch" tests, the justification of their implementation was confirmed (Radojković, 2008). In the figures with the distribution of stress

only a detail of stress distribution σ_{max} around the hole was shown, because showing the stress distribution throughout the model would be unclear (unreadable), and that the research shown that the highest stress values were obtained in the vicinity of the hole. In the mentioned figures you can also see the finite elements mesh.

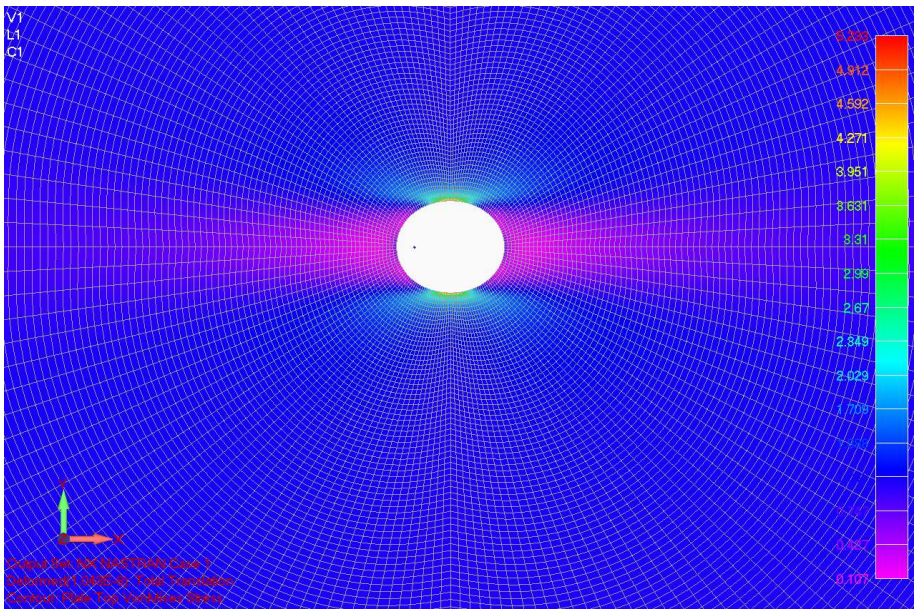

Figure 1. The distribution of stress σ_{max} at straining the plate weakened by the circular hole in the direction of x axis, when the same coincides with the direction corresponding to the maximum value of the modulus of elasticity

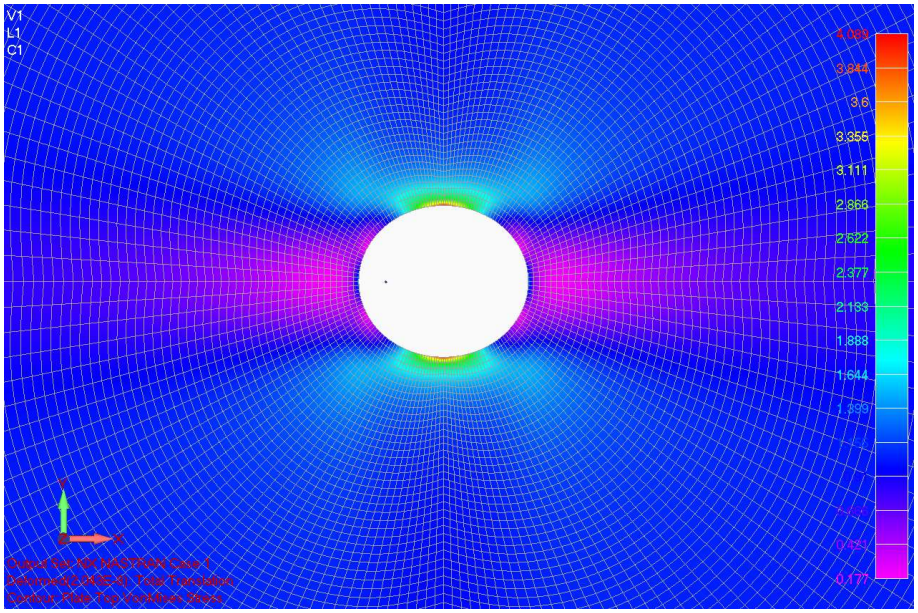

Figure 2. The distribution of stress σ_{max} at straining the plate weakened by the circular hole in the direction of x axis, when the same coincides with the direction corresponding to the lowest value of the modulus of elasticity

Figure 1 shows the stress distribution σ_{max}, in the uniaxial strained orthotropic plate of birch veneer weakened by the circular hole, when it is strained by the surface forces along the axis x and when the x-axis direction corresponds to the direction for which the modulus of elasticity of the material has the highest value ($E_x = E_{max}$), and the y-axis corresponds to the direction for which the modulus of elasticity of the material has the lowest value ($E_y = E_{min}$). The highest obtained value of the maximum strain stress in this case is σ_{max} = 5,233 N/m^2. When the orthotropic plate of birch veneer weakened by the circular hole is strained by the surface forces along the x axis, and when the x-axis corresponds to the direction for which the modulus of elasticity of the material has the lowest value ($E_x = E_{min}$), and y-axis corresponds to the direction in which the modulus of elasticity of the material has the highest value ($E_y = E_{max}$), the highest obtained value of the maximum strain stress is σ_{max} = 4,089 N/m^2 (Figure 2).

4. ANALYSIS OF RESULTS OBTAINED NUMERICALLY

Based on the obtained values for the maximum strain stress σ_{max}, with the uniaxial strained anisotropic, i.e. orthotropic plate weakened by the circular hole, it can be seen that the lowest values of the stress are obtained at straining in the direction for which the modulus of elasticity of the material has the lowest value which should be considered during the design and construction of parts of the type of thin sheets weakened by the circular hole having a certain reservation because different anisotropic, or orthotropic materials behave differently to stress concentration.

5. CONCLUSIONS

This paper has shown that, to determine the stress distribution in mechanical structures composed of elements of type of uniaxial strained anisotropic (orthotropic) plates weakened by the circular hole, numerical methods can be used, and that the results obtained by the finite elements method (FEM) justify the application of it. By the analysis of the results obtained for the uniaxial tensioned orthotropic plate of birch veneer, weakened by the circular hole a number of conclusions can be derived that may be valid for other anisotropic materials, but with some reservations because different anisotropic materials may behave differently in terms of stress concentration.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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HYPER-ACCUMULATION OF NICKEL BY BORNMUELLERA DIECKII DEGEN AS AN ENDEMIC PLANT SPECIES IN KOSOVO

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Abstract

The objective of this study was determination of chemical elements in *Bornmuellera dieckii* (Fam. *Brassicaceae*), as an endemic plant species, which is located only in Kosovo (so far it has been found only in some localities in the Sharri Mountains). In the same location and in the same time, for comparasion we collected another Balkan endemic plant *Stachys scardica* (Fam. *Lamiaceae*). Also, we collected the soil samples in which they have grown. The plants were separated in three parts: roots, stems and leaves, they prepared in a standard procedure of cleaning, drying and digested in the microwave digestion system. The plants samples and soil samples were analysed by Flame atomic absorption spectroscopy (FAAS). The level of nickel content (in mg/kg) for roots, stems and leaves in plant *Bornmuellera dieckii* were: 4102, 9713 and 24295, but in plant *Stachys scardica,* these values were 95.4, 23.8 and 62.9. The Bioconcentration factor (BCF) of nickel for *Bornmuellera dieckii* was ranged: from 2 to 12, and the Translocation factor (TF) was 2.4 for root to stem, and 5.9 for root to leaf.

Keywords: Endemic plants, Bornmuellera dieckii, nickel-hyperaccumulating plants, microwave digestion, FAAS.

1. INTRODUCTION

The term "hyperaccumulator" was used for plants that, differently from the excluder plants, actively take up large exceeded amounts of one or more heavy metals from soil. Moreover the heavy metals are not retained in the roots but are translocated to the shoot and accumulated in aboveground organs, especially leaves at concentrations 100-1000 times than non-hyperaccumulating species (Rascio, &Navari-Izzo, 2011; Brooks et al, 1977, p.49; Rascio, 1977; Revees, 2006).

The total number of endemic plants in the Balkans is estimated as more than 2200 taxa, where 335 of them have been recorded on serpentine (Stevanović et al, 2003; Bani et al, 2013). Serpentine (ultramafic or ophiolitic) substrates cover quite large areas in the Balkans, more than in other parts of Europe (Bani et al, 2010; Brooks, 1987). The serpentine areas located in the Balkan Peninsula are widespread and form a belt that runs down from Bosnia to Greece (Salihaj et al, 2018; Bani et al, 2009). Serpentine soils are formed by weathering of ultramafic rocks and are characterized by low calcium/magnesium ratio and high concentrations of iron, nickel, magnesium, cobalt, and chromium (Osmani et al, 2018).

Over 450 plant species have been identified as hyperaccumulators of trace elements (Zn, Ni, Mn, Cu, Co, Cd, As and Se), where majority (75%) of them being Ni hyperaccumulators (Verbruggen et al, 2009, p.760). There is a great number of plants, 317 taxa of 37 families, which could accumulate over 1000 mg Ni/kg (or 0.1%). (Kabata-Pendias, 2011). The greatest number of Ni hyperaccumulator plants species are from family of Brassicaceae (*Alyssum*, *Thlaspi*, *Bornmellera*) (Baker & Brooks, 1989; Reeves and Adigüzel, 2008). The genus *Bornmuellera* is restricted to Greece, Kosovo, Serbia, Albania and Turkey (Bani et al, 2017; Marlhold, 2011).

Bornmuellera diecki is a local endemic plant found in Sharri mountains (Blecic, 1968; Rexhepi, 1982; Tutin et al, 1964). Endemic plant of Kosovo discovered by the Hungarian botanist A. Degen, in 1900, in the serpentine terrains near Mushtisht (Rexhepi, 2000). Based on IUCN criteria, this type of plant is rated as "Endangered" (EN) (Millaku et al, 2013).

Plants that accumulate and exclude metals have tremendous potential for application in remediation of metals in environment (Prasad, 2005). Phytoextraction is the most important phytoremediation approach for removal of metals and metalloids from soil or water by plant roots and their translocation and accumulation in aboveground biomass (Sarwar et. al, 2017). Some plants (*Alyssum sps*) growing in serpentine soils, and using to produce nickel (Mahar et al, 2016; Bani et al, 2018).

The objective of this study was determination of chemical elements in local endemic plant *Bornmuellera diecki* and Balkan endemic plant *Stachys scardica*, to investigate their ability for accumulation of metals in the plant parts. We analysed 12 chemical elements (K, Na, Ca, Mg, Fe, Ni, Cu, Mn, Zn, Cr, Pb and Cd) in root, stem and leaf, of two plants species and in the soil where they were growing.

2. MATERIALS AND METHODS

2.1.Soil and plants sampling

Sampling was conducted in August 2020 in the Mountains of Mushtisht (open herbaceous place near coniferous forest, altitude 1330-1350 m), Kosovo. Two different plants, very close be(Figure 1) and one soil samples were collected at the same time and at the same place. The samples (plants and soil) have been prepared out of 10 sub samples that have been taken with a distance of 10-50 m between them. The soil samples were taken from a depth 0-20 cm, near the roots of the sampled plants. The soil samples put in a plastic bag, and plants samples put in the paper bags.

Soil sample is dried for 48 h at a temperature 80 °C, aggregates were crushed and sieved (a < 2 mm). Plant samples were washed with distilled water and dried for 48 h at a temperature 80 °C. The samples were divided into three parts: root, stem and leaf, then ground and sieved (a < 1 mm).

Figure 1. Plant species investigated: *Bornmuellera dieckii* (left) and *Stachys scardica* (right)

2.2.Chemical analysis

The pseudo total contents of elements in soil (0.25g on DW) were extracted with aqua regia using microwave assisted extraction (MAE) (6 ml of 35% HCl and 2 ml of 65% HNO_3) from finely ground samples (US EPA 3051A). The solutions obtained were then diluted with distilled water to 50 ml in a volumetric plastic flask and were sent for analysis.

The total content of metals in plants (0.5g on DW) was extracted using microwave assisted extraction MAE (5 ml H_2O, 5 ml HNO_3 and 3 ml H_2O_2) (Czarnecki and Düring, 2014). The solutions obtained were then diluted with distilled water to 25 ml in a volumetric plastic flask and were sent for analysis.

Content of elements in soil and plant extracts were measured with an atomic absorption spectrometer (AAS) (MSeries, Thermo, at the Faculty of Agricultural and Veterinary-University of Prishtina) by the flame method.

The quality assurance of the analytical method for soil samples were examined by analyzing two certified reference materials ("soil 1" and "soil 2", test 2004, 2005) supplied by the "Centre for Agricultural Technology Augustenberg" (Karlsruhe).

2.3.Data analysis

The ability of phytoextraction can be quantified by calculating bioconcentration factor and translocation factor.

Bioconcentration factor indicates the efficiency of a plant species in accumulating a metal into its tissues from the surrounding environment (soil), by using formula:

$$\text{Bioconcentration factor (BCF)} = \frac{C\ (tissue)}{C\,(soil)}$$

where C(tissue) is the concentration of the target metal in the plant harvested tissue, and C(soil) is the concentration of the same metal in the soil.

Translocation factor indicates the efficiency of the plant in the translocating the accumulated metal from roots to shoots, by using formula:

$$\text{Translocation factor (TF)} = \frac{C\ (shoot)}{C(root)}$$

where C(shoot) is concentration of the metal in plant steam or leaf, and C(root) is concentration of the same metal in plant roots (Ali et al, 2013).

3. RESULTS AND DISCUSSION

3.1.Chemical composition of soil

Twelve major and trace elements were analysed in soil sample, where 10 of them (Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Zn and Cr) were determined, and Cd and Pb were below the limit detection of the techniques (Flame Atomic Absorption Spectrometry-FAAS).

The soil concentration (mg/kg) of metals in dry weight (Figure 1) are in a following order: Fe (88520) > Mg (10604) > Ni (2062) > Mn (1918) > K (1388) > Cr (1172) > Ca (452) > Na (339.7) > Zn (90.6) > Cu (33.1).

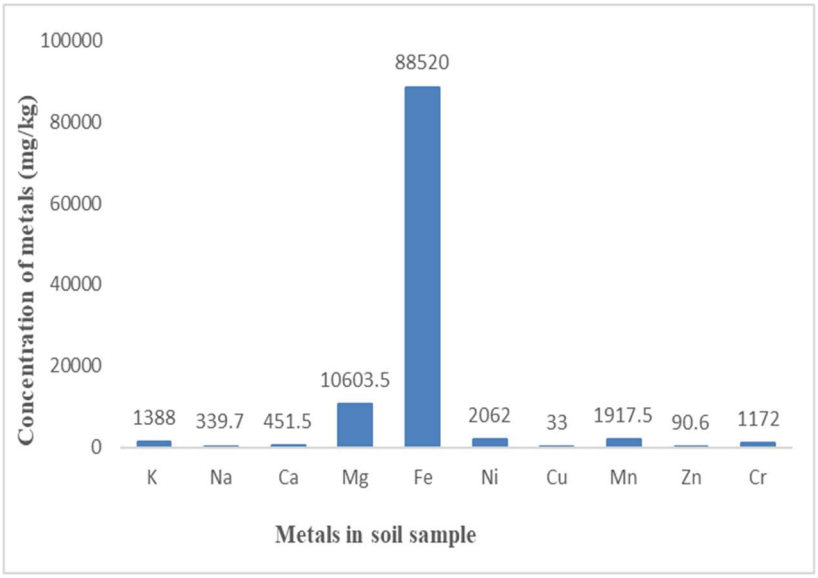

Figure 2. Content of metals in soil sample (mg/kg)

The most concentration from all elements determined in our soil samples was iron with 88520 mg/kg (or 8.85%). This value is similar with the values reported by authors (Salihaj et al, 2018; Bani et al, 2013) and in the accordance to the ultramafic soils (Pendias, 2011).

Concentration of magnesium was 10603.5 mg/kg (or 1.06%) and calcium 451.5 mg/kg. The ratio between them (Mg/Ca) was 23.49. Similarly, a higher ration of Mg/Ca was recorded in serpentine soils at different sites by other authors (Shallari et al, 1998; Bani et al, 2010; Osmani et al, 2018).

The total concentration of nickel in soil sample was 2061.6 mg/kg, this value is similar with the values presented in Kosovo (Salihaj et al, 2018) and Balkan countries (Bani et al, 2010). In the mafic soils the values of nickel are ranged from 1400 to 2000 mg/kg (Pendias, 2011).

In mafic soils (serpentine) the level of manganese is ranged 850-2000 mg/kg, and in our samples is 1918 mg/kg, this value is close to other authors presented (Bani et al, 2010). The concentration of chromium is 1172 mg/kg, which is in accordance with mafic soils ranged 170-3400 mg/kg (Pendias, 2011). This value is found among the values (200-1600 mg/kg) presented for Kosovo (Salihaj et al, 2011) and below the value (1910 mg/kg) reported for Austria (Wenzel et al, 2003).

The concentration of major elements (K and Na) in our soil samples were 1388 mg/kg and 339.7 mg/kg, respectively. The trace elements: copper (33 mg/kg) and zinc (90.61 mg) were very close to authors (Osmani et al, 2018), and below the values reported for Balkan countries (Bani et al, 2010).

3.2. Chemical composition of plants material

From twelve metals analysed, 3 of them (Cd, Cr and Pb) were below the limit detection of the techniquees FAAS. In table 1, we presented the concentration of 9 metals in three different tissues (roots, stems, leaves) for plants species *Burmuellera deicki* and *Stachys scardica*.

Table 1. Content of metals (mg/kg) in plants tissues

Plant	Sample	Ca	Cu	Fe	K	Mg	Mn	Na	Ni	Zn	Mg/Ca
Bornmuellera dieckii	Roots	1384	5.51	409.5	4396	2930.8	37.97	89.67	4102	45.82	2.12
	Stems	2431	6.62	121.1	6045	3117.5	24.53	68.48	9713	33.49	2.64
	Leaves	6133	7.62	71.82	7424	5860.4	62.13	67.08	24295	24.20	0.947
Stachys scardica	Roots	3824	23.6	576.4	6625	47.0	52.08	103.5	95.38	73.88	0.012
	Stems	2119	9.78	26.82	8444	40.8	27.44	85.81	23.76	30.98	0.019
	Leaves	6066	10.7	315.5	9602	6539.2	58.01	65.49	62.91	46.99	1.08

The most concentrated metals in *Bornmuellera dieckii* was nickel, where its concentration (mg/kg) increases from roots to leaves in order: roots (4102) < stems (9713) < leaves (24295). Our results shown that *Bornmuellera dieckii* is nickel-hyperaccumulating plant. That *Bornmuellera* species are nickel hyperaccumulators were reported also by other authors. According to (Baker & Brooks, 1989; Bani et al, 2010) in Greece, nickel accumulated up to 21300 mg/kg in leaves of *Bormuellera* subsp. *baldaccii* and 31200 mg/kg in leaves of *Bormuellera* subsp. *tymphaea*, also in Albania *Bormuellera* subsp. *markgrafii* accumulate nickel up to 27300 mg/kg. The greatest nickel hyperaccumulator is Sebertia acuminate (a native tree) in New Caledonia, which is able to accumulate nickel in its latex up to 26% (Prasad, 2005; Mahar et al, 2016). But in other plant species *Stachys scardica,* the concentration (mg/kg) of nickel was very low: roots (95.38), stems (23.76) and leaves (62.91), because it has not ability for nickel accumulation.

The concentration (mg/kg) of Ca in *Bornmuellera dieckii* increases from roots to leaves in order: roots (1384) < stems (2431) < leaves (6133). From our results we can see that we have good corelation between Ni and Ca, in this plant species. Magnesium concentrations also increases from roots to leaves in following order: roots (2930.8 mg/kg) < stems (3117.5 mg/kg)

< leaves (5860.4 mg/kg). The ratio between Mg/Ca in the parts of *Bornmuellera dieckii,* were: 2.12 for roots; 2.64 for stems and 0.947 for leaves. The concentration of Ca in *Stachys scardica,* has shown the minimum value in stem (2119 mg/kg) and the maximum value in leaves (6066 mg/kg), magnesium has shown low values in roots (47 mg/kg) and stems (40.8) but in leaves has shown higher concentration (6539.2 mg/kg) than calcium, and ratio (Mg/Ca) between them was 1.08.

Potassium concentrations increases in two plants from roots to leaves with good corelation. The iron concentrations (mg/kg) in both plant species (*Bornmuellera dieckii* and *Stachys scardica)* decrease from roots to leaves. The trace elements (Cu, Mn and Zn) have shown low concentration below 100 mg/kg for plants investigated.

For understanding in details the ability of plants at accumulation of metals in their tissues we calculated Bioconcentration factor and Translocation factor. Only plant species with Bioconcentration factor (BCF) and Translocation factor (TF) greater than 1, have potential to be used for phytoremediation because the plant is hyperaccumulator for specific element (Ali et al, 2013; Osmani et al, 2018). In Figure 2, we presented Bioconcentration factor of metals in our plants investigated *Bornmuellera dieckii* and *Stachys scardica.* The local endemic plant species *Bornmuellera dieckii* is hyperaccumulator for potassium where BCF ranged from 3.18 (root) to 5.35 (leaves), also for calcium from 3.1 (roots) to 13.6 (leaves), and for nickel where BCF values increases: 1.99 (roots) < 4.7 (stems) < 11.8 (leaves). While Balkan endemic plant species *Stachys scardica,* was hyperaccumulator only for potassium and calcium, where BCF(K) increases: 4.8 (roots) < 6.1 (stems) < 6.9 (leaves), and the values of BCF(Ca) increases: 4.7 (steams) < 8.5 (roots) < 13.4 (leaves). Magnesium in their leaves was in high concentration (0.586 % in *B.deickii* and 0.654 % in *S.scardica*) but BCF values were below 1, because they were growing in serpentine soil where Mg was 1.06 % in DW.

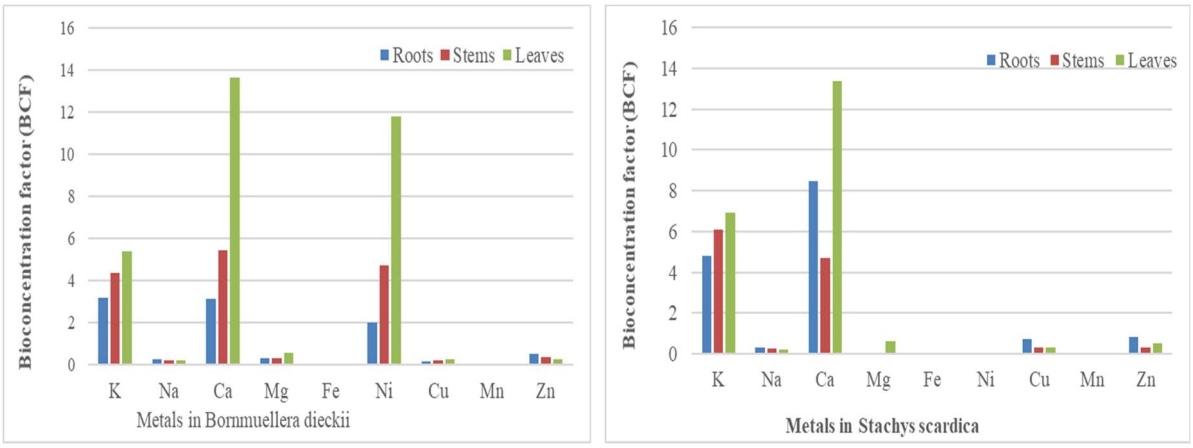

Figure 3. Bioconcentration factor of metals in *Bornmuellera dieckii* and *Stachys scardica*

The Translocation factor (TF) presented in Figure 3, shown us ability of plants for transport of metals from root to stem and root to leaf. In *Bornmuellera dieckii*, only Na, Fe and Zn have TF below 1, that mean they are concentrated in their roots. Other metals have TF above 1, and they are more concentrated in their leaves than steams. Nickel has the highest values of translocation factor from all metals investigated, where TF for root to leaf was 5.9, more than 2 times higher than for root to steam translocation 2.4. From all metals investigated in *Stachys scardica* only

potassium has TF higher than 1 for transport of metal from root to stem, while for translocation from root to leaf, the highest value has magnesium with 139.

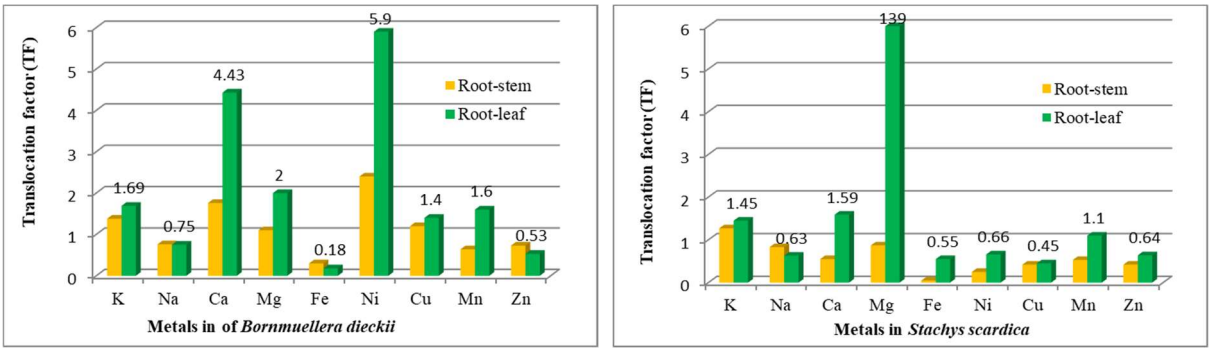

Figure 4. Translocation factor (TF) of metals in *Bornmuellera dieckii* and *Stachys scardica*

4. CONCLUSION

As we expected based on the reports of the authors (Rexhepi, 2000; Millaku et al, 2013), in the Mushtisht Mountains we found the local endemic plant *Bornmuellera dieckii*, which is found only in Kosovo. This endemic plant grows in serpentine soils which are rich with Fe, Mg, Ni, Cr and Mn and poor with Ca, K and Na. The ration between Mg/Ca is above 1, in soil sample and also in plant samples. Our experimental results confirmed that *Bornmuellera dieckii* accumulates nickel up to 2.43% on dry weight of leaves and should be added to the list of nickel hyperaccumulative plants. Bioconcentration factor (BCF) of nickel was from 2 on its roots, up to 11.8 on its leaves. Translocation factor (TF) for root to stem was 2.4, and for root to leaf was 5.9. While Balkan endemic plant *Stachys scardica,* is not hyperaccumulator, because nickel was in low concentrations, and bioconcentration factor (BCF) and translocation factor (TF) were much lower than 1.

Since this is the first research on this field reported so far for plant species *Bornmuellera dieckii*, more research should be conducted to prove the possibility of using the plant for phytoremediation and agromining of nickel (Mahar et al, 2016; Bani et al, 2018). Therefore, we recommend that the plant *Bornmuellera diecki* should be planted in serpentine soils and verify the capacity of the biomass produced as well as the yield of nickel production.

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MULTIDISCIPLINARY APPROACH TO BIOGAS PRODUCTION

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Abstract

The use of renewable energy sources, which focus on sustainable development, faces many challenges that were insufficient in mutual understanding of the actors involved in this process. This paper will discuss the need for a multidisciplinary approach to electricity generation in biogas power plants with a focus on the raw material supply chain. The aim of this paper is to point out possible improvements in the process of operation of biogas power plants, which is most common in the Republic of Serbia and which can be achieved through joint efforts of researchers, entrepreneurs, and decision-makers, based on good practices implemented in the EU. Biogas power plants use organic raw materials: silage based on energy crops and manure from livestock production, from which, in a highly automated process of anaerobic digestion, they obtain biogas from which electricity is further produced and placed on the grid at fiding tariffs. In order for this product to be ecologically, energetically and economically sustainable, close cooperation of experts in the field of agriculture (agronomists and cattle breeders), biology (microbiologists), soil science (with a focus on nutrient management), mechanical engineering (electricity production from biogas) is necessary, spatial planning (to avoid the use of fertile agricultural land for biomass production), environmental science (reduction of greenhouse gas emissions), waste management (to expand the list of materials used as raw materials), energy, and decision-makers at the state level.

Key words: Biomass, renewable energy sources, biodegradable waste, resource efficiency, environment.

1. INTRODUCTION

Biogas power plant works on a base principle of using organic material as an entry substance to produce energy carrier in the form of biogas while co-products of the system are extracted and reused. This type of powerplant usually uses the process of Anaerobic Digestion (AD). This process is based on a biochemical reaction that uses organic matter and with the help of microorganisms, in the absence of oxygen, produces a gas that is made of methane and carbon dioxide. The byproduct of this process is called digestate or sludge and it can contain certain chemical characteristics that can make it suitable for reuse in the fields of agriculture and farm industry (Zhanga et al 2019).

Availably of feedstock, strong supply networks along with rising focus toward waste management will stimulate the European industry growth (Scarlat 2019).

AD has a long history, with the first operational AD system constructed in India in 1897. Currently, there are a number of countries that each have thousands of biogas plants for domestic and commercial purposes. It is considered that the simplicity of AD, when compared against other biological and thermal technologies for the processing of organic wastes, coupled with its adaptability to a wide spectrum of feedstocks, that has led to its current scale of adoption. Crop and livestock farmers use AD plants for fuel production, manure management, and biofertilizer production, whilst commercial AD plants can operate with a more diverse set of feedstocks, including municipal solid wastes (MSW) and industrial effluents, and their focus can often be on the reduction of chemical oxygen demand (COD) and effluent treatment as well as on energy generation (Mortola et al 2019).

AD can be used to produce biogas and energy from a variety of organic feedstocks and also as a means of treatment and value-addition for various kinds of waste streams. The type of feedstock used is of great importance as it will influence the optimal AD process conditions as well as the quality of the biogas and digestate. AD facilities that rely on a small subset of agricultural residues and energy crops and on-site AD facilities that deal with the outputs of a particular industrial process tend to have relatively consistent supplies of reasonably homogeneous feedstocks. However, stand-alone AD plants that use feedstocks from a variety of sources tend to have inconsistent levels of supply as well as heterogeneous feedstock compositions that can cover wide ranges of levels in: complex carbohydrates, proteins, lipids, sugars, and acids.

Simplyfied biogas plant scheme is presented in Figure 1.

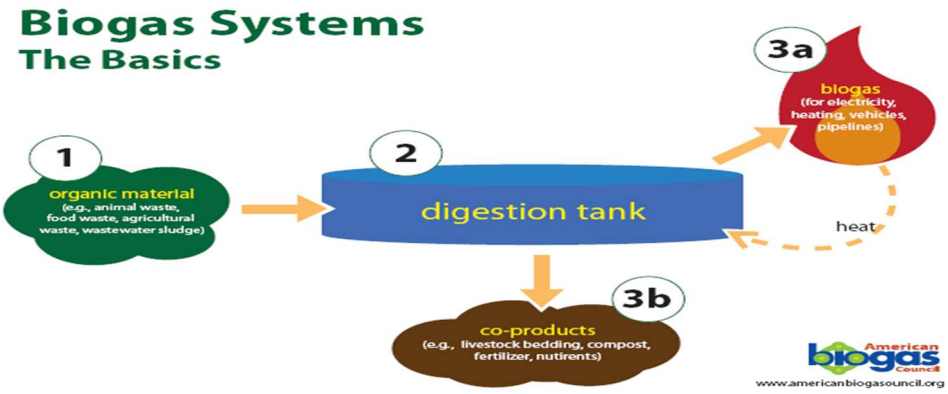

Figure 1. Biogas plant basic example (americanbiogascouncil.org)

The simplyfied sistem is made out of 3 stages; 1st stage is influent (feedstock), 2nd is digestion tank where product is made, and 3rd is product meaning biogas and digestate and both products are separate effluents of the system.

1. Influent, organic material, or feedstock can have multiple origins: energy crops, manure, industrial waste, source separated organics (SSO), municipal solid biodegradable waste (MSW), organic waste from food or hospitality industry, or wastewater treatment plant

sludge. Depending on the source, influent might need to be treated before entering the production cycle for safety, health and efficiency reasons.

2. Digestion tank is the main part of biogas plant and it is a place where anaerobic digestion takes place. The tank allows the separation of the effluents in a way that biogas is separated on the top and digestate (the byproduct of the process) is left in the tank. This process takes several days depending on the charging system.
3. 3a) Biogas, main product that can be used for production of electricity, for heating, as a vehicle driver. In biogas plant in the cogeneration process 70% is electricity and 30% is heat that is returned to production cycle. Cogeneration makes entire system more efficient and cost efficient.
   3b) digestate is a by-product of creating biogas via the process of anaerobic digestion. Digestate has multiple usage possibilities, it can be used as a fertilizer, livestock bedding, compost or nutrient for plants, or it can be re-interduce in the production of biogas depending on the characteristics and physical/ chemical properties.

Europe Anaerobic Digestion Market size was valued at over USD 45 billion in 2019 and cumulative installed capacity is projected to exceed 17 GW by 2026 (Gupta & Paranjape 2020). Rising focus to limit greenhouse gas emissions coupled with introduction of supportive policies by respective governments toward biogas utilization will fuel the Europe anaerobic digestion industry demand.

The Europe anaerobic digestion market report features a detailed analysis of industry trends and is segmented on a regional & country basis across feedstock, application, and process. Moreover, the market forecasts & estimates are in line with the data represented by authorities including the European Environment Agency (EEA), International Renewable Energy Agency (IRENA), International Energy Agency (IEA), European Commission (EC), government regulatory bodies, and company press releases.

If we look at the biogas production process only as making biogas in the biogas plant and take into consideration only the personnel that works at the plant, we would leave out the big part of the biogas production process. The correct way to look on the biogas production is to take into consideration all industry that is making input to the plant as well as the industry that have used not only for biogas as a final product but the by-products usage in other industries. The agricultural industry takes a big part in feedstock production, mainly as a provider of agro energy crops of first-generation. If we utilize the production of agro energy crops on marginal lands, the valuable space for producing food is saved and there are possibilities for phytoremediation if correct crops are used (Głab & Sowinski 2019).

2. MATERIALS AND METHODS

The literature review included scientific publications concerning the biogas production with the all related actions and industries for influent and effluent for the process. A keyword-based search in the Web of Science framework was conducted in June 2020. The terms "biogas", "biomass", and "renewable energy source" were used in the search. They entered the selection only works in English and the date of publication of the papers 2020 was used as a restrictive criterion. The 100 publications (of 740) were selected, abstracts of all identified papers were reviewed. Papers were considered if their topic covered one of the following areas:

1) Biogas production
2) Agro-energy crops for production of green energy
3) Circular economy

Some of most relevant publications in research area of AD process and biogas production were chosen for review, regardless of publication year.

3. RESULTS AND DISCUSSIONS

Production of biogas combines multiple areas of different industries. As we mentioned previously, for biogas plant processes the feedstock plays the main part and since it can come from different sources, it needs multidisciplinary approach.

Research of the publications in 2020 has shown that there is a high interest of the researchers for biomass as a renewable fuel source in biogas plants. From chosen 100 publications, 52 were dedicated to the production of biogas, 38 on agro energy crops, and 53 to the circular economy. From this, we can conclude that the multidisciplinary approach in research is present and the multiple search parameters occur in a fashion: 18 papers had biogas and agro energy crops combined, biogas and circular economy in 12 papers, energy crops and circular economy in 18, and all 3 parameters in 6 papers. Future research is needed to determine the country-specific stats, type of biomass, and the expertise of the researcher.

Some improvements in biogas production technologies relate to various parts of the AD process and some address socio-economic and environmental issues. Some of them will be shown here.

3.1 Microbiology

Microaeration pretreatment released organic matters and stimulated enzyme activity.

•CH4 production was significantly correlated with enzyme activity after microaeration.

•Microaeration increased biogas production by 16.4% and improved sludge dewaterability.

•Microaeration enriched hydrolytic and fermentative bacteria for anaerobic digestion. (Ruan et al 2019)

3.2 Feedstock evaluation

Feedstock analysis is crucial in order to properly evaluate feedstocks for use in AD processes. Of particular importance is the biomethane potential (BMP). This laboratory tests involves mixing the organic substrate with an anaerobic inoculum in a closed reactor that is incubated at a set temperature, with the contents mixed, for a set period of time. During this period the sample is digested and biogas is produced. The volume of biogas is monitored allowing for a cumulative plot of biogas production over time to be derived. This biogas can then be analysed for its composition, in particular the methane content, to allow the BMP to be determined. The BMP can be considered to be the experimental theoretical maximum amount of methane produced from a feedstock.

In addition to the BMP, it is important to understand the composition of the organic matter in the feedstock in order to determine optimal process conditions for its digestion. For example, differentiating between: structural sugars and soluble sugars, total proteins, and total fats will help to understand how the feedstock will progress across the 4 stages of AD. Nitrogen content

is also particularly important, in order to balance the C/N ratio and to avoid toxic levels of ammonia, and it is often the case that, based on the results of analysis, the co-digestion of two or more feedstocks may be necessary in order to balance the carbon-nitrogen ratio (C/N) in the AD system (Ohemeng-Ntiamoah & Datta 2019).

Other important parameters that should be tested for in a feedstock include toxic compounds such as acids, ammonia, and heavy metals. In the case of waste streams from industries, other specific compounds/intermediates released in trace quantities by the industrial process should also be determined as they can possibly accumulate in the digester with time and might inhibit the AD process.

It should also be considered that the composition of a given feedstock is not necessarily static, it can change according to variations in its supply and production. For example, the compositions of many samples can vary according to the time of year they are harvested/collected as well as depending on their length of time in storage. As a result, samples should be tested, for their composition and BMP, in a variety of conditions, where these may be considered to influence the outputs and course of digestion in AD processes.

3.3 Analytical Requirements for Digestate

Digestate is the material that is left over following the anaerobic digestion process. Digestate can be made into products like: Bedding for livestock; Flower pots; Soil amendments; and

Fertilizers. When properly processed, dewatered digestate can be used as livestock bedding or to produce products like flower pots.

Digestate can be directly land applied and incorporated into soils to improve soil characteristics and facilitate plant growth. Digestate can also be further processed into products that are bagged and sold in stores. Some emerging technologies can be employed post-digestion to recover the nitrogen and phosphorus in digestate and create concentrated nutrient products, such as struvite (magnesium-ammonium-phosphate) and ammonium sulfate fertilizers (Zhang et al 2019).

The digestate output from anaerobic digestion contains high volumes of water and can be treated by a variety of methods including: drying, ammonia stripping and drying, biological treatment, and reverse osmosis. The liquid and solids fractions of the digestate can be separated in a number of ways, but typically mechanical separation is used. The separated solids can be either composted or dried and pelletised, although composting is not necessary if the final application of the digestate is for land-spreading. Before using digestate for any applications, it should be tested for fiber content, fiber composition, chemical oxygen demand (COD), biological oxygen demand (BOD), NH4-N, nitrogen-phosphorous-potassium (NPK), micronutrients, trace elements, heavy metals, microbial load and pathogens (Przygocka-Cyna & Grzebisz 2018)

3.4 Reduction of pollution through integrated waste management

The products of AD produce less odor than farm slurry. It can reduce pollution of water courses by reducing run-off. Run-off is the liquid slurry which is sprayed onto farmland, but then drains into surface water. It can carry sediments and pollutants into the receiving waters.

AD can lessen the risks of the spread of disease and contamination by destroying bacteria, viruses and weed seeds. Well-managed AD can decrease methane (CH_4) release more

effectively than conventional waste management, because the methane is converted into carbon dioxide (CO_2), a less potent greenhouse gas. The use of AD can aid industry to manage organic waste in a manner that is not detrimental to the surrounding area and will necessitate awareness of environmental regulations.

AD can generate income by charging gate fees, selling biogas (as electricity or heat), liquor and/or fiber products. Public opinion is changing, and demands the farming community consider the environment and minimise pollution when farming. There are increased legislative and regulative measures being placed on farmers regarding local waste management (Von Cossel et al 2019).

3.5 Demand for alternative energy sources

Heightened concern about global warming, and climate change, has influenced EU policy. Government and EU policy is driving an increase in the proportion of energy derived from renewable sources. Competition within the energy industry has increased due to new emerging energy markets derived from alternative sources such as renewable energy (Espy et al 2020).

3.6 Community issues

Anaerobic digestion projects can directly boost rural economies by creating jobs and indirectly through increasing disposable incomes in rural areas. It can provide a waste management option with positive environmental and economic benefits. Anaerobic digestion can also offer an opportunity to realize potential in local communities working together, stimulating new developments that are community owned and operated (Nevzorova & Kutcherov 2019).

4. CONCLUSIONS

Biogas plants are one of good example of producing green energy by the principles of the circular economy. Biogas plants can't stand without other industry inputs, the feedstock needed for the production and they have a valuable output that can be reused. Connectivity with other industries promotes new hiring's as well as education in all branches. This results in bridging gaps among different types of industries and promotes new skills needed for making this complex system work. Taking into consideration all previously mentioned is the biogas industry a standalone the industry is the production of agro energy plants still part of agriculture industry and is the production of fertilizer a par of agricultural or biogas industry, or are all those, till now, different types of industries merging into one industry under the mission of a circular economy.

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WHERE IS MY PUBLIC SPACE? THE IMPORTANCE OF OPEN PUBLIC SPACES BEFORE AND DURING THE COVID 19 / CORONAVIRUS PANDEMIC IN THE MAIN CITIES OF KOSOVO

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Abstract

Since the first case of COVID 19 - Coronavirus was identified in December 2019 in Wuhan, CHINA, despite warnings, very few people in Kosovo have thought that this virus will be pandemic level and will have an impact on the daily life of the inhabitants, the well-being of each family, economic development and the environment. Like many countries in the world, Kosovo was in an unenviable situation to deal with the COVID 19 - Coronavirus. With a fragile health system and insufficient professional services, after identifying the first case of COVID 19 - Coronavirus infection in Kosovo and taking measures to deal with the pandemic virus; the lives of the people of Kosovo have changed radically. Despite dealing with the pandemic, unstable politics in Kosovo made the situation even more difficult. This research presents the assessment of the use of open public spaces before and during the COVID 19 - Coronavirus pandemic as well as the impact on the environment. The period during the pandemic is divided into two phases: the rigorous phase and the mitigation phase to prevent the spread of the virus. Many participants of different genders, ages, professions answered the questionnaire for the two phases of the pandemic by providing data which would help many municipalities to think in the future about the serious treatment of public spaces and the protection of the environment.

Key words: COVID19, open public spaces, active life, environment, social and physical distancing.

1. INTRODUCTION

The situation of open public spaces in the municipalities of Kosovo is deficient and in many researches by different professionals this issue has been addressed several times as alarming. Their lack was felt by many residents but on the other hand local governments are still not able to meet these requirements due to lack of budget and lack of awareness of decision makers about the role of these public spaces in everyday life.

In this research it was more than necessary to get acquainted with the situation of the citizens of the geographically spread municipalities in Kosovo during the quarantine period. The active life of the respondents was quite limited and the need for more activities and socializing was quite pronounced. However, the built environment did not meet these conditions, on the contrary, they do not provide enough safety for protection against COVID19. Respecting physical distances in open public spaces according to the measures introduced by the Government was impossible. The COVID19 period can be used quite well to raise the awareness to start thinking differently to increase the quality of life for citizens through the provision and balancing of public spaces.

1.1 Abbreviations

AIDS - Acquired immunodeficiency syndrome
BC – Before Christ
COVID 19 - Coronavirus Disease 2019
EC – Emergency Committee
H1N1 - Influenza virus type A ("H"-hemagglutinin,"N"- neuraminidases and "1" - types).
HIV - Human Immunodeficiency Virus
HLAB - High-level Advisory Board
IHR - International Health Regulation
SARS - Severe Acute Respiratory Syndrome
UN – United Nations
WHO – World Health Organization

2. METHODOLOGY

This research was conducted during the period of the outbreak of COVID 19-coronavirus in Kosovo when most of the population in Kosovo was quarantined and reduced all unnecessary movements to protect health and prevent further spread of COVID 19. The groups participating in this survey are of different social stratification such as ages, genders, religions, education, income, occupation, and social status. The survey was designed for two different periods:

- The period before the pandemic which includes the time until when the quarantine measures have started to be implemented,
- The period of the pandemic includes the time of the beginning of the quarantine until the beginning of the relief measures, respectively from 15. March.2020 to 1. June.2020 (third phase).

The distribution of the survey was done in some municipalities of Kosovo with the aim of geographical inclusion, such as: Prishtina, Prizren, Ferizaj, Gjakova, Gjilan, Drenas, Lipjan, Malisheva, Mitrovica South, Peja, Podujeva, Rahovec, Skenderaj, Suhareka, Vushtrri, Decan, Fushe Kosove, Istog, Kacanik, Shtimje, Klina, and Obilic.

The number of distributed questionnaires was done depending on the number of inhabitants of the above-mentioned municipalities.

3. RESULTS AND DISCUSSIONS

3.1 COVID 19 / Coronavirus

With "No one is safe until everyone is" the meeting of the UN High-level Advisory Board (HLAB) on Economic and Social Affairs ended or we can say that a new chapter of a global commitment to overcoming social and economic challenges has begun (United Nations, 2020). All pandemics recorded so far from 432 BC in Athens until 2020 have been recorded with high mortality rates. Smallpox, polio, cholera, flu, yellow fever, H1N1 swine flu, HIV / AIDS, Ebola, Zika, SAR's are just some of the 20 names of pandemics in these last 700 years to come of COVID 19 / Coronavirus which officially with 20 July 2020 swept every corner of the globe (Swadesh M. Rana, July 2020).

The first case of COVID 19 / Coronavirus appeared in December 2019 in Wuhan, China (World Health Organization, April 2020), while the World Health Organization (WHO), officially registered the case of COVID 19 on 4. January 2020 and the first death on 19. January 2020. The rapid and uncontrolled spread, as well as the assessment of the current situation by the IHR Emergency Committee (EC), forced the General Director of the WHO on 30. January 2020 declares the outbreak of coronavirus and Public Health Emergency of International Concern. Just two months later, on March 11, COVID 19 / Coronavirus has officially declared a pandemic (World Health Organization, Sitrep 94, June 2020)

Data from the WHO show a drastic increase in the number of people affected by COVID 19 and the increase in the number of deaths due to the virus is also worrying. In addition to the two negative indicators, the number of recoveries is also promising (World Health Organization Online Dashboard, n.d. 2020). Until the preparation of this research, despite many efforts and political promises, no vaccine has been discovered which cures COVID 19 (World Health Organization, COVID-19 vaccines, n.d.).

3.2 COVID 19 / Coronavirus in Kosovo

With the proclamation of COVID 19 / Coronavirus pandemic by the WHO, the Government of Kosovo on 11. March approves preventive measures to protect against COVID 19 / Coronavirus which in the following government meetings were supplemented with other additional measures (Office of the Prime Minister of Kosovo, March 2020).

In Kosovo, the first case of being affected by COVID 19 was officially registered on 13. March 2020, (Zëri daily, August 2020) and a few days later the first case of death from COVID 19 (Reuters agency, March 2020) was registered. With a fragile health system, the Government of Kosovo began to take some anti-COVID 19 measures.

On March 15, the state of emergency of public health and other following decisions are declared. The Government of Kosovo takes them in coordination with the instructions issued by the WHO as well as with some countries in the region. The same as the countries in the region (Office of the Prime Minister of Kosovo, March 2020), Kosovo closes its borders and anyone entering Kosovo had to be quarantined within 15 days.

On 23. March a decision is taken to ban the free movement of citizens from 10:00 to 16:00 and 20:00 to 6:00 (Office of the Prime Minister of Kosovo, March 2020).

On 26. April the decision is made to tighten the restriction of movement, where citizens are free to move only one hour at a certain time based on the last ID number (Kosovo Ministry of Health, April 2020). These schedules were valid from 27 to 30 April.2020 where the Ministry of Health then presented the new short-term plan divided into three phases:

- The first phase included the period from 4. to 18. May where citizens had the opportunity to move 3 hours during the day at certain times according to the last ID number.
- The second phase included the period from 18. May to 1. June. 2020 and
- The third phase started from 1. June onwards.

The free movement of citizens in the second phase and the third phase depended on the developments of the epidemiological situation (Kosovo Ministry of Health, April 2020).

Despite the psychological burden of the rapid spread of the pandemic, the citizens of Kosovo also faced an unstable political situation. Lack of coordination in joint decisions of the ruling coalition led to the motion of no confidence in the government and opening the way for the new government. (The Guardian, March 2020).

3.3 Research goals

During the period of the pandemic and the restriction of movement, the only safe communication without physical contact were social networks and online communication applications which were used in various technological equipment. Despite the solution of social networking, active living and physical activity were restricted because government ordinances to restrict movement and increase awareness to avoid unnecessary movement in the city. The goals of this research are knowledge of:

- The active life of citizens during the pandemic period.
- The role of the built environment (transport, urban designs, green spaces etc.) during the pandemic period.
- Social environment in open public spaces during the pandemic period.
- How public spaces can affect the well-being of residents and the individual environment during the pandemic period.

3.4 Knowledge of the pandemic

The spread of the pandemic to all respondents of this survey was something new. Knowledge of the pandemic was so small that they did not take much into account its dangers. On the other hand, very little was known about the differences between outbreak, endemic, epidemic, and pandemic. Most respondents categorized the pandemic as an epidemic since the media used the term "epidemic" in the first case in Wuhan, China (Lillian Yang, Jiahui Huang, April 2020).

Following the publication of the news about the risk of the spread of COVID 19, most of the respondents did not consider themselves endangered by this pandemic but some expressed a sense of insecurity. Almost all respondents did not even think that for three months COVID 19 would arrive in Kosovo.

There were differing opinions about COVID 19. Some saw the virus as an "economic conspiracy of developed countries" while others were convinced that medical technology had advanced so

much that the cure vaccine would be discovered before it reached Europe. There were cases when respondents said that COVID 19 does not exist and there is no need to panic, but only a small group of respondents expressed fear of COVID 19 and have even followed the situation of the spread since the outbreak in Wuhan - China.

3.5 Social distance and physical distance

With the introduction of the first strict measures in Kosovo which prohibited free movement or allowed it at certain times, families began to mobilize to organize a new order of life. The closure of schools forced parents to play the role of educator or teacher as universities began to organize online lectures and exercises. A new initiative during the pandemic is also the beginning of the use of balconies – "Urban balconies" in multi-apartment buildings. In the case of individual houses, the situation was different because they possessed gardens which were used for various activities. It is worth mentioning that during the quarantine period, "urban-farming" began to develop as a result of the need for physical activity but also due to the "risk" of food shortages. Communication with neighbours in the case of individual houses was easier by respecting the physical distance while for children the garden played an important role in terms of physical activities and outdoor living. However, in addition to some positive phenomena mentioned for respecting social distance, negative phenomena began to appear, such as rising unemployment, economic crisis, and domestic violence. In fact, according to Kosovo Women's Network data during the pandemic period, domestic violence has increased compared to the pre-pandemic period (Kosovo Women's Network, n.d.).

The use of open public spaces has forced residents to be more disciplined and to respect anti-COVID 19 measures by maintaining physical distance and constantly wearing gloves and masks. The big problem was the children who despite parental care, stopping contact with other children was impossible while playing in open public spaces. The police were under constant surveillance and fined anyone who did not respect the measures. The most disciplined were the elderly who respected all anti-COVID 19 measures in open public spaces while the most vulnerable were people with disabilities who in addition to the lack of easy access to open public spaces, they also had challenges with their companion because the free movement schedules in the city did not match between the disabled person and the attendant. In general, the urban design of public spaces was considered by respondents as unsuitable for the use and observance of anti- COVID 19 measures. Due to the small number of police officers, surveillance in rural areas was more deficient, therefore the spread of Covid19 was higher precisely in the villages.

3.6 Open public spaces

The small number of open public spaces is a worrying issue for most cities in Kosovo. The bad situation with open public spaces has prompted some municipalities to start thinking about drafting strategies for open public spaces (DEMOS, n.d.), while some municipalities have started with concrete actions to increase the area with open public spaces in the urban and rural areas. There are also good practices for creating and improving access to rivers in the urban area and creating conditions for walking and recreation along the river (Koha daily, July 2020)(Telegrafi daily, December 2019). Some municipalities have begun to think differently about the whole involvement of the community in decision-making regarding the design of open public spaces. It was these meetings that created the link between the active community and transparent and accountable governance (Block by Block, n.d.), (Ec ma ndryshe, November 2020), (UN Habitat

Kosovo, n.d.). But in general, the design of projects dedicated to open public spaces in Kosovo are still at a technical level, not inclusive, without stakeholder access to the process and not transparent.

3.7 Movement and use of open public spaces before the pandemic

Before the pandemic period, the use of open public spaces was as needed, individually or in company. Reaching a space was done mainly by walking and in some cases by private vehicles. TAXI was not used to go to a public space while the use of public transport was quite small because in the Kosovo the urban public transport operates only in three municipalities. The use of bicycles, electric bicycles and electric scooters to reach an open public space was not at a satisfactory level due to uncertainty in traffic and lack of a path for cyclists.

Most respondents said that the use of squares was more desirable because they felt socialized, safe and stayed until late. While other open public spaces in the city preferred to use them only during the day. Also, the playgrounds for children at age 5 were used only during the day, while only in capital city Prishtina the playgrounds were used at night. The parks were also used by the respondents mainly in the afternoon until the evening because during the day they were engaged in work, school or faculties. The use of parks in the late hours was avoided due to in security while the parks in the morning were mostly used by the elderly. Most of the respondents prefers hiking trails in forests and mountains were preferred for exploitation.

The use of green spaces was low due to their lack in urban areas. Urban design for free walking is rated as good and there are no obstacles in movement. The opposite opinion is held by people with disabilities who have expressed that access, not only to open public spaces but in general is a challenge for this category of society.

Staying in open public spaces before the pandemic period was not very attractive. Apart from parks and squares isolated from vehicles, other parts had more of a transit role between the neighbourhoods than they were used to stay.

The lack of municipal property is a challenge that accompanies all municipalities in Kosovo for the creation of new public spaces, therefore all municipalities in Kosovo do not have a balanced distribution of open public spaces throughout the urban area. Therefore, the period of COVID19 despite the negative phenomena, many municipalities have learned about the importance of open public spaces.

3.8 Movement and use of open public spaces during the pandemic

During the pandemic period the use of public spaces was necessary for the respondents while walking was preferred to get there. The use of private vehicles was also an alternative while bicycles were also used. TAXI and urban public transport have not been used because their operation was banned by the government. Different schedules for free movement have increased the need of respondents for the use of open public spaces. However, to the best of their ability, respondents mostly used the parks, squares, and open public spaces in their neighbourhoods. A group of respondents preferred not to go out in open public spaces and stay indoors using balconies (in multi-apartment buildings) and gardens (in individual houses).

City parks, forest or mountains were mostly used because they offered opportunities to move in several directions as well as to do various physical activities while socialization was smaller because the physical distance had to be respected. During the pandemic period parks were also

used in the late hours due to the presence of people. Other choices were to use the town squares which offered the opportunity to move in different directions and socialize with other people while respecting the physical distance between them. Some municipalities due to the safety reason closed city square. With decision of the Government all shopping malls were closed but their private parkin place was used as public space from surrounding residences.

The quarantine period has highlighted the defects of urban designs. Sidewalks were spaces that were mostly attempted to be avoided by respondents because they were considered narrow and not comfortable for the implementation of physical distances. The usurpation of sidewalks by the displaying goods, illegal parking, private placement of various urban objects such as small billboards, flowerpots, or other greenery, challenged even more free movement, while people with disabilities and mothers in wheelchairs suffered the most. The reasons for using these spaces were many, such as socialization, stress relief, better mental health, finding peace, increased well-being, relaxation in open space, more active life, conversation on various topics which not treated earlier, strengthening “ties” with relatives through online communication, etc.

Safety in the open public spaces in the late hours before the pandemic period for males was considered high but during the pandemic even men did not feel safe due to "coronaphobia" (Alisha Arora, 2020), the large number of street dogs, any possible physical attack, therefore, they also preferred to avoid "unnecessary exits" in open public spaces in the late hours. "coronaphobia" has forced people not to use too much urban furniture and for this, they have preferred to sit or do exercises in the greenery.

As for females, it was more than expected that before the pandemic period they would feel safe in open public spaces but during the pandemic, they felt unsafe to use these public spaces because they feel "lost in space" due to their absence of people although public spaces were safe and well lit, fear of assault or sexual harassment, fear of any physical assault for theft, fear of the presence of stray dogs and "coronophobia".

Traffic in the pandemic period in most municipalities has been significantly reduced, offering new views of car-free cities and more space for active movement. A good opportunity to start thinking about the public spaces design and implementation of the concept "shared space". The lack of traffic was a very good indicator for the development of bicycle paths and turning the roads in one direction to regulate the movement of cars and to start thinking about the concept of "Seamless Mobility".

The results of this research highlighted the importance of a balanced distribution of open public spaces in the urban area, especially green spaces. The need to use them in the pandemic period showed that all municipalities in Kosovo do not have enough open public spaces while the existing ones do not meet the needs of every neighbourhood.

In addition to the uncontrolled growth of greenery in urban areas during the pandemic period as a result of lack of maintenance, more and more fauna began to be present in urban areas respectively squirrels, rabbits, deer while in some municipalities in the neighborhood appeared even boars. According to the respondents, the contact with the fauna was considered very positive and engaged the inhabitants to take care of them by offering them food. With or without our desire, the pandemic highlighted the biophilia respectively the importance of the need of the inhabitants to be related to other forms of living such as greenery, flowers, animals, and

birds.The biggest concern in this regard was the presence of stray dogs who were brought in herds and posed a danger.

Despite the fact of increasing the use of open public spaces, some municipal services such as maintenance of public lighting, disinfection of roads, maintenance of urban furniture have not been at the right level. For the first time, open public spaces began to be polluted by materials such as gloves, masks, various plastic bottles of disinfectants which were thrown uncontrollably in public spaces.

3.9 The economic situation in Kosovo during the pandemic

Respondents considered the financial situation quite worrying. Failure to prepare in time for the organization of online work was considered worrying by many respondents. Some others have even lost their jobs because the businesses where they worked were on the verge of bankruptcy. In addition to gastronomy which had the function of "delivery" service before the pandemic, many companies of different services began to apply the concept of "delivery" for their products. Social networks started to fill with promotions of various products and interesting offers, but on the other hand, the state budget had roots of about 14.6% of revenues January-May 2020 compared to January-May 2019 (Kosovo Ministry of Finance database, n.d.).

According to the World Bank, the economic growth forecast for Kosovo before the pandemic was highest in the Western Balkans at 4.1%, but the baseline scenario due to the pandemic showed a root of -4.5% and the worst-case scenario and at the same time the highest in the Western Balkans it could be -11.3%. The Government of Kosovo has taken some concrete short-term measures to mitigate the social and economic impact of COVID-19, which included fiscal and trade-related measures, monetary and financial measures, and social protection measures (World Bank Group report, spring 2020).

4. CONCLUSIONS

The pandemic situation in Kosovo, in general, has harmed the social life and economy of the country. Both the government and the residents are facing an unenviable situation. We are now aware that after the COVID 19 - coronavirus pandemic, our society in the future will be affected by other pandemics. Fear of infection has forced many residents to change the discourse of life and new organization in the family which has harmed the quality of life and well-being of families. Every family faced different problems as the demand for free movement in the neighbourhoods where they lived grew more and more. The existing condition of open public spaces in most cases was not at the right level in terms of maintenance, access, attractiveness, and security was considered a concern. Therefore, it is necessary to start with fundamental changes in this direction, starting from the central level to the responsibilities of each resident.

The central level should make changes in the legal framework, with special emphasis on that of spatial planning and to regulate the statute of open public spaces and to set the criteria for each typology of open public space. The use of mobile phones allows using different applications so the central level should provide a free information application for residents of Kosovo who will receive all information about open public spaces, which may or may not be used, their situation, etc.

In local level, until the legal changes for the mandatory treatment of open public spaces, all municipalities should start drafting strategic sectoral policies related to open public spaces. Eventually, the concepts of thinking about movement must change. All municipalities should remove motorized vehicles as a priority and give priority to pedestrians, cyclists, public transport, parking, and then vehicles and to draft Sustainable urban mobility plan. Public garages should be designed considering the concept of vertical public spaces. Barrier-free access to public spaces should be mandatory for all categories of society, gender, age, ethnicity, and religion. An important issue is the creation of a stable link between spatial planning - open public spaces, well-being, and quality of life for each resident. To achieve this, the distribution of open public spaces in each neighbourhood of the urban and rural areas must be balanced and they must be connected. The process of designing these spaces should be inclusive. Improving public spaces around multi-apartment buildings and providing conditions for physical activities but at the same time start thinking about urban farms where residents of buildings in addition to an active life at the same time will be socialized. Increase security in open public spaces by drafting strategies for police patrolling, activating neighbourhood observers, arranging spaces by maintaining them, regulating public lighting, and removing stray dogs.

Citizens should be aware to stay away from the use of vehicles and as much as possible to walk and pedal while on the other hand local institutions in addition to creating conditions for the free active movement they should also think about the financial support of every resident who will use electric tools for movement. Such a step will begin to affect the increase of citizens' awareness of active life and protection of the environment

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SEXUAL HARASSMENT AS THE HIDDEN CRIMINOGENIC POTENTIAL OF NIGHTLIFE ENTERTAINMENT SPOTS IN CITIES

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Abstract

Sexual harassment, which includes verbal, non-verbal, and physical behaviours referred to gender, gender expression, or sexual orientation of a harassed person, is incorporated in basically all areas of human activity. Among places, where sexual harassment occurs, nightlife (entertainment) areas in cities remain rather under-researched. The purpose of the paper is the presentation of the criminogenic potential of nightlife areas, focused on the occurrence of sexual harassment. The criminogenic potential of nightlife areas arises from, *inter alia*, the presence of alcohol and drugs in these areas, which contributes to the emergence of various types of deviant behaviours, including sexual harassment. The culture of accepting sexual harassment in entertainment spots is widely present, as well as high pressure on victims to tolerate sexual harassment. If we set entertainment spots in the context of situational action theory (Wikström, 2014), they can present an environment where sexual harassment or sexual assault offer an acceptable action alternative. Sexual harassment, occurred in nightlife areas, represent an issue that, firstly, is not explicitly legally restricted, and secondly, its occurrence is challenging to prove. Furthermore, studies conducted abroad reveal that street harassment and stranger harassment have potentially significant effects, not only on victims but also at the community level, since it may be used as a reason to limit or deter access to public spaces, as an additional mechanism aimed at the oppression of, particularly women's, public participation. Its long-term and overall effects might also be detrimental to women's safety, freedom and participation in public life.

Key words: sexual harassment, nightlife, entertainment spots, cities.

1. INTRODUCTION

Sexual harassment represents a form of sexual violence (Krug et al., 2002), which mostly involves an expression of power, control and discrimination in society (Bargh et. al, 1995; Stop Street Harassment, n. d.) and has long been normalized, justified and invisible, and has represented an inevitable part of life, particularly of women and girls (Mlambo-Ngcuka, 2019). Sexual harassment, which affects a wide range of people in comparison with other forms of discrimination, concerns the highest share of the population (Bargh et al., 1995; Stop Street Harassment, n. d.). It includes any form of "unwanted verbal, non-verbal or physical behavior

of a sexual nature", having the "purpose or effect of violating the dignity of a person, in particular when creating an intimidating, hostile, degrading, humiliating or offensive environment" (Council Directive 2004/113/EC of 13 December 2004 implementing the principle of equal treatment between men and women in the access to and supply of goods and services (hereinafter: Directive 2004/113/EC, 2004)). The European Union has also legally protected the fundamental right to human dignity and banned discrimination in cases of sexual harassment in the workplace (Charter of Fundamental Rights of the European Union (2012/C 326/02)). As is apparent from the very definition of sexual harassment, it is most often identified in the scope of the workplace. In the past, most of the research attention has been devoted to this area. Burn (2019) summarises and complements the tripartite model of sexual harassment proposed by Fitzgerald et al. (1997), which identifies three behavioural dimensions of sexual harassment in the workplace: gender-based harassment (gender harassment), unwanted sexual attention and sexual coercion. However, as will be presented in this paper, sexual harassment occurs in various forms and different locations, and can be seen as part of domestic violence; it may also occur in a more generalized way, such as sexual harassment in public places (Ahmed et al., 2014). Regardless of the context in which verbal or non-verbal sexual harassment linked to gender, gender expression or sexual orientation (Burn, 2019) occurs, it affects the harassed individuals/victims and the environment in which they are located.

The paper aims to analyse the incidence, and prevalence of the street and stranger harassment in the urban nightlife areas. In the scope of this paper, the phenomenon of sexual harassment is discussed in the context of nightlife entertainment areas in cities. The final discussion provides suggestions for further research on sexual harassment in cities' nightlife areas.

2. DEFINITION OF STREET AND STRANGER SEXUAL HARASSMENT

The review of the literature revealed the use of two particular terms related to sexual harassment, which refer to sexual harassment in public places but do not yet have a purely standardised definition. These terms are "street harassment" and "stranger harassment". The latter, contrary to other forms of sexual harassment, presume that the perpetrator is usually unknown to the victim (Fairchild & Rudman, 2008). Firstly, Bowman (1993, p. 575) defines street sexual harassment perpetrated by strangers, highlighting that this type of street harassment occurs when one or more unknown men harass one or more women in a public place, on one or more occasions, by disrupting or trying to gain female attention by speaking or acting in an explicitly or implicitly sexual manner, which is not wanted by the woman or women to whom they are addressed. Such language includes, but is not necessarily limited to, references to male/female sexual organs, body parts or sexual activity; sexual demands; marking (with words or actions) the "target of harassment" as an object of sexual desire; the use of words which, at the time of their invention, cause injury or, due to their nature, often provoke violent resistance, even if the harassed person herself did not react with violence (Bowman, 1993). Furthermore, Kearl (2014) identifies street harassment as unwanted interactions between strangers in public places, which are caused due to the actual or perceived gender, sexual orientation or expression, and cause the person subjected to harassment to be disturbed, angered, humiliated or fearful. Street harassment can take place on the streets, in shops, in public transport, in parks or on beaches, and includes behaviours ranging from verbal harassment, exhibition, following and groping to rape. Sexual harassment in the workplace or a domestic environment differs from street harassment in terms

of its perpetrators. The latter is mostly carried out by strangers in a public place, which also means less legal protection of victims (Kearl, 2014). Nevertheless, Stop Street Harassment organisation defines street (sexual) harassment or gender-based street harassment as unwanted remarks, comments, gestures, and other acts of coercion of a foreign person in a public place, which are committed without the consent of a person at whom it is directed due to their gender, gender expression or sexual orientation. Moreover, in the context of street harassment, individuals may also be harassed on other grounds, such as race, nationality, religious affiliation, disability or social class. In some instances, individuals may be the target of harassment due to a combination of several of the abovementioned grounds (Stop Street Harassment, n. d.).

3. INCIDENCE AND PREVALENCE OF SEXUAL HARASSMENT IN PUBLIC PLACES

To demonstrate the complexity and "omnipresence" of sexual harassment, we decided to present individual research studies, which explore the dimensions of the phenomenon in question, with an emphasis on harassment in public areas. Hoel and Varita (2018) state that comparative studies on sexual harassment in public places at the European Union level are not available. They believe that the 2014 survey on violence against women carried out by the European Union's Agency for Fundamental Rights, which examined the experience of sexual harassment in general, to be the best approximation. In restaurants, clubs or cafes, physical violence, which was not intimate partner violence, was experienced by 10 percent of women, out of which 4 percent of women were exposed to sexual violence. In total, the violence of persons, who were not in an intimate partner relationship with the victim, was experienced by 8 percent of women in restaurants, clubs, bars and cafes (FRA, 2014).

The US national research study, which was carried out in 2019 and involved 1,182 women and 1,037 men over 18 years of age, shows that, when combining all public places that were involved in the survey (i.e. public and common transport and nightlife areas), it can be observed that 71 percent of women and 28 percent of men experienced sexual harassment in public places, which could also be identified as street harassment. Nightlife venues involving bars, clubs and concert venues, were places, in which sexual harassment was experienced by 37 percent of women and 12 percent of men. In general, homosexual or bisexual women are more likely to report sexual harassment. In light of the topic discussed, it is alarming that sexual harassment in public places was reported in 91 percent of all cases (UC San Diego Center on Gender Equity and Health, 2019).

The previous US survey (Kearl, 2014), which included 2,000 individuals over 18 years of age, which were roughly equally divided by sex, notes that the issue of street harassment in the US is a burning issue. 65 percent of women stated they were victims of at least one form of street sexual harassment, of which more than half (57%) were exposed to verbal harassment, 41 percent suffered aggressive physical forms of harassment involving sexual touching (23%), stalking (20%) and exhibition (14%).In comparison, 9 percent of them reported they were forced to do something sexual. Men were exposed to street sexual harassment in 25 percent of cases, 18 percent of which had the form of verbal harassment, while 16 percent were cases of physical sexual harassment. Sexual harassment was predominately reported by men who identified themselves as LGBT.

The results of a research study of the European Union Agency for Fundamental Rights (FRA, 2013) about the personal experience of 93,079 LGBT individuals with discrimination and gender-related acts indicate a (still) strong presence of discrimination against otherwise oriented individuals. Almost half (47%) of all respondents felt personally discriminated against or harassed due to their sexual orientation in the past. One in five (18%) respondents, who visited a café, a restaurant, a bar or a nightclub in the year before the survey, felt personally discriminated against due to their sexual orientation. A quarter (26%) of LGBT respondents were attacked or threatened with violence in the past five years. Only less than 17 percent of hate violence were reported to the police.

A recent Swedish study about female students' experience (n = 1,941) in universities found that one in four students experienced one or more sexual harassment incidents in the previous year, which mostly took place in clubs or in restaurants (Mellgren, Andersson, & Ivert, 2017). Furthermore, a quarter of all students (22.7%) involved in the study conducted by Clodfelter et al. (2008; n = 750) reported suffering one of the forms of verbal, non-verbal or physical harassment in the previous academic year, which suggested that in the current academic year, 2,270 students within the student campus population, which includes 10,000 students, may become victims of sexual harassment. Besides, Fairchild & Rudman (2008, p. 353) indicate that approximately 41 percent of all American female students (n = 228) reported unwanted sexual attention from strangers, which had happened at least once a month and included sexist comments or enticement. A third of all victims reported being whistled or stared at, and 31 percent of them stated they had been exposed to whistles and staring every few days. A quarter of all respondents experienced sexual coercion or assault (e.g. heavy grabbing) at least once a month. These data support the need to address sexual harassment perpetrated by strangers as a significant form of humiliation and insult of women, which affects the quality of their lives. Sexual harassment carried out by strangers changes public places into everyday hostile environments for women.

4. NIGHTLIFE AREAS IN URBAN ENVIRONMENTS AND THEIR CRIMINOGENIC POTENTIAL

The nightlife and entertainment areas, particularly in major cities, contribute to economic development, provide opportunities in tourism and offer additional job opportunities (Stuart & Hughes, n. d.; Košir, 2013), so it is not surprising that the planning of nightlife has become a fundamental element of interurban competition. Changing the urban nightlife that tends to increase the expansion of activities in the urban night environments is thus a reflection of private dynamics and public policy that raises various debates. These new forms of development that promote entrepreneurship (transforming urban management and strengthening interurban competition) contribute to the reorganisation of urban geography and the use of urban areas (Mallet & Burger, 2015). When attempting to structure nightlife, one should not forget the role of media that shape time and, in particular, classify behaviour in the 24-hour cycle of day and night (Straw, 2015). Grazian (2009) states that scientists involved in the urban environment and sociologists emphasise the contribution of nightlife (nightclubs, bars and music venues) to the public life of cities and social capital, which represents the total benefits gained through growth, intensity and diversity of interpersonal relations, as well as the links between the few and their social networks. Grazian (2009) expresses a sceptical attitude towards that, as many nightlife

areas do not represent an area of entertainment and social inclusion. As a justification, he puts forward three generalisable empirical findings that justify his scepticism regarding the abovementioned positive contribution of nightlife areas. Firstly, racial and social factors may represent obstacles to participation in urban nightlife. Secondly, he indicates the normalisation of gender gaps and the occurrence of daily, even routine harassment of women in these areas. He stresses that although women today have greater access to public nightlife areas, as well as more autonomy in them, the social creation of gender gaps still plays an important role in designing their experience in leisure entertainment activities (Grazian, 2009). Just like the female service staff, young women visiting nightlife areas are usually expected to be feminine, taking into account the "forced" sex norms, which include wearing tight trousers, deep-cut blouses and high heels (Grazian, 2008). After studying the reports of young women, Grazian (2008, p. 103) states that women need to "show some skin and be a little flirtatious" to enter popular places that are usually quite busy, which applies particularly to minor girls. This could be the reason why men often target both employees and visitors of nightlife areas, which are considered as the "targets" of their romantic advances and cheesy pickup attempts. To stop these kinds of advances, women use a variety of "cooling out" strategies, avoidance tactics or other defensive actions encompassing behaviours from friendly rejection, excuses, jokes, rudeness, avoidance, unresponsiveness and flight (Snow, Robinson, & Mccall, 1991). Grazian (2007) states that students are harassing women in bars and clubs during their aggressive "girl hunting" endeavours, which represent a sort of a collective ritual or competition and are considered as bonding activity in a group of heterosexual men with the intention of achieving sexual intercourse. In bars and clubs, female students, apart from being the targets of the aforementioned "girl hunting", are also often harassed by (married) middle-aged men (Grazian, 2008:164 – 169). Gervais, DiLillo and McChargue (2014) indicate that there is a positive correlation between the frequency of alcohol consumption, the amount of alcohol, the evaluation of the body, sexual advances and sexual violence. Their survey thus shows that the overall effect of body evaluation and sexual advances is strongly linked to the amount of consumed alcohol and sexual violence. Also, body evaluation as such is strongly linked to the amount of alcohol consumed and sexual advances (Gervais et al., 2014). Thirdly, Grazian also highlights the lack of an inclusive local nightlife environment in urban neighbourhood communities. He notes that these arguments show that nightlife areas can work more effectively as an avenue of integration rather than bridging social capital (Grazian, 2009).

In recent decades, nightlife has been one of the essential leisure activities of young people in many Western countries. At the same time, such a form of leisure time represents one of the most critical ways that can lead to a wide range of health and social problems, including alcohol and drug consumption, antisocial behaviour and crime (Stuart & Hughes, n. d.; Košir, 2013; Calafat et.al, 2008). Also, there are other risks involved in the participation in nightlife areas, such as noise, binge drinking on the streets and vandalism (Calafat, Juan, & Duch, 2009). Violent behaviour associated with nightlife context is an issue that primarily affects younger populations. In a survey involving 1,363 young people from nine European cities, who often participate in nightlife activities, adolescents were asked to assess the three analysed forms of violent behaviour, i.e. carrying a weapon, being threatened or injured with a weapon, and being involved in a physical fight. Most adolescents, 11.4 percent of women and 28.4 percent of men (Calafat et al., 2011), reported they were involved in a physical fight. In a UK survey of 511 cases of violent acts, involving attacks and injuries carried out by unknown perpetrators, and 442 cases

of violence among acquaintances, Allen et. al (2003) note that pubs or clubs are the most common places where violence among strangers occurs (38%). Violence between acquaintances predominantly occurs in the streets (25%), as well as in pubs or clubs (23%). A glass or a bottle was most commonly used as a weapon in attacks involving strangers, (in 9%), which points to a link between the availability of objects found in the most common settings and the occurrence of such violence (Allen et al., 2003). In Cardiff, the capital city of Wales, a total of 4,729 incidents were analysed. More than half of all events were related to pubs or clubs, whereas 30 percent of incidents happened inside and 21 percent occurred outside or in their immediate vicinity. Most of the remaining incidents happened elsewhere in the streets (34%; (Maguire & Nettleton, 2003).

In many cities, the growth of the nightlife economy resulted in growing concerns about the related crime and disruption to the surrounding area, notably alcohol-related violence (Maguire & Nettleton, 2003). Calafat et al. (2009) surveyed the use of means of transport to access nightlife areas among 1,363 regular visitors of nightlife areas in nine European cities. The results suggest that about half of all visitors to nightlife areas used some form of public transport (bus, train or taxi), around 40 percent travelled by car, while 10 percent came on foot. High behavioural risks were reported concerning nightlife activities, particularly when individuals had driven other persons under the influence of drugs or alcohol, which happened in 37.21 percent of cases in the month before the survey (Calafat et al., 2009).

5. CONCLUSIONS

This paper aimed at emphasising the importance of discussions on sexual harassment, which constitutes sexual violence, but is often neglected and overlooked is also the starting point for an empirical study of this issue in the Municipality of Ljubljana, Slovenia, which is being conducted as part of the European Commission project entitled SHINE – Sexual Harassment in Nightlife Entertainment Spots. Except for some criminological publications, sexual harassment in public places or its occurrence in a crowd of people has been, as stated by Hoel & Varita (2018), relatively neglected and under-researched. Therefore, it would make sense to fill this gap with research studies focusing on areas characterised by the gathering of larger crowds, such as city centres or nightlife areas. Moreover, according to Ahmed et al. (2014), research studies on street sexual harassment were, when compared to the studies into the more severe forms of sexual violence (Ceccato, 2014), given less media attention and research focus. They stressed that sexual harassment has potentially significant effects at the community level, since it may be used as a reason to limit or deter access to public spaces, as an additional mechanism aimed at the oppression of women's public participation. Furthermore, they noted that long-term and overall effects of street harassment might also be detrimental to women's safety, freedom and participation in public life (Ahmed et al., 2014), which was also highlighted by Fairchild & Rudman (2008). The psychological implications of sexual harassment in nightlife areas for victims are not (yet) supported by tangible empirical evidence (Fairchild & Rudman, 2008). Sexual harassment perpetrated by strangers creates a sense of fear. It has an impact on reducing the sense of safety, particularly among women, whose social participation is limited since they choose to avoid potential situations or perpetrators of sexual harassment. Consequently, the quality of their lives is reduced (Hoel & Varita, 2018).

It is essential to highlight that people's perception of and response to specific actions differ. According to Grossman (2008), because of their specific perception of certain acts, individuals may understand a particular act of sexual nature as an invasion of their personal space. Alternatively, the attention they receive from another person may suit them. This coincides with the concept that women, who were taught to seek self-approval in others, are inclined to interpret men's attention as flattering, which in turn means that unwanted attention is not defined as harassment (Bardwick in Tangri et al., 1982). Victims are thus facing sexual harassment passively or actively, albeit the first response, which involves confronting the harasser or reporting them to the authorities, is less common. The latter way of responding to sexual harassment manifests itself in the way the victim tries to ignore the event or disregard it (Fairchild & Rudman, 2008). Thus, sexual harassment can lead to the occurrence of a victim's self-blame and doubts about their behaviour and actions (Hoel & Varita, 2018), as well as in the fact that victims perceive themselves as sexual objects (self-objectification) and are ashamed of their physical appearance (Fairchild & Rudman, 2008).

The provision of safe nightlife areas is a growing priority across Europe. City authorities must manage habits, not only recreational habits of domestic youth but, due to the increasing international tourism, also the habits of young people from other countries (Stuart & Hughes, n. d.). The reduction of alcohol-related harm, particularly among young people, which occurs due to increased alcohol consumption in public places, is a major priority in Europe. According to the routine activity theory, alcohol consumption or intoxication effects and reduces the ability of the individuals to protect themselves, which, mainly in the presence of a motivated offender, increases the likelihood of them becoming appropriate targets (Clodfelter et al., 2008). Alcohol consumption is associated with the emergence of sexual harassment in nightlife areas where victims, particularly women, are expected to tolerate sexual harassment due to a generally prevalent culture of acceptance of such behaviours (Mellgren et al., 2017). Due to the existence of certain "gender norms" in nightlife areas, the social participation, particularly of young women, is also conditioned by the fact that their entry into popular places is easier if they are flirtatious and dressed "attractively" (Grazian, 2008). When combined with the premises of the routine activity theory, these social norms point to the element of target suitability. According to Watts & Zimmerman (2002), the fact that society blames the victim instead of the perpetrator, either because of their dress or behaviour, is typical of sexual violence. Consequently, many nightlife areas no longer represent areas of entertainment and social inclusion (Grazian, 2009).

Welsh et. al (2006) observe that existing data on the number of sexual harassment incidents represent only the tip of the iceberg. Victims do not officially report sexual harassment incidents because of the fear of surrounding condemnation provoked by harassment or by the fact that they complained about the harasser. Unreported and undiscovered crimes lead to the occurrence of a dark field of criminality. This represents an obstacle for the research of sexual harassment, particularly of its incidence. Another research impediment also arises from the fact that reports filed by women indicate that they are faced with unwanted sexual attention, but do not characterise such acts as sexual harassment. Consequently, they are not formally reported to the authorities (Firestone & Hariss in Robnik, 2009). Inequality and discrimination, which are, inter alia, associated with sexual harassment, are thus still the cornerstone in the continuum of violence against women and girls. To achieve lasting and substantial changes, the root causes of gender inequality and discrimination, such as stereotypes, beliefs, behaviours and relationships that justify sexual harassment, must be addressed and eliminated first.

Comprehensive policies and guidelines based on gender equality should also be developed (Mlambo-Ngcuka, 2019), as everyone, regardless of factors, such as race, age, gender, disability, sexual orientation or gender expression, should be treated with respect, dignity and empathy. Therefore, no form of discrimination may be admissible under any circumstances (Stop Street Harassment, n. d.). We strongly agree with the comment made by Hoel and Varita (2018), which requires a reconsideration of the issue of stranger sexual harassment by individuals, who hold an established opinion that the form of attention caused to victims of street sexual harassment is irrelevant or that it even constitutes a form of flattery to women. In this regard, we believe that, firstly, it is imperative for the public to identify acts of sexual harassment, perceive them as prohibited and unacceptable acts, and, as stated by Mellgren et al. (2017), start responding to them with zero tolerance.

Inequality and discrimination, which are, *inter alia*, associated with sexual harassment, are thus still the cornerstone in the continuum of violence against women and girls. To achieve lasting and substantial changes, the root causes of gender inequality and discrimination, such as stereotypes, beliefs, behaviours and relationships that justify sexual harassment, must be addressed and eliminated first. Comprehensive policies and guidelines based on gender equality should also be developed (Mlambo-Ngcuka, 2019), as everyone, regardless of factors, such as race, age, gender, disability, sexual orientation or gender expression, should be treated with respect, dignity and empathy. Therefore, no form of discrimination may be admissible under any circumstances (Stop Street Harassment, n. d.).

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Theory to Practice as a Cognitive, Educational and Social Challenge

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SMALL AND MEDIUM ENTERPRISES: IMPORTANCE FOR THE KOSOVO ECONOMY

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Abstract

This study aims to broaden the understanding of the importance of SMEs (Small and Medium Enterprises) for the economy of Kosovo, especially in terms of economic development, labor market and innovation. The study was conducted through analysis of documentary sources such as relevant reports of national and international institutions as well as relevant scientific papers. The scientific contribution of this study is theoretical and aims to help researchers of the field for an expanded understanding of SMEs over national economies. This study provides a concise framework of important elements on the economic impact of SMEs on Kosovo's economy. Examination of available data has shown that the SME sector plays a crucial role for the Kosovo economy. The key role of SMEs was emphasized in terms of overall value generated and the labor market while innovation remains a challenge to be addressed by stakeholders.

Key words: SMEs, economic development, labor market, innovation.

1. INTRODUCTION

Small and medium-sized entities are the most vital and important sector in a country's economy. They are the backbone of an economy and a key factor for growth and employment. SMEs provide and generate employment opportunities, especially in times of recession; they are a major source of modernization, innovation and entrepreneurial spirit; they create links between individuals' innovative efforts and competitiveness and play a very important role in the future development of businesses. In short, dynamic and healthy market economies are totally reliant on small and medium-sized entities. The economy which is depended on remittances, public investment and consumption activities also remains a general challenge for the economy of Kosovo. This structure of economy its followed by challenges of the private sector which also have hindered the contribution of the business community to economic growth.

The main problem that prompted this study is the scarcity and clarity of the impact of SMEs on the economy of Kosovo, which makes it difficult to further expand studies on the importance of SMEs. This study addresses three key issues. Firstly, it is the aim of this paper to give a brief exposition of some arguments in favour of and against the economic importance of the small business sector to the Kosovo economy. Secondly, it examines the overall role of SMEs in

Kosovo's economy. Thirdly, it deals with the role of the SME sector in employment, and it analyses their role toward innovations. The subject of this paper is Kosovo SME sector, economic development, employment and innovation.

1.1 Literature review

Classification of SMEs: To better analyse the role of SMEs we must first define them. An enterprise is defined as any legal, independent, organized entity of persons, property, obligation and economic activities oriented on realization of profit. (Khatuna & Jinoria, 2014). Classification of enterprises are categorized based on different factors and criteria's, such as location, size, age, structure, organization, number of employees, sales volume, worth of assets, ownership through innovation and technology (Rahman, 2001). The most used criterion to distinguish between large and small businesses is the number of employees (Hatten, 2011). According to Bolton Report 1971, two main approaches are suggested to the business entity definition: quantitative and qualitative approach, (Carter & Jones-Evans, 2006). Nations, policymakers, academics, statistical agencies, and international institutions mainly apply quantitative criteria when defining SMEs. European Commission in 2003 determine the number of employees as main criterion to define an enterprise, however in 2005 this institution added two more financial criteria: annual turnover and annual balance sheet (European Commission: 2003, 2005).

Importance of SMEs for economy, employment and innovation: SMEs are widely considered as the backbone for most economies. In general, the role of SME-s in industrialized and developed nations has increased continuously over the past decades. Small and medium enterprises have been the subject of discussion for many relevant international actors and under the attention of academics (Dragnić D., 2009, 39). The main characteristics of SMEs tend to derive from their limitation such as personalized management (owner/manager), constraints on resources (management/organization, human resources, finance) and technological capabilities, limited market impact, and greater flexibility to the external environment (Dragnic, 2014).

Small and medium sized are widespread around the world and represent more than 90% of the total enterprises in almost every nation (World Bank, 2020). According to Annual Report on European SMEs, there are more than 25 million SMEs which accounts 99.8% of total enterprises in EU-28, and employ around 100 million people or (66%) of total employment in EU-28, and generate slightly less than three-fifth of the value added in the non-financial business sector. Despite the fact that they provide economic growth, generate employment, impacts innovation process, bring new ideas and other benefits, there is a fact that SMEs play a major role particularly in developing countries (World Bank, 2020). However, Kosovo lags behind the region relatively economically and socially and is considered a potential source of social and political instability (KEC, 2019, p.9). Slow GDP growth due to weak economic policies and political instability has resulted in high levels of unemployment and informal economy (1/3 of GDP according to EC, 2019, p.47), poor education, weak business climate and infrastructure.

Nowadays the word innovation is synonymous with the word digitalization. The way business is developed today is very different from the way it has been. Innovations are changing economies, markets, and rediscovering relationships between organizations and suppliers, consumers, thus becoming a critical mechanism for increasing innovation and job creation (EC,

2019, 4). Digital transformation is a major challenge for SMEs, especially those traditional and non-innovative such as those in Kosovo who are facing the risk of digital transformation losing the ability to compete (KCHC, 2019, 7).

2. METHODOLOGY

The methodological approach of this paper is based on secondary data analysis and examination of documentary sources, such as reports from national and international relevant institutions, and other research publications in the area of SMEs. This study has analytical character and aims to review the previous studies by various acters which serves to the theoretical part of the study. The research purpose is also to give an overview of the SME role related to economic growth, challenges and constraints toward employment opportunities and innovation. The researcher first examines and interpret concepts and data for the relevance of SMEs toward economy in general. Secondly the author discuss and analyze the relevance of SMEs toward labor market and innovation generally, to try to realize the ultimate goal of our study, and draw conclusions based on result analysis.

3. RESULTS AND DISCUSSIONS

3.1 The SMEs' significance for the Kosovo economy

In Kosovo the classification of SMEs is defined by law on foreign investment which entered into force in 2014. This law defines SMEs by the sole criterion of the size of the number of employees, which is in line with the definition of the EU. (OECD, 2019)

Table 1. Classification of SMEs in Republic of Kosovo

	EU definition	Kosovo definition
Micro	< 10 employees, turnover or balance sheet total ≤ EUR 2 m	< 10 employees
Small	< 50 employees, turnover or balance sheet total ≤ EUR 10 m	< 50 employees
Medium	< 250 employees, turnover or balance sheet total ≤ EUR 43 m	< 250 employees

Source: Republic of Kosovo (2014 [23]), Law No. 04/L-220 on Foreign Investment, https://mti.rksgov.net/desk/inc/media/1916AE1F-48E8-451D-A328-CA350EC4D7D2.pdf

Despite facing a high number of challenges and barriers, SMEs are expected to be the largest contributors to the economy and employment opportunities. A private sector which is dominated by SMEs and is considered as a pillar of economic growth, is also considered to be suffering from a state of stagnation and has failed to grow relative to its potential (Dobranja, 2019).

Table 2. Business demography indicators

	Enterprise		Value added	
Enterprise size	**Number**	**Share**	**Million E**	**Share**
Micro	34,611	93,1%	39,9	13,2%
Small	2,182	5,9%	61,5	20,3%
Medium	322	1,0%	144,4	47,5%
Total SMEs	**37115**	**100,0%**	**303,3**	**100,0%**

Source: EC (2019) SBA Factsheet. Country Report. p.3

Although, SMEs play a special role in the private sector, composing about 99.9% of all firms (KAS, 2020). With more than 93% of total business stock, is composed by micro-enterprises which is the largest sector in non-financial business economy (European Commission, 2019, p.3), while small and medium sized enterprise comprise 5.9% and 0.1% respectively. Kosovo SMEs generate 81,0% of total value added for the private sector with medium enterprises as largest contributor with 47% of total value added (European Commission, 2019, p.3). However, the value added created by micro-enterprise remains low compared to its peers in region, meanwhile, it has the largest share of SME exports of all the WBT economies, at 97.3%, with the dominant share coming from micro enterprises 54.9% (OECD, 2019, p.655). Given the fact that micro-enterprises dominate, and while their contribution remains small, stakeholders should be committed to creating favorable conditions for micro-enterprises to grow by creating a stability that enables future growth of value added, employment and exports.

Services are largest and most important sector of Kosovo's economy contributing significantly to GDP (72.63% of the GDP) and job creation (85.3% of the employment in Kosovo), driven by construction, real estate, and retail (MTI, 2019). Almost half of businesses in Kosovo (45.4%) belong to the trade and retail sector, the other services sector represents about 15% of enterprises, while manufacturing represents about 14% of enterprises in the business sector according to Kosovo Agency of Statistics.

Most enterprises in the trade and retail sector are mainly focused on food, beverages and retail. While most of the companies in service industry mainly operate in catering services, which is considered that the majority of businesses in the construction are involved in the construction of residential buildings. Despite the potential of the sectors that these enterprises are operating, they are mainly focused on consumption activities, which impacts directly to the growth of trade deficit, giving the fact that sectors with potential for employment growth and exports like manufacturing and information and communication technology continue to be underdeveloped and below potential levels.

This poor performance is attributed to the impact of internal and external barriers. From an internal perspective, the SME sector is characterized by traditional and non-innovative enterprises which often suffer from a lack of skills related to business activities, access to finance, innovation and technological skills, etc. Whereas, the external barriers that limit the development of SMEs and the utilization of its potential have to do with corruption, informality and unfair competition as well as the limited market and weak business climate, pandemic situation, political instability. Consequently, the continuous improvement of the business environment has not been sufficient for SMEs to increase the importance of this sector further.

3.2 The SMEs' contribution to job market and innovation

The SME sector also plays an important role in the labor market in Kosovo. Although not enough to reduce the unemployment rate which is currently at the level of 24.5%. This situation is also reflected by the education system which is not responding sufficiently to labor market needs.

Kosovo is considered a state of micro-enterprises based on the fact that about 99% of enterprises employ 1-9 workers, or about 76% of total business sector employment in Kosovo (EC, 2019, p.3), and around 55% of total employment in Kosovo (KAS, 2020). While the small and medium sized proportion (employing 10-249 workers) is only 1% (EC, 2019, p. 51). This is

reflected in the fact that about 80% of enterprises have individual ownership according to the Open Data Platform, which in most cases have a characteristic of self-employment rather than their growth as an integral part.

Table 3. Employment in SME sector

Enterprise size	Numer of employee	Share
Micro	62,450	34,9%
Small	40,727	22,8%
Medium	33,075	18,5%
Total	**136,252**	**76,2%**

Source: EC (2019) SBA Factsheet. Country Report. p.3

The SME sector is considered a promising sector in terms of employment growth, however, based on the fact that the existing enterprises are small and do not continue to grow their staff and business, it remains unclear whether the SME sector will generate in the future the necessary employment to ensure higher growth and impact in terms of the labor market and overall economic development. SME sector have been subject of a major criticism, concerning the working conditions and the treatment of labor force (Dita Dobranja, 2019).

Based on our above states that most of the firms in Kosovo are traditional and non-innovative, Kosovo is still in its initial phases of innovation development. However, some steps are taken by the institutions with the establishment of the Ministry for Innovation and Entrepreneurship (MIE) in 2017 which has underpinned the institutional framework for streamlining innovation in policy making. Kosovo has made some progress with launching the programme for direct financial support for innovative businesses, start-ups and NGOs, however a limited number of entities supported it will not help overall improvement in the innovation and entrepreneurship without ant long term strategy (EC, 2019, p.28) Widespread informality leads to unfair competition, hindering access to finance and the ability of registered businesses to grow and innovate (EC, 2019, p.7)

The ICT sector is expected to take the lead in the innovation road of Kosovo. It is the one of few sectors with positive trade balance, 78% of already existing companies export their services (ECIKS, 2019) and has started to play an increasing role in Kosovo's economic growth.

Despite this situation, international community especially European Commission is helping out with financial measures to support expansion of ICT infrastructure network, innovation and entrepreneurship centers, improve quality of vocational and education training and other educational reforms to help overall environment for social development (EC, 2019, p.29). According to Kosovo Chamber of Commerce, management/owners of SMEs are aware and are working in the direction of digital transformation to improve their business performance. However, skilled workforce, knowledge and financial resources are main obstacle to digitally transform their businesses.

4. CONCLUSIONS

SME sector plays an important role in the economic development and employment of Kosovo, while innovation activity of SMEs remains challenging and its necessary to take strategic and

concrete actions by relevant acters to unlock the potential in the most important and promising sector of the economy.

Kosovo's SMEs lack long-term objectives, innovation development, low product range, trade and services orientation, inadequate resource management, low level of product diversification, access to finance, informal economy.

Utilizing and expanding the potential of sectors such as manufacturing and information and technology would help the overall contribution of SME toward stable economic development, generate employment, and increase innovation activity toward healthy export rates.

The SME development agenda must be considered with urgent and concrete priority by local and international institutions to overcome the challenges of unemployment, high trade deficit, consumption in terms of development and increasing their role in the overall economy of the country.

Kosovo's medium-term outlook is estimated to be positive and growing. However, Kosovo needs to further engage in creating a sustainable political and fiscal environment and create a better business climate that enables productive investment and SMEs performance enhancement.

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THE FEMALE UNEMPLOYMENT, INACTIVITY AND JOB-SEEKING FEMALES – EVIDENCE FROM A TRANSITION ECONOMY

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Abstract

Unemployment presents a concerning issue worldwide. It is known as a serious macroeconomic illness. The losses from unemployment are severe, cannot be compensated and are much greater than losses from inefficiencies or monopolies. Unemployment also causes demotivation and devaluation of human capital. By reviewing the literature, we found that there are numerous research papers and reports concerning gender gap and inequality in employment, wages and education. We found that the literature concerning unemployment and inactivity in particular female unemployment is scarce. Thus, by using the existing literature, Eurostat data and labor source survey results from Kosovo Agency of Statistics this paper aims to investigate the female unemployment and inactivity in the labor market in Kosovo. Besides, by using the secondary data from the Ministry of Labor and Social Welfare (MLSW)- Employment Agency of the Republic of Kosovo (EARK) special focus in this paper is given to female job seekers in the Mitrovica region, whereas the data of female job seekers are explored, by ethnicity, age group and level of education for the period 2013-2018. The findings show that the unemployment trend during the years 2015-2016 increased, while during the years 2017 -2018 there was a significant decrease. The highest number of female job seekers are of Albanian ethnicity, in the age group 25-39 years and, the vast majority of unemployed females are with vocational education or are non-educated.

Key words: Female unemployment, labor market, labor market inactivity, female job seekers.

1. INTRODUCTION

Unemployment presents one of the most concerning issues in economies of different countries worldwide. Unemployment or joblessness appears when people are without a job and are actively searching for employment (Mançellari et al., 2007). The fact of being unemployed for a long-time result in the loss of hope of finding a job. Previous experiences show that most of the individuals who were economically inactive when they were 20–24 years old have a significantly elevated risk for remaining inactive seven years later (Franzén & Kassman, 2005, p. 403).

The labor market in the United States in the early 1970s was characterized by the significantly large gap between male and female unemployment rates (Madhu S. Mohanty, 2003, p. 69). Besides, many developed countries face problems such as the shortage of skilled labor and low female labor market participation (Caliendo & Künn, 2012). According to ILO school-to-work transition surveys (SWTS) from more than 30 developing countries being young and female can serve as a double strike for those seeking to find productive employment (Elder & Kring, 2016). A considering number of authors traced employers' discrimination against females and the large gender gaps in wages and employment in the U.S. labor market during the 1960s and 1970s (Niemi, 1974; Becker, 1971). According to the famous theory of taste discrimination, in a labor market, a female job seeker would be hired only if the employer's inequality of having a female employee is fully neutralized by lower costs of hiring her (Becker, 1971).

Unemployment mainly causes demotivation and devaluation of human capital. The causes, consequences, and solutions vary based on the specific type of unemployment that is present within a country. Many authors explored and discussed consequences and costs from inactivity and unemployment (Sik, 2012; Franzén & Kassman, 2005; Burgess & de Reyter, 2000) which are very serious and are more critical than losses from inefficiencies or monopolies; this costs cannot be compensated (Mançellari et al., 2007). Job loss is harmful to both partners' life satisfaction with a greater decrease among men than among women (Esche, 2020).

By using a sample of 560,000 young people living in Sweden, Franzén & Kassman (2005) examined the longer-term labor-market consequences of being economically inactive. Unemployment results in a loss of income, whereas most unemployed people experience a decline in their living standard (Couch & Placzek, 2010) this leads to a drop in spending and an increase in debt (Christelis et al., 2015). The relationship between unemployment and economic growth has been extensively studied since Okun's law study in 1962, whereas the unemployment and output are negatively and significantly related in the short term and the long term (Hutengsa & Stadtmann, 2014). From an economic point of view, high unemployment means a decrease in current GDP (Wachtel, 1984). The economic costs of unemployment are expressed in the macroeconomic perspective "in the output gap" i.e. the difference between current and potential output, where in unemployment situations this difference has negative values (Mançellari et al., 2007). The losses are not only economical and financial, considering that unemployed individuals not only lose income but also face challenges that threats physical and mental health (Franzén & Kassman, 2005). Unemployment mainly causes demotivation and devaluation of human capital (Mançellari et al., 2007). Unemployment dehumanizes the unemployed and causes partial or total loss of esteem among peers (Obumneke, 2012). The unemployment indirectly may affect the well-being of other family members through the negative externalities due to sharing the same household, having a common income, and being exposed to similar stressors (Luhmann et al., 2014). The negative consequences of unemployment are numerous and include psychological problems of frustration, depression, hostility and gradual drift of some visible unemployed youths into all manner of criminal behaviour (Okafor, 2011). High unemployment with low welfare coverage has exceptionally high social and personal costs (Gallie, Kostova, & Kuchar, 2001).

According to Obumneke (2012) the accelerating level of prostitution, armed robbery, rape and all facets of violence can be largely attributed to the incidence of unemployment. The results of a study in Australia reported positive correlations between unemployment and death due to

stress and heart disease (Bunn, 1979). Platt (1984) reviewed 95 studies published from 1953 to 1982 on unemployment or job loss and suicide or attempted suicide. He found that people who committed suicide were more likely to be jobless when they died than were other people who died from other causes (Platt, 1984). Although it is difficult to show that job loss had caused individual acts of suicide, numerous research is in line with this theory. According to Brenner (1976), only a 1% rise in unemployment was correlated with approximately 6000 excess deaths annually in the United States. Other research found that the evidence strongly supports an association between unemployment and a greater risk of morbidity (Robert et al., 1995) and alcohol-related hospitalisation (Lundin, 2011). Similarly, in Oxford in the period between 1979 and 1982, the rates of attempted suicide among unemployed women were 7.5–10.9 times higher than those of employed women and were in particular high in women unemployed for more than a year (Hawton et al., 1988). Despite the negative effects of unemployment still some findings reveal positive side-effects for the both unemployed men and women thanks to the increased time available for leisure activities (Esche, 2020). Based on the reviewed literature, we can conclude that many research reports and papers investigate the gender gap and inequality in employment, wages and education, but there is a scarcity in the literature concerning unemployment and in particular female unemployment. This gap in the literature motivated us to explore female unemployment, inactivity and job-seeking females.

2. METHODOLOGY

For our research purpose, we have used secondary data: the existing literature and data from World Bank, Eurostat and ILOSTAT to investigate the female unemployment. To explore the female unemployment and inactivity in the labor market in Kosovo, we have used the data from the labor source survey of Kosovo Agency of Statistics and SEE Jobs Gateway Database. This paper, in particular, is focused on female unemployment and female jobseekers in the Mitrovica region. Therefore, we have used the secondary data from the MLSW - EARK to explore: the female job seekers by ethnicity, age group and level of education for the period January 2013-September 2018.

3. RESULTS AND DISCUSSIONS

The unemployed amounts to all persons of working age who were without work during the reference period, currently available for work, and seeking work (International Labour Organization, 1982). According to the International Labour Organization (1982), the unemployment rate is a percentage of unemployed persons as a percentage of the total number of persons in the labor force.

3.1 Female Un(employment)

Based on the data of the World Bank- - ILOSTAT database (2020), countries with the highest unemployment rate of females worldwide are mainly in Africa and Asia. Whereas, the highest unemployment rates of females are recorded in: West Bank and Gaza (40.9%), followed by Iraq (30.4), South Africa (30.3%), Gabon (28.5%), Lesotho (27.1%), Yemen Rep. (24.9%), Libya (24.6%), Eswatini (23.7%), Tunisia (23.4%), Jordan and St. Lucia (23.3%), Egypt, Arab Republic and Saudi Arabia with an unemployment rate of 22.1% (The World Bank, 2020).

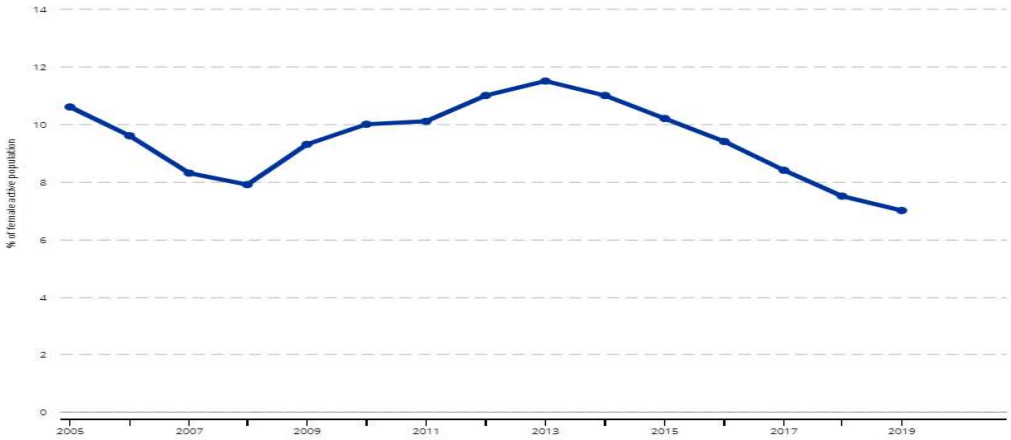

Figure 1. Female Unemployment in EU 27

Source: Eurostat

Figure 1 presents the rate of Female Unemployment as % of the active female population aged 15-74 in EU 27 for the whole period covering years 2005 to 2019, whereas the highest rates of female unemployment were in 2013 and the lowest in 2019.

According to EUROSTAT (2020), the employment rate was higher for men than for women in general for all 27 EU Member States with only two exceptions: Latvia in 2010 and Lithuania in 2009 and 2010. Overall in Europe, the gender employment gap has decreased. At EU level was recorded a decrease from 16.4 % in 2005 to 11.7 % in 2019 (EUROSTAT, 2020). This decrease was mainly due to the increased rate of women employment with an increase of 8.6 % at EU level. The largest increases for female employment rates between 2005 and 2019 were in Malta (+ 31.9 % whereas the employment gender gap changed by -24.9 %), Bulgaria and Poland (both +13.6 %) (EUROSTAT, 2020). Despite significant changes in the labor market in terms of decreasing the gender gap in general in EU countries, not all countries have experienced large increases in female employment. The highest employment rates for women in 2019 were found in Sweden (79.7 %), whereas the lowest female employment rates were recorded in Italy (53.8 %) and Greece (51.3 %) (EUROSTAT, 2020).

3.2 The unemployment in Western Balkans (WB6) and Kosovo

In Kosovo, the unemployment rate measures the number of people actively looking for a job as a percentage of the labor force (Trading Economics, 2020). Based on the data from Trading Economics (2020), the unemployment rate in Kosovo is continually high, going up to 57% in the fourth quarter of 2001. As can be seen in figure 2, unemployment continued to fall across the Western Balkans except in Montenegro, reaching new historic lows in all countries whereas the overall unemployment rate stood at 13.3 % in Q2 of 2019 (The Vienna Institute for international economic studies, 2020). The unemployment rate in Kosovo remains continually the highest among WB6, expect in 2012. The lowest rate of unemployment in Kosovo is 26.1% in 2019 (the average of the first two quarters).

The Unemployment rate among young people is even higher and presents the primary concern of the Government of Kosovo. According to data from Trading Economics (2020), the current youth unemployment rate is 49.10 %, whereas the lowest rate was of 48.9 % in the third quarter

of 2019 and the highest was of 61% in the fourth quarter of 2014. As a result of increased unemployment and as responding to scarce employment opportunities in particular for youth, in early 2015 the exodus with around 50,000 people mainly youth left Kosovo and headed to EU countries, in search for a better life and more employment opportunities (Avdullahi & Tmava, 2018).

Kosovo estimated population of 1,793,467 in 2018, whereas the total population of working age (15 to 64) was 1,198,273 or 40.9% of people of working age participated in the labor force or were economically active (employed or unemployed but actively looking for work and available for work) (KAS, 2019). According to KAS (2019), the rest of the 59.1% were economically inactive. In 2018 a significant proportion of the young population was unemployed around 55.4% and youth unemployment among females was even higher (64.7 %) compared to males (51.5%) (KAS, 2019).

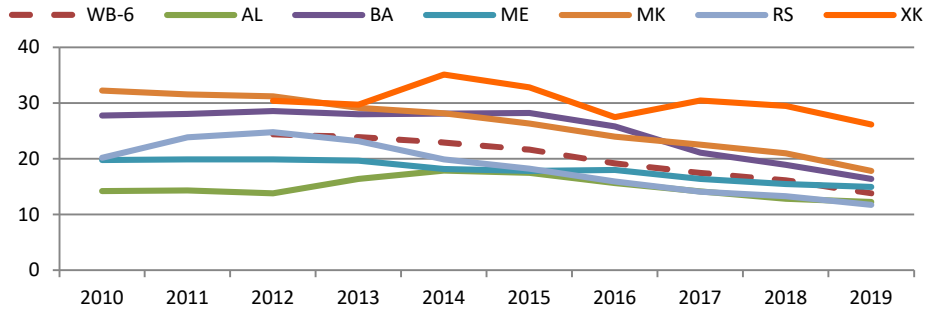

Figure 2. The Western Balkan countries Unemployment rates, in %

Source: SEE Jobs Gateway Database (Data for Kosovo available beginning in 2012)

3.3 Female unemployment and inactivity in WB6 and in Kosovo

The phenomenon of female unemployment is evident in all Western Balkan countries. In almost WB6, the unemployment rate was higher for women than for men. The exception is only in Albania and Serbia, where the differences are less noticeable. In particular, this is true for Kosovo, but also Bosnia and Herzegovina, Montenegro and North Macedonia (The Vienna Institute for international economic studies, 2020). Figure 3 shows that from all WB6, the highest rate of female unemployment continually is evident in Kosovo.

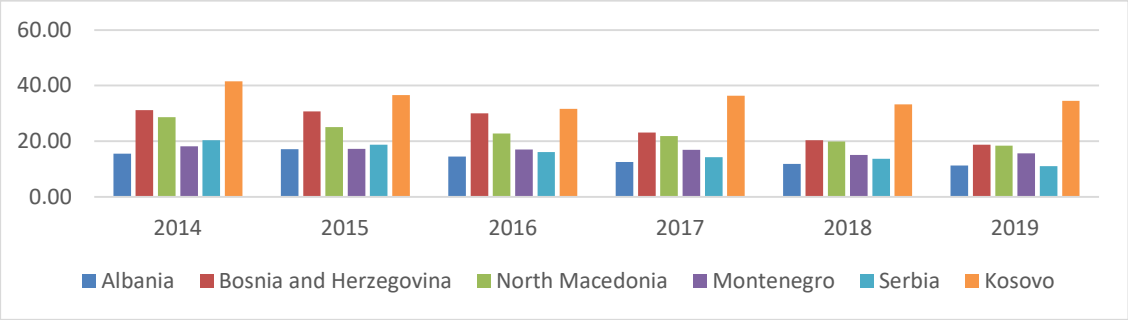

Figure 3. Female Unemployment in Western Balkan countries (% of female labor force-national estimate)

Source: The world bank IBRD-IDA

Although the overall unemployment rate in Western Balkans countries experienced a decrease from 2.6 percentage points since 2012, in the second quarter of 2019, still inactivity remained continuously high (The Vienna Institute for international economic studies, 2020). For both genders in WB6, the highest inactivity rates were in the second quarter of 2019 in Kosovo with 80% for female and 40% for male (Figure 4). Based on The Vienna Institute for international economic studies report (2020) the number of persons that were economically inactive in 2019 in the WB6 is averaged to 37 % of the working-age population and, it is fewer than in the past years mainly due to a decline in female inactivity, mostly in Albania, North Macedonia and Serbia.

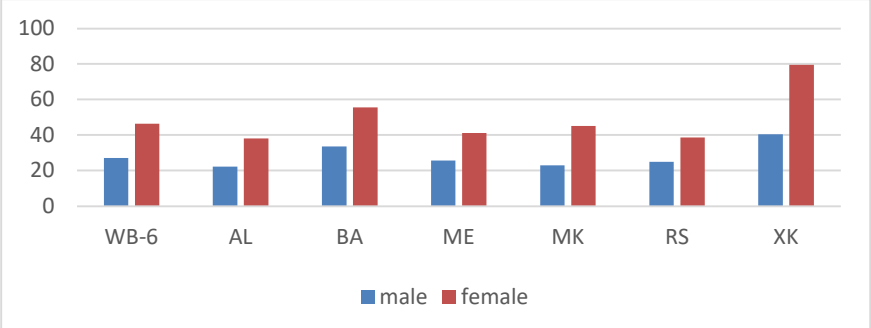

Figure 4. Inactivity rates (15-64 years) in Western Balkan for both genders in Q2 of 2019, in %

Source: SEE Jobs Gateway Database

While in some of the WB6 countries there has been a decline in economic inactivity of women, on the contrary in Kosovo still the number of inactive women in the labor market is very large, while the number of women jobseekers and employed is small. In most Kosovan families, women are the main responsible person of caretaking for the children and elderly family members. Besides, they are responsible for most of the home tasks such as: preparing food and cleaning. All these obligations are time-consuming and can prohibit them from seeking paid employment, particularly if they are not supported by sociocultural attitudes and/or family-friendly policies and programmes that allow them to balance work and family responsibilities (International Labour Organization, 2016). Some of them lack adequate education, while some have been looking for work for a long time and over time have lost hope of finding a job. The Government of Kosovo and MLSW must create urgent policies that promote female job seeking, increase female's employment, female entrepreneurship and thus empower Kosovan females. Otherwise for labor-exporting countries like Kosovo, the failure to provide economic, social, and political empowerment for more educated females is likely to encourage a female brain drain (Nejad & Young, 2014). Aiming to explore this issue further below we investigate the female unemployment and female job seekers from Mitrovica region by ethnicity, age group and level of education for the period January 2013-September 2018 by using the secondary data from the MLSW - EARK.

3.4 Female job seekers in the Mitrovica region

The rate of women's economic inactivity in Kosovo is very high until on the contrast the number of female job seekers is low. The Department of Labor and Employment is the key instrument in addressing structural problems in the market employment, creating and designing employment policies and vocational training for job seekers as well as developing the social

dialogue in Kosovo. This department develops its activities through seven Centers of Regional Employment Offices, 23 Municipal Employment Offices, six Municipal Employment Sub-Offices and eight Vocational Training Centers (Ministry of Labor and Social Welfare, 2009).

We have used the secondary data from MLSW – EARK for seven municipalities of the Mitrovica Region: Mitrovica, Vushtrri, Skenderaj, Mitrovica North, Zvecan, Leposavic and Zubin Potok to explore: the female job seekers by ethnicity, age group and level of education for the period January 2013-September 2018.

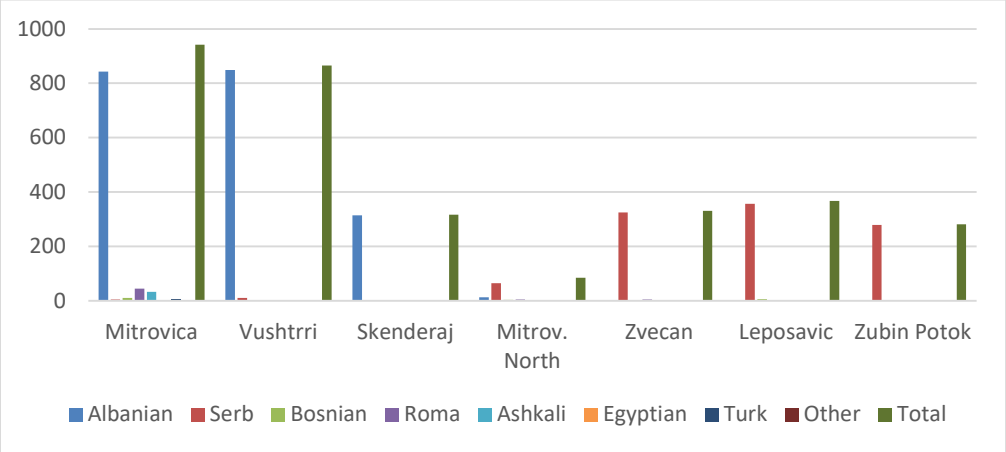

Figure 5. Female jobseekers in the Mitrovica region based on ethnicity for the period 2013-2018

Source: MLSW - EARK

The findings show that the women job-seeking trend during the years 2015-2016 increased, while during the years 2017 -2018 there was a significant decrease. Based on the data, the total number of female job-seekers in the Mitrovica region for the period January 2013-September 2018 was 3187. Figure 5 shows that the highest number of female job seekers are in the municipality of Mitrovica (942 job-seeker), Vushtrri (865 job-seekers) and Leposavic (367 job-seekers). The largest number of female job seekers in the entire region of Mitrovica are of Albanian ethnicity (2022 job seekers), where the largest number of them are from the municipalities: Vushtrri, Mitrovica and Skenderaj, whereas in the rest municipalities where Albanians are a minority their total number is 16 job-seekers and 13 of them are in northern Mitrovica, 2 in Zubin Potok, 1 in Leposavic, while in Zvecan there is no Albanian female registered to find a job. The total number of female job seekers of Serbian ethnicity was 1043 and most of them were from Nothern Mitrovica, Zubin Potok, Leposavic and Zvecan. The rest of female job seekers in the Mitrovica region were of Roma ethnicity (56 job seekers), Ashkali (35 job seekers), Bosnian (20 job seekers), Turk (4 job seekers), 1 Egyptian job seeker and 6 female job seekers were from other ethnicities.

Educated women are more likely to find a job; therefore, we have used the EARK data to explore the number of female job seekers based on their education. Figure 6 shows that the vast majority of female jobseekers are with vocational education (1133 female job seekers) or are non-educated (981 female jobseekers), followed by those with bachelor's degree (499 female jobseekers), high school and primary education. Only 36 female jobseekers were with Master degree, while with the PhD degree there was no registered female jobseeker.

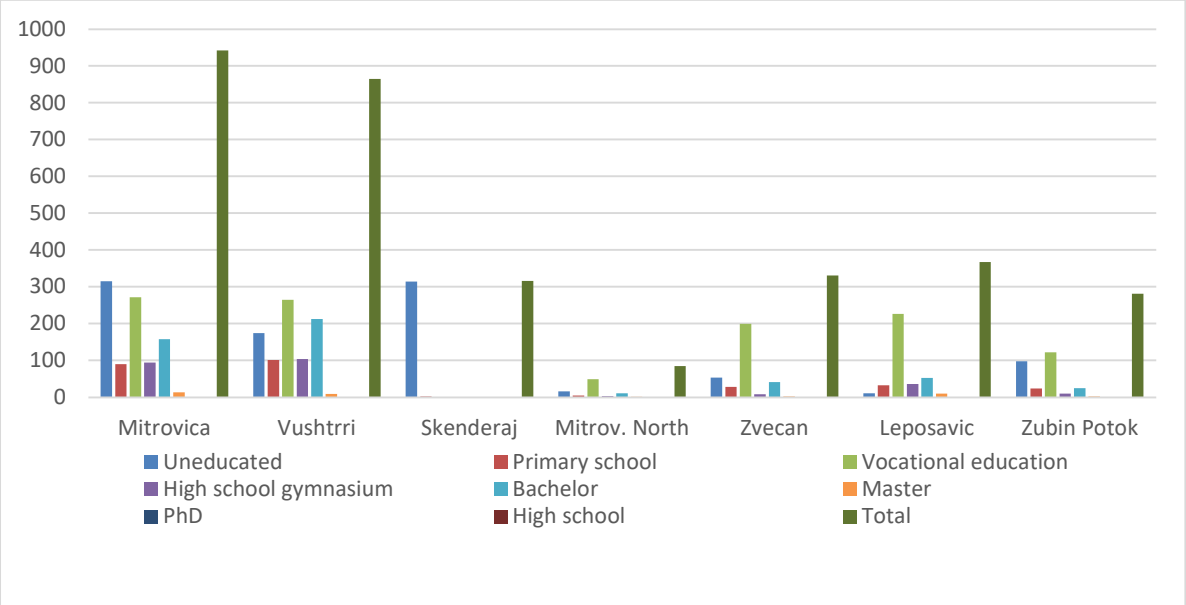

Figure 6. Female jobseekers in the Mitrovica region based on education for the period 2013-2018

Source: MLSW - EARK

As can be seen in figure 7 the vast majority of the female job seekers were in the age group 25-39 years (1954 job seekers), followed by age group 40-54 (641 job seekers); age group15-24 (428 job seekers) and age group 55+ (164 job seekers).

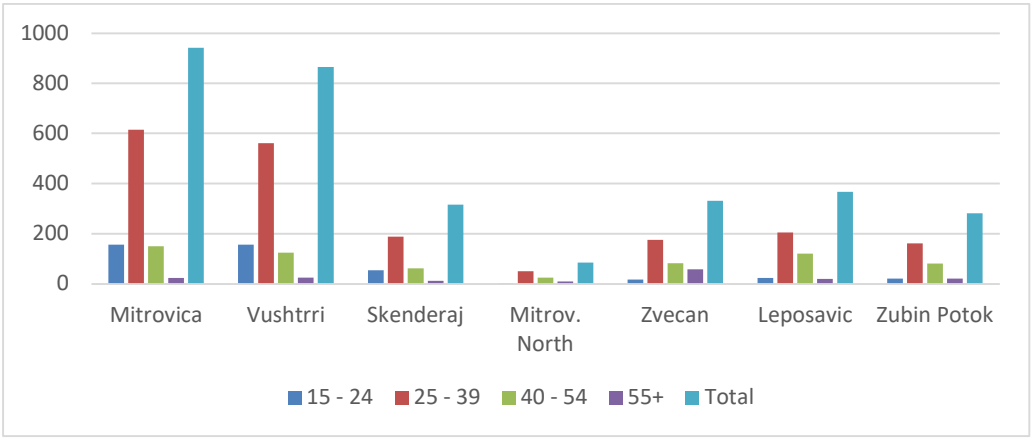

Figure 7. Female jobseekers in the Mitrovica region based on age group for the period 2013-2018

Source: MLSW - EARK

4. CONCLUSIONS AND RECOMANDATIONS

Although Kosovo experienced continuous economic growth, the unemployment rate remains the highest among WB6. The unemployment rate of female and youth in Kosovo is even much higher, presenting one of the biggest challenges and concerns for the country. Unemployment

usually has negative effects in the early stage of the career on lifetime income and career possibilities (Olofsson & Wadensjo, 2012). This is a very critical issue considering that high youth and female unemployment threatens the social cohesion of the societies itself (Olofsson & Wadensjo, 2012). Therefore, it is required higher commitment of the government towards creating a supportive environment for businesses and in particular for startups considering that the private sector is the largest generator of employment worldwide. In addition to unemployment, Kosovo has high rates of economic inactivity as well, whereas in 2018 from the total population of working-age only 40.9% participated in the labor force or were economically active, the rest of the 59.1% were economically inactive. The situation is even worse for women, considering that in the second quarter of 2019 the inactivity rate for female was 80% and 40% for male. The findings show that the women job-seeking trend during the years 2015-2016 increased, while during the years 2017 -2018 there was a significant decrease. The highest number of female job seekers are of Albanian ethnicity, in the age group 25-39 years and, the vast majority of unemployed females are with vocational education or are non-educated.

Based on the findings and analyzes included in this research, it turns out that the trend of unemployment and low participation of females in the labor market reflects the general economic situation of a country, state, or region - identifying the underlying causes that affect in creating such a circumstance. The consequences of unemployment are primarily negative (Esche, 2020). Unemployment is associated with significantly higher levels of psychological distress (Gallie, Kostova, & Kuchar, 2001) and other social and economic consequences.

It is recommended to establish local and central mechanisms for direct involvement and representation in policy-making processes that affect the field of employment and vocational training of women in particular, through working groups, round tables and other platforms which give a strong impact during the process of designing, drafting and implementing these policies/documents. Institutions need to create policies that attract the unemployed who are economically inactive and women in particular, towards registration as active job seekers. Although it is known that mass employment of job seekers is hard to be achieved, these institutions can at least contribute by providing training on entrepreneurship and thus prepare individuals with the necessary knowledge and skills that will allow them to identify opportunities, understand customer's needs and expectations, generate new ideas, develop business plans and create their own business, thus contributing to the development of different sectors based on their previous education and experience. In this way, they would start their own business and also employ other people.

Besides, it is necessary to conduct labor market research by professional and competent institutions to reach accurate conclusions regarding the needs, difficulties and advantages of particular groups for integration into the labor market (women and youth) so that the addressing of requests for these groups is done effectively and according to identified priorities. We strongly recommend the active inclusion with specific quotas and special budget lines within the schemes which are implemented by the EARK to facilitate and faster integration in the labor market for women and youth as a category which have the highest unemployment rate in the country as well as in WB6.

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THE EFFECTS OF TAXATION ON THE ECONOMIC GROWTH OF THE REPUBLIC OF NORTH MACEDONIA

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Abstract

The main objective of this paper is to determine the impact of direct and indirect taxation on the economic growth of the Republic of North Macedonia for the last two decades. In this regard, Augmented Dickey Fuller (ADF) and Philips – Perron (PP) test has been employed to determine the unit root of the time series. In addition, the results suggest data to be stationary in their first difference thus Vector Error Correction Model (VECM) has been utilized to investigate the relationship between direct and indirect taxes and economic growth for the time period 2001 – 2018 for the case of the Republic of North Macedonia. Moreover, the results imply that indirect taxes have positive, while direct taxes have negative effect on the Macedonian economy. These results are mainly due to the high dominance of Consumption tax compared to Personal Income Tax and Corporate Tax that by nature are more distortive than Value Added Tax and Excise. Finally, taxation is assessed as an important factor that can stimulate and promote the economic growth in the long run in a developing country such as Republic of North Macedonia, thus should be encouraged efforts for constructing effective policies with a long run perspective.

Key words: direct taxes, indirect taxes, economic growth, VECM.

1. INTRODUCTION

In economics, the major challenge of national governments worldwide is to perpetually increase the welfare of the citizens through the implementation of appropriate economic policies and programs by direct participation in domestic and global economic activities. Fiscal policy aligning government revenue and expenditure is of crucial importance in promoting price stability and sustainable growth. Thus, it represents one of the macroeconomic policy instruments to be used in preventing or reducing short-run fluctuations in output, income and employment for promoting economic growth.

Government revenue impacts economic growth through meeting the various governmental needs. Perhaps the most important mechanism through which government expenditure impacts on economic performance are the costs of raising taxes to finance the public expenditures. By lowering the returns to earning income, taxes reduce incentives to work, save and invest, thereby "crowding out" or discouraging private sector activity.

The objective of this paper is to investigate the role and impact of tax on the economic growth in the Republic of North Macedonia. There are numerous researches which have been done on tax and economic growth in developing countries. However, there are several studies of this topic which have been done for the Republic of North Macedonia, through the co-integration methodology. In this regard the following particular objectives are set: to investigate the relationship between tax revenues and economic growth in the Republic of North Macedonia for the time period 2001 – 2018; analyse the relationship between indirect, direct taxation and the country's economic growth and recommend policy measures that the policymakers of the Republic of North Macedonia may adopt to accelerate its economic growth. The data for tax revenues and macroeconomic indicators for the Republic of North Macedonia are based on quarterly time series covering the time spin 2001 to 2018, generated from Ministry of Finance and National Bank of RNM. However, even though data are taken from official reports of reliable institution, yet they are not error free. In addition, the scope of the time period is not very long, covering the time period for 18 years, which might cause some misleading results.

Finally, study will provide an insight on how fiscal policy changes may increase Macedonia's economic growth. In particular, the statistical significance of key elements in determining Macedonia's economic growth is expected to shed light on the linkage between tax revenues and economic growth and how this will be useful to policy makers who will ensure prudent use of tax revenues to achieve economic growth.

2. LITERATURE REVIEW

The nexus between tax revenues and economic growth is highly debatable issue, that have been always in the focus of academicians and policymakers having into consideration the direct and indirect effect of the taxation in promoting the economic growth in developed and developing countries. In this regard, in the literature, there exist plenty of papers that have been examined the relationship between taxation and economic growth in developing countries.

Relationship between tax and economic growth in the Republic of North Macedonia is seen from endogenous framework and its growth rate of a country. In this regard, authors King and Robelo (1990), explained the endogenous growth model by believing that government policy, including taxation, can permanently increase the output per capital within high level of innovation. However, the main implication is that taxes and public expenditures have consistent effect on output in short term and long term.

The effect of taxation as generating tool for economic growth in developing countries has been studied by many scholars ((Bleaney and Gemmell (1999); Myles (2000); Cremer et al. (2001); Musanga (2007); Greenidge and Drakes (2009); Arisoy and Unlukaplan (2010); Izedonmi and Okunbor (2014), Alili Sulejmani et al. (2017), Ibraimi & Alili Sulejmani (2017)).

Moreover, authors Martinez-Vacquez et al (2009), considering direct and indirect forms of taxation explained theoretical optimal tax literature, however the main question that still remained largely unanswered is the economic consequences of different mixes of taxes.

According to Cremer et al. (2001), they explained that because individuals differ in their qualitative characteristics, general income tax will not suffice, thus indirect taxes should form basis for optimal tax policy.

The debate between direct and indirect tax for designing optimal tax system has been polarized, where at one side are proponents of indirect tax as a growth driver while at the other side there are scholars who observed negative or non-significant relationship between indirect tax and economic growth. In their paper, Greenidge and Drakes (2009), use unrestricted error correction model to examine the relationship between tax policy and macroeconomic activities, claiming that total tax and indirect taxes have a contractionary effect on the economy in both the short run and long run period. In addition, in his paper Musanga (2007) investigated the relationship among indirect taxes and economic growth for the case of Uganda for time period 1987 to 2005, by utilizing co-integration regression technique, resulting that a % change in indirect tax would decrease economic growth by 0.53%.

Kneller et al. (1999) focused their analysis mainly on 22 OECD countries covering the time spin 1970 -1995, using five years average of the annual data to circumvent the business cycle effect and static panel econometric technique to investigate the relationship between fiscal policy and growth, where results suggested significant positive link between indirect taxes and economic growth.

Further, Arisoy and Unlukaplan (2010), investigated the relationship between direct and indirect tax and economic growth for the case of Turkey covering the period 1968-2006, by employing the OLS technique, revealing that real output is positively related to indirect tax revenue. They concluded that indirect taxes are significantly and positively correlated with economic growth in Turkey.

Moreover, Scarlet (2011) examined the relationship between taxation and economic growth for the case of Jamaica, by employing quarterly time series data for time period 1990 to 2010, indicating as a result an existence of a significant positive relationship between indirect tax and economic growth in the long run.

In addition, Alili Sulejmani et al. (2017) have investigated the relationship between distortionary taxes and economic growth for the case of Republic of North Macedonia for the time spin 2000 – 2016, indicating that between Personal income tax and economic growth there exist a significant relationship in the long run. Though that is not the case for the Corporate taxes. Further, Ibraimi and Alili Sulejmani (2017) have been investigating the relationship of indirect taxes and economic growth in the Republic of North Macedonia, where their findings reveal positive effects of indirect taxes on the economic growth of the Republic of Macedonia.

3. RESEARCH METHODOLOGY

This section displays insight regarding the selected methodology used in this paper. In addition, in order to determine the long run relationship between tax revenues and economic growth, thus the relationship between direct taxes and indirect taxes, firstly time series has been checked for their stationarity or unit root, thus Augmented Dickey Fuller test. Further, Johansen test for co-integration has been utilized to determine whether exist at least one co-integrated vector among the variables in the model, suggesting the existence of long run relationship among them. Later, Vector Error Correction model has been used to analyse the relationship among tax revenues and real GDP growth rate in the Republic of North Macedonia, for the time period 2001 – 2018, thus the effects of direct and indirect taxes in the economic growth in the long run.

In order to analyse the relationship between taxes and economic growth in the case of the Republic of North Macedonia, quarterly time series have been employed for the time period 2000q1 to 2018q4. The major objective of this paper is to examine the relationship between tax revenues and economic growth as well as the impact of direct and indirect taxes on the economic growth rate of the Republic of North Macedonia.

Moreover, data are taken from official reports of Ministry of Finance and Central Bank, where the composition of indirect taxes is made of VAT and excises, while of direct taxes from Personal Income Tax and Corporate Tax. In addition, Solow model of neoclassical growth has been employed, indicating Direct taxes, Indirect taxes, and Gross Fixed Capital Formation concerted to natural logarithmic as independent variable and real GDP as dependent variable, while labour force participation rate has been removed from the model due to insignificance.

Further, the unit root test has been employed in order to check if time series are stationary or do not contain unit root, and in this direction Augmented Dickey Fuller test has been used. Moreover, based on results of unit root, Johansen test for co-integration has been employed in order to find co-integrating vector rank in this model, thus in order to determine whether there exists a significant long-run relationship between the variables in the following basic regression models:

$$lnRGDP = \beta_0 + \beta_1 lnDT + \beta_2 lnIT + \beta_3 lnGFCF + \varepsilon \quad (1)$$

4. EMPIRICAL FINDINGS

In order to determine the effects of direct and indirect taxes on economic growth in the Republic of North Macedonia for the time period 2001q1-2018q4, VECM model has been used to determine the long run relationship among these variables.

Firstly, time series have been checked for unit root. In addition, lag structure has been used determined by employing several selection criteria such as AIC, SBIC and HQIC criteria. Moreover, table 1 indicate the results of lag structure selection for the model.

Table1. Lag structure selection

Lag	LR	FPE	AIC	HQIC	SBIC
0		7.4e-09	7.36926 -	7.31465 -	7.22964
1	331.92	5.0e-11	-12.368	-12.0949	-11.6699
2	68.514	2.7e-11	-12.9766	-12.485	-11.72
3	45.738	2.2e-11	-13.2055	-12.4955	-11.3904
4	116.97*	5.6e-12*	-14.6216*	-13.6932*	-12.2481*

Source: author's calculations

In order to determine if the variables possess unit root, Table 2 reflects the results of the conducted Augmented Dickey Fuller test for unit root, with results indicating the accepted null hypothesis that the series contain unit root at zero order levels for each variable, thus it is excepted the null hypothesis that the series are non-stationary in their level.

Regarding the null hypothesis of a unit root, it is strongly rejected for the differenced series of all variables, thus indicating that all variables are stationary in their first difference.

Table 2. Unit root – Augmented Dickey Fuller test

	Variable	Augmented Dickey Fuller	Comment
Level	**lnRGDP**	0.170 (-2.923)	**H_0 - accepted**
	lnDT	-1.178 (-2.923)	**H_0- accepted**
	lnIT	-1.971 (-2.923)	**H_0 - accepted**
	lnGFCF	-1.471 (-2.923)	**H_0- accepted**
First difference	**lnRGDP**	-3.304 (-2.924)	**H_1- accepted**
	lnDT	-4.753 (-2.924)	**H_1- accepted**
	lnIT	-5.026 (-2.924)	**H_1- accepted**
	lnGFCF	-3.097 (-2.924)	**H_1- accepted**
Notes: † numbers in brackets represent lag length in ADF test			

Source: author's calculations

The following table illustrates trace test (λtrace) statistics results regarding the existence of long run equilibrium between the direct, indirect taxes and real GDP. In addition, null hypothesis of no co-integration (r=0) based on the trace test between these variables is rejected at 5% level of significance and it is accept at $r \leq 1$ at 5% level of significance, it suggests the existance of one co-integrating vector between the variables, indicating the presence of a significant long-run relationship among these variables.

Table 3. Johansen test for co-integration

Null hypothesis	Alternative hypothesis	λ- trace	95 % critical value
$r = 0$	$r > 0$	48.0450	47.21
$r \leq 1$	$r > 1$	**18.6348***	**29.68**
$r \leq 2$	$r > 2$	6.4349	15.41

Source: author's calculations

Based on the results conducted from the Vector Error Correction Model which are illustrated in table4, it is indicated that indirect taxes have positive effect on real GDP in the long run at 5% level of significance, while direct taxes have negative effect on real GDP growth rate in the long-run in Republic of Macedonia for the time period 2000-2018.

Table 4. Vector Error Correction Model

Variables (co-integration vector 1)	β	α
Real GDP	1	0
lnDT	-0.465 (-0.008)	-2.927 (0.000)
lnIT	0.166 (0.059)	1.689 (0.000)
ln GFCF	-1.008 (0.001)	-1.452 (0.000)

Source: author's calculations

Further, the long run regression test results are indicated as follows:

$$lnRGDP = -0.465lnDT + 0.166lnIT - 1.0004lnGFCF \quad (2)$$

Based on these results, we can claim that in the Republic of North Macedonia there exist a positive relationship among indirect taxes and real GDP and negative nexus among direct taxes and real GDP, mainly because of the high dominance of consumption tax, compared Personal Income tax and Corporate Tax, which from nature are more distortive than VAT and Excise. In addition, by increasing 1% of the indirect taxes, the real GDP will increase 0.166%, while by increasing 1% of direct taxes; the real GDP will decrease by 0.465%.

5. CONCLUSIONS AND RECOMMENDATIONS

The relationship between tax revenues and economic growth is a debate issue that has existed for a long time in emerging countries. The discussion on the two variables has exhibit contentions from academicians and policy makers with one school holding on the view that taxation is bad for the economy while the other school believe that taxation is good for the economy. Plenty empirical literature exists that studies the relationship between economic growth and tax revenues though most of them analyse the variable at cross - country level. However, not much literature exists exploring the relationship between the two variables at country specific level by emphasizing the effects of direct and indirect taxation on the economic growth, with an emphasize on the co-integration methodology.

The main aim of this study is to fill in the literature gap in country specific studies by exploring the relationship between economic growth and tax revenues in the Republic of North Macedonia, and also determining the relationship between the direct, indirect taxes and economic growth. In this regard, while analysing the data was observed that the residuals were all non-stationary in their level and stationary in their first difference. In addition, the existence of one co-integrating vector while adoption of Johansen test for co-integration, implied the need of VECM in order to determine the long-run relationship among direct, indirect taxes and real GDP in Macedonia for time period 2000q1-2018q4. Results of VECM identified a positive long-run relationship among indirect taxes and economic growth, while a negative one among direct taxes and economic growth in the Republic of North Macedonia.

Such results can be seen as further contribution to the existing literature and debate regarding the relationship among indirect taxes and economic growth in developing countries as well as suggestions for Macedonian policymakers regarding the fiscal and tax policies.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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THE EVOLVING ROLE OF THE RELATIONSHIP DEVELOPMENT MANAGER IN DEVELOPING TRUST AND MAINTAINING EFFICIENT SUPPLY CHAINS - A STUDY OF MANUFACTURING COMPANIES FROM KOSOVO AND ALBANIA

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Abstract

In order to reduce cycle times between supply chain entities, managers must work to create new relational forms that rely on trust to a greater extent. We present a model suggesting that to build relationships based on product lifecycle management, inventory management and control, demand & lead time management, logistics, collaboration, procurement, vertically integrated partnerships, preferential pricing & lead-times. Our model suggests that should increase relevance and robustness of the evolving role of management in developing trust and maintaining efficient in supply chain. This model is tested with data gathered from a sample of purchasing on different type of managers: general managers, functional managers, frontline managers of manufacturing companies from Kosovo and Albania during different stages of the supply chains process. The results suggest that even in cases when managers do not have a great deal of control over their suppliers, working to build trust within the relationship can improve supplier responsiveness.

Key words: supply chains, managers, manufacturing companies.

1. INTRODUCTION

The role of managers in supply chain management has gained much attention and interest due to the changing manufacturing strategies and dramatic increase in globalization. (Weeratunge and Herath, 2017). Today's managers-driven, integrated supply chains are enabling manufacturing companies to reduce inventory and costs, add product value, extend resources, accelerate time to market, and retain customers (Wang, Dai and Wang, 2017). Therefore, Baah and Jin (2019) describe that managers on supply chain has significant impact on developing trust as it can improve company culture through fostering 'fair' play, create a collegial working environment and citizenship behavior inside companies and cooperation between companies. Carr (2019) said that changes in the environment (socio-political, changing demand etc.) are the cause for increasing uncertainty in the market place. In order to deal with this, flexibility in the supply chain becomes more and more important. It is investigated that Supply refers to the ability of managers to increase suppliers' responsiveness. Because of this, the management of

relationship with suppliers is of crucial importance (Xu, Hsu and Niu, 2018). Cohen, Cui, Ernst, Huchzermeier, Kouvelis, Lee, Matsuo, Steuber and Tsay (2018) also emphasize the role of 'trust' along the partners in the supply chain since larger emphasis is put on the flow of communication and the willingness of these nodes in the chain to support a dynamic supply chain configuration. Based on the aforementioned researches, we deduce that managers and trust play significant role in the efficiency of supply chain. Therefore, we are interested to verify and to advance understanding of the evolving role of managers in developing trust, maintaining efficiency of supply chains and the importance of management on supply chains in the manufacturing companies from Kosovo and Albania with an across broad industry groupings.

2. RESEARCH CONTEXT

2.1 The role of managers in the manufacturing companies

Managers of manufacturing companies should pay special attention the import and creation of raw materials to be used by the company. (Longoni, Cagliano, 2018). They must be able to track the materials as they are combined, shaped, and altered to form new products (Mathiyazhagan, Datta, Singla, Krishnamoorthi, 2018). Ideally, the managers will be able to bring in fresh ideas that allow the company to deliver its products at higher quantities or at a faster rate to the market (Petljak, Zulauf, Štulec, Seuring, Wagner, 2018).

2.2 Trust in the context of the manufacturing companies

Trust is the form of mutuality in which the chain members perceives that their future depends on each other's interaction (Pourjavad, Shahin, 2018). The presence of trust facilitates the chain members to foster interaction for coordination of decision making and problem solving (Prasad, Pradhan, Gaurav, Chatterjee, Kaur, Dash, Nayak, 2018). According to Raut, Narkhede, Gardas (2017) trust-based relationships are often accomplished by emphasizing the principles of accountability, entrepreneurship, expertise, and cooperation.

3. HYPOTHESES

The model shown in Fig. 1 is based on a number of theoretical and managerial studies, which suggest that inventory management and control, demand & lead time management, logistics, collaboration are in the relationship determined by product lifecycle management. The model also posits that procurement is ultimately linked to the preferential pricing & lead-times and vertically integrated partnerships. The model is tested using a set of questions aims to identify the skills and processes that are necessary to build the sustainable role of managers. Moreover, will clarify the importance of trust and efficiency during different stages of the supply chains process. More and more companies are beginning to realize the importance of developing competitive advantage through developing their supply chains and undertaking supply chain management through managers Sousa Jabbour, Chiappetta Jabbour, Hingley, Vilalta-Perdomo, Ramsden, Twigg (2020). As the role of managers on supply chains and developing trust on manufacturing companies varies across industries Ulaga, Eggert (2006).

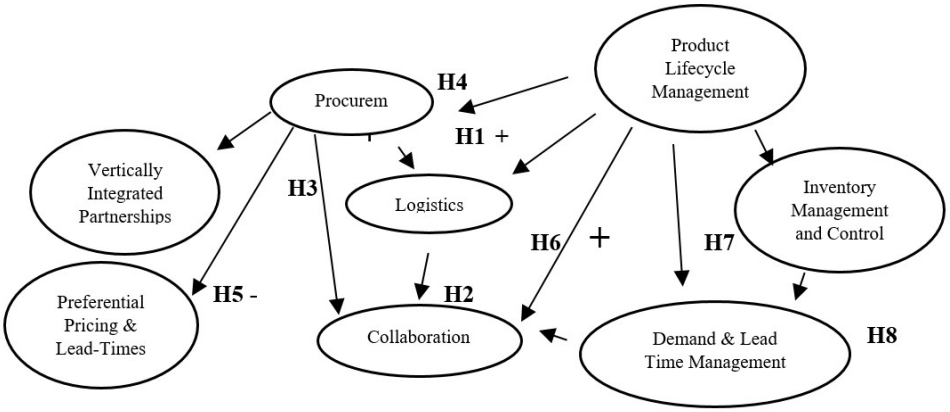


Figure 1. Model of developing trust and maintaining efficient supply chains

3.1 Product Lifecycle Management

The complex management of supply chains has increased the need for information exchange, sharing, and archiving. Concretely, product lifecycle management enables a sup-ply chain to become much more competitive by an effective collaboration among customers, developers, suppliers, and manufacturers at various lifecycle stages of a product (Bouhaddou, 2018). We therefore propose that:

Hypothesis 1: The structure of product lifecycle management on supply chain must be defined at the level of the product design that is to say at the level of the digital mockup.

3.2 Inventory Management and Control

To create a successful supply chain, it is of importance that companies adapt the different products to their demand and the supply chain should therefore be managed with regard to the inventory management and control (Lee 2002). If the performance is not optimized, the service level, logistics costs and tied up capital will be higher than needed due to lack of planning and inventory control (Relph, 2015).

Hypothesis 2: By grouping the different inventory management and control areas within the supply chain when evaluating the performance, the possibility of identifying the underlying problems that result in unnecessary high costs can increase.

3.3 Demand & Lead Time Management

Bona (2014) means that planning for variations in demand and the prediction of future demand is an important phase in the resource planning since it supports other planning functions such as production planning and material requirement planning as well. Lack of planning systems that consider the uncertainties in future demand forecasts can expect to result in poorer planning decisions compared to models that account for the uncertainty (Gupta, 2003).

Hypothesis 3: Lead time and demand management strategies can be used to prevent and reduce unnecessary high costs, to increase supply chain performance.

3.4 Preferential Pricing & Lead-Times

Sehgal (2009) point to the importance of involving the organization when analyzing the costs. It is important to group the costs into categories and measure and optimize the costs in order to

be more efficient throughout the supply chain. Akzaheim (2008) means in addition that it is crucial to group costs in order to see which are relevant for the evaluation team.

Hypothesis 8: The weaknesses in supply chain performance result in unnecessary high costs

3.5 Procurement

In recent years, procurement has become an important topic both for academics and practitioners on how to manage customer relationships. Procurement in different ways are beneficial but at the same time companies need to keep in mind that more relationship building is not always better, the important part is to build a strong relationship for the right customers (Reniartz et al., 2004).

Hypothesis 6: By having a special service of procurement for the most important customers, one can create a situation where the firm can gain a key supplier status with some specific customers.

3.6 Logistics

Even if the suppliers have a preferred minimum quantity, companies continuously need to plan for the optimal inventory levels out from the requirements by the supplier but also the size of the warehouse, in order to optimize the costs for that reason is very important to have good people in the area of logistic (Mubiry 2015). However, Relph (2015) states that it is important that logistic to determine both how much needs to be ordered to match supply with demand but also how much extra is needed to cover for the unexpected demand, late deliveries from suppliers or other unexpected events.

Hypothesis 4: When the inventory level is decreasing to the re-order point, a new order will be placed upon the most suitable re-order point, logistic play important role.

3.7 Collaboration

In many industries, companies still use quite simplified inventory management models of collaboration. When managing the service level of different products, it is common to use a categorization of collaboration based on the volume value where the products requiring a high service level are prioritized for the company (Mattsson, 2003). Collaboration is an important and challenging task where costs can be saved if making a detailed differentiation of the products hold in inventory (Boylan, 2008).

Hypothesis 5: By collaborating to classifying the demand of different products the control of stock levels can be improved which in turn improves the service level and reduce costs.

3.8 Vertically Integrated Partnerships

According to Attaran and Attaran (2007) the lack of vertically integrated partnerships has a significant impact on how companies supply chains is performing. One way that has previous been brought up by Ulaga and Eggert (2006) is to differentiate customers based on integrated partnerships.

Hypothesis 7: Competition between companies are getting tougher, due to globalization and frequently changing demands important the firm to maintain integrated partnerships in ways that companies to offers unique product that haven't not seen before.

4. METHODS

4.1 Sample

The study employed a mail survey sent to general managers, functional managers, and frontline managers. By focusing on managers, we will gain insight into how each view their evolving role on supply chains to gain trust and learn more about their impact on creating trust and maintaining it at this time of great competition. A judgmental sample is appropriate because for the investigation of the research questions the researcher depends on access to a specific population which needs to possess a high degree of expertise (Stock and Seliger, 2016). The variables for are taken from previous research of Handfielda and Bechtelb, that is make on 2001. We used the same variables and didn't change anything; the reason was to know the efficient of supply chains in manufacturing companies from Kosovo and Albania.

Respondents returned 112 surveys, of which 11 were unusable. The 101 usable surveys represented a response rate of just under 20%. The sample included manufacturing firms from the automotive, computer, chemical, consumer products, electronics, industrial equipment, pharmaceutical, and steel industries. To investigate the possibility of nonresponse bias in our data, we tested for statistically significant differences in the responses of early and late waves of returned surveys.

Table 1. Correlations, means, and standard deviations

	Correlations							**Mean**	**S.D.**
Product Lifecycle Management	1.00							4.128	0.876
Inventory Management and Control	.0.22	1.00						2.321	1.239
Demand & Lead Time Management	.123*	.134*	1.00					1.787	0.456
Logistics	-120	.123	-234	1.00				3.090	1.779
Collaboration	.122	.678	.237*	.456*	1.00			2.567	1.346
Procurement	.560*	.435*	.094+	-127	.556	1.00		5.444	0.096
Vertically Integrated Partnerships	.322	.890	.120	.567*	.970	.121		6.990	1.598
Preferential Pricing & Lead-Times	.432	.881	.340	.867	.945	.104	1.00	8.999	3.222

* Significant at P < .05.

The last wave of surveys received was considered to be representative of no respondents. Specifically, 10 of the survey items initially used for the analysis were randomly selected, the sample was split into two groups on the basis of early and late survey return times, and t tests were performed on the responses of the two groups. The groups represented the first 67 and last 34 responses of the total 101 responses received. The t tests yielded no statistically significant differences among the 8 survey items tested. These results suggested that nonresponse bias might not be a problem in this study. A cross-industry sample on different type of managers was believed to be appropriate for studying the interorganizational relationships proposed in the hypotheses.

Table 2. Covariance matrix

	Correlations							
Product Lifecycle Management	1.00							
Inventory Management and Control	.0.22	.323						
Demand & Lead Time Management	.123*	.134*	.634					
Logistics	-120	.123	-234	.777				
Collaboration	.122	.678	.237*	.456*	447			
Procurement	.560*	.435*	.094+	-127	.556	546		
Vertically Integrated Partnerships	.322	.890	.120	.567*	.970	.121	256	
Preferential Pricing & Lead-Times	.657	.457	.233	.345	.890	235	567	552

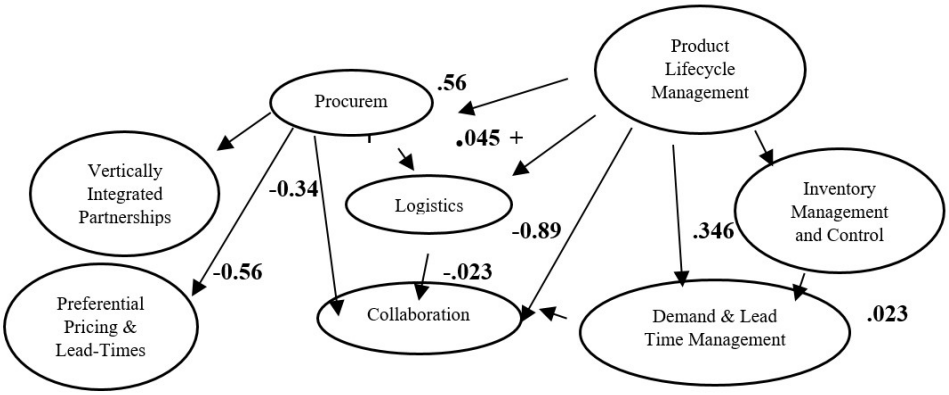
Table 3. Structural equation model results

Sign	**Correlations From**	**To**	**Regression weight**	**Standard regression weight**	**Standard error**	**Critical ratio b**	**R2c**	**Hypothesis supported**
Hypothesis 1 (+)	Product Lifecycle Management	Collaboration	.533	.045	.067	1.345**	.198	yes
Hypothesis 2 (+)	Inventory Management and Control	Logistics	-.023	.032	.025	-0.237	.0321	no
Hypothesis 3 (-)	Demand & Lead Time Management	Logistics	-0.34	.022	.022	-1.980	.081	no
Hypothesis 4 (+)	Logistics	Collaboration	.56	0.78	.231	5.002**	.095	yes
Hypothesis 5 (-)	Collaboration	Procurement	-0.56	0.22	.670	0.235	.562	no
Hypothesis 6 (+)	Procurement	Collaboration	-0.89	0.24	.620	2.678	.422	yes
Hypothesis 7 (+)	Vertically Integrated Partnerships	Collaboration	.346	0.78	.100	2.908**	.120	no
Hypothesis 8 (+)	Preferential Pricing & Lead-Times	Product Lifecycle Management	.321	.023	.022	1.456	.345	yes

c2 = 8.327 (5 df, P=.139, D1=.90, D2=.95, GFI=.91, AGFI=.90). a
n = 97. The squared multiple correlation represents the percentage of variance explained in the dependent construct by all of the variables in the specified model.
b Critical ratio = ratio of regression weight to standard error. Under assumptions of independent observations and multivariate normal distributions, this ratio approximates the standard normal distribution and is used as a test of significance.
c the squared multiple correlation represents the percentage of variance explained in the endogenous variable by all of the corresponding variables.
* Significant at P=.05.
** Significant at P=.01

5. RESULTS

The operationalized hypotheses were tested using a fully specified structural equations model.



*p< .05

*p< .01

X2=8.327(5 d.f.,p=.139Δ1=.87 △ 2=.92 GFI=.88 AGFI=.79)

Figure 2. Model of developing trust and maintaining efficient supply chains standard regression coefficients

Details regarding the statistical analysis, construct validity, and model testing are presented in Appendix A. Fig. 2. Model of long-term interorganizational relationship development standard regression coefficients. Tables 2 and 3 show the correlation coefficients and covariance matrix for the variables, and Table 4 presents the parameter estimates and whether each hypothesis was support/not supported. The key results are summarized in Fig. 2 showing the hypothesized relationships among the variables with the standardized parameter estimates for each relationship. The data represents an adequate fit to the model.

6. DISCUSSION

6.1. Theoretical implications

The empirical evidence supports the view, suggested by Hypothesis 1, the structure of product lifecycle management on supply chain should are linked to further to level of the digital mockup. These relations ultimately lead to greater buyer trust in their supplier. The study suggests that suppliers that dedicate local facilities and equipment to serving the customer are demonstrating their commitment to the relationship, thereby establishing a basis for further communication. This communication takes the form of site visits, joint development of new products, and sharing of sensitive information. Furthermore, the commitment of site-specific assets leads to greater trust on the part of supply chain (supporting Hypothesis 5). Moreover, collaborating to classifying the demand of different products are provided with tangible evidence of the commitment, which establishes the basis for a more harmonious relationship. Despite the strong linkage, our model suggests that such relationships may be overshadowed by supply chain that exist at an industry level. A set of hypotheses (Hypotheses 2 – 4) examined relationships among the level of dependence of logistic on the supplier, the degree of contractual formality, and perceived levels of buyer trust perceived in the relationship. Managers in this study tended to employ a set of formalized control as countermeasures against strong market positions held by powerful suppliers (supporting Hypothesis 4). Such control had

little effect on the level of trust the buyer placed in the supplier (Hypothesis 2 was not supported). The hypothesized linkage between procurement and trust (Hypothesis 6) was not supported. Our results suggest that even when information is shared between parties, face-to-face interactions may not always lead to greater levels of trust. In this regard, without a tangible physical investment in the relationship to supplement information-sharing, the buyer's level of trust in the supplier may not be influenced. Nevertheless, the study's results suggest that powerful suppliers are not as responsive to buyer's demands, and have longer lead times, less reliable delivery performance, and lower levels of schedule responsiveness (Hypothesis 7). While this is not a surprising result, it is somewhat at odds with the previously discussed results (that supply chain -dependence and use of relation between them have no impact on trust). The remaining hypotheses (Hypothesis 8) speculated that weaknesses on supply chain and costs were associated with improved responsiveness. Only the latter of these constructs (costs) had a significant influence on supplier responsiveness.

6.2. Managerial implications

Subsequent informal discussions with general managers, functional managers, and frontline managers elicited an interesting set of possible explanations for some of these results, especially regarding the use trust and maintaining efficient supply chains. During these interviews, several managers stated that skills and processes are necessary to build the suitable role of managers, but trust and efficiency during different stages of the supply chains process is very important. But the evolution of trust may be based not so much on the skills of managers, as on the tangible commitment of assets or a record of satisfactory performance that emerges over time. The results also suggest that managers – trust relationships may develop at two levels: at an industry level and at a cognitive level that reflects the buyer's true assessment of the supplier. These two dimensions may have very different influences on the development of interorganizational relationships. Buyers ultimately put more faith on the supplier's actions, indeed many large corporations, having experienced severe foreign competition in several years, have adopted total quality management practices, which emphasize a customer-oriented approach to management, and advocate customer satisfaction above all else. It is therefore possible that powerful suppliers (in spite of strong market positions) may seek to develop trusting relationships with dependent buyers. The importance of supplier actions in the development of trust is also suggested that firms will avoid taking advantage of a powerful market position in order to maintain a posture of goodwill with their customers. Also, a powerful manager of supply chain does not trust its primary critical supplier, even though it has demonstrated an acceptable level of responsiveness. At the industry level, the supplier does not have a strong position, as many alternative suppliers exist and the commodity or item may not be highly differentiable. Since trust is often a function of sustained reliable performance, the supplier may not have had time to foster a trusting relationship. A final possibility is that the buyer distrusts the supplier's representative for reasons related to differences in cultural alignment. While these explanations do not provide a full picture of the dynamics involved, they do suggest the existence of a multidimensional relationship between parties in supply chain relationships.

6.3 Limitations to the study

Although there is a strong interest about evolving role of managers on developing trust and maintaining efficient supply chains from both academia and practice, the subject is not well researched (Müller, Kiel, Voigt, 2018). Consequently, the manufacturing companies lacks

conceptual frameworks that reflect the impact of managers on process of supply chain is, consequently the role of operating and influential of managers in the manufacturing companies process is unexplored (Ceptureanu, Ceptureanu, 2019). There are a number of limitations that influence the generalizability of this study. First, this study limited only on manufacturing industry and may not be generalizable to other sectors. Second, the sample selection was based on a convenience sample, which is often used for exploratory work rather than a random probability sample. Third, the study is based on an interview. Therefore, there is a possibility of respondents answering questions in a way that is perceived to be more desirable or acceptable than what is actually experienced or believed. Thus, the results of this study should be considered indicative rather than definitive based on these limitations.

6.4 Directions for future research

The focus of the study is narrowed only on manufacturing industries, other studies replicating this research across multiple industries and sector would increase the understanding of the evolving role of managers in supply chains, developing trust and maintain the efficiencies of supply chains. However, given the significance of managers in supply chains, this area should be examined as well with the use of standard questions and selecting samples that are representative of population to address the study limitations. There is a further need for researchers to investigate on the challenges and barriers in adoption and use of managers in supply chains and how these challenges can impact the innovation in supply chains to achieve competitive advantage. This will also help in identifying the relationship among the managers and efficiencies of supply chains and the importance of competitive advantage.

7. CONCLUSIONS

Results of our empirical analysis suggest that the skills and processes necessary, would contribute to the understanding about the capabilities of managers on supply chains and their impact on developing and maintaining trust. Managers who are serious about improving supply chain responsiveness should work towards building greater levels of trust with key-input suppliers, and explore opportunities for colocation and information sharing on a regular basis. At the industry level, intervening forces such as skills and trust are closely related, yet appear to have little bearing on skills- trust at the interpersonal and cognitive level. Such a perspective is suggested by the result that the level of perceived buyer-dependence on a manager was not associated with the level of trust in that supplier. In addition, when suppliers were willing to make site-specific asset commitments in the form of capacity and equipment, higher levels of trust were developed. The implication is important; even in cases when managers do not have a large degree of control over a supplier, working with them to improve levels of trust may be helpful in improving supply chain responsiveness. As organizations seek to identify means of managing these new forms of relationships, researchers must develop new models and methods to identify which suppliers to approach in relationship development, the methods for implementing and sustaining such relationships, and the appropriate processes for dealing with conflicts within such relationships when they arise. Future studies should also consider the new elements developed in this study: product lifecycle management, inventory management and control, demand & lead time management, logistics, collaboration, procurement, vertically integrated partnerships.

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Theory to Practice as a Cognitive, Educational and Social Challenge

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INNOVATIVE ACTIVITIES OF SMALL AND MEDIUM ENTERPRISE IN THE AREA OF TOURISM TO MEET THE CHANGES IN THE MARKET

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Abstract

During the years of operation of small and medium enterprises in the area of tourism, the management was focused on attracting a quality workforce to improve business efficiency. The main problem faced by the business entities was the insufficient qualification of the employed workforce. On the other hand, there was a foreign quantitative alignment of the workforce with the volume of business. Workforce fluctuation is another reason that is negatively affected by SMEs in the area of tourism. The high degree of labor turnover leaves negative consequences on business, in the sense that every newly employed worker needs time to get used to the new job he performs, which further slows down the normal functioning of the workforce. The identified problem of the degree of qualification of the workforce of the SME in the area of tourism became bigger with the investment in new and modern assets. The strategic activities carried out by the management of the SME in the area of tourism are adopted to perform business and operating conditions effectively, but it is necessary to constantly make them. This paper presents a possible solution for innovative activities of SMEs in the area of tourism to meet the changes in the market.

Key words: small and medium enterprise, area of tourism, quality workforce, qualification of the employed, workforce fluctuation, the strategic activities.

1. INTRODUCTION

The strategy, especially in the field of tourism, can include a predetermined direction by which short-term fluctuations can be separated; qualitative plans related to the quality and composition of the business; a long-term plan that sets directions and provides a basis for short-term plans. means for integrating functional activities, setting priorities, and weighing risks; feasibility accounts in relation to the use of funds and ways to achieve superiority over competitors; plans that must provide communication and motivation, but also the integration of functional activities. The function of the strategy is to define the way to establish the relationship between the company and its environment, as well as to specify the types of businesses that should be conducted within the company. The comprehensive strategy of each company, according to many experts, includes managerial decisions related to the following five components: 1)

consumer (tourism) mix; 2) production mix (tourist product); 3) geographical boundaries of the market to be served: 4) competing markets; and 5) objectives (criteria) for implementation. The aspects of the strategy outlined may help to define the nature of the company's relationship with its environment, but do not define how these relationships will be established. It is also evident that goals are an inevitable component of any strategy. Providing the appropriate type and volume of labor needed to conduct the business of the company is possible by hiring workers. Worker employed in this way enter into the certain interrelationships representing the organized social groups that are called the work collective. Therefore, the role of the work strengths in business operations is studied in the context of composition and size. The type of activity performed by a certain company on the basis of the social division of labor, as well as its size and scope of the business, requires an appropriate number and qualification structure of workers. This structure of the working collective is conditioned by how objective business needs of the company, as well as the influence of organizational factors that are manifested through the degree of managerial skill of management. In this sense, the optimal (1) and the actual (2) composition are distinguished working collective. (1) The optimal composition of the work collective is characterized by the adequacy business needs of the company. This implies that the work collective is its own number and qualification structure, capable of timely execution the planned tasks of the company, with the least possible expenditure of labor and means of production. The division of labor distributed all jobs in the company to individuals and groups of workers in the workplace. Workers in the workplace are in charge of performing certain tasks within the company's business program. Each member of the work collective needs to have appropriate work abilities in order to perform the specific tasks in a timely and successful manner. That means the worker has to be qualified to perform the tasks assigned to the job where the appropriate mental and physical abilities that make up his work are required strength. On the other hand, it is necessary to perform certain tasks provide an adequate number of workers, which implies the quantitative compliance workforce with the volume of business of the company. Qualitative harmonization of the composition of the work collective implies the employment of workers of appropriate types of qualifications. That means workers have to be trained for those professions that are required in their jobs. Also, a very important item is the time it takes for new workers to do the job as efficiently as possible, so in most cases, it is necessary to count on the workers getting used to the new job they are doing. In doing so, the level of expertise of the worker should correspond to the complexity of the job should perform. Quantitative harmonization of the composition of the working collective implies the employment of the number of workers that corresponds to the volume of business of the company. That's why it is necessary to organize the business of the company so that the number of workers is harmonized with the scope of work that the company, in a given period, must perform. (2) The actual composition of the working collective shall be established in the case when the company employs workers of inadequate qualifications, or when it hires employment of a larger number of workers than required by the scope of business. In such In some cases, there is an increased consumption of labor per unit of product or service, then to deviations from the planned quality, as well as to the irrational use of tools and materials. This deviation of the real from the optimal composition of the work collective arises as a consequence of omissions in activities enterprise management. The composition of the work collective changes with the development of the company, which implies both an increase in the volume of business and the introduction of more modern techniques and technologies. In such conditions, a part of the work of the workers has replaced operation of new, more efficient machines, as well as the

application of new technologies in business companies. This can be an activity of small and medium enterprises that will enable a positive change aimed at improving the position of enterprises in the market.

2. MATERIALS AND METHODS

By studying the organizational behavior of individuals, working groups, and business systems as a whole, the influence of this phenomenon on the adoption process can be noticed decision on current business, as well as on the growth and development of the company. Namely, a certain evaluation of phenomena and procedures, then attitudes towards individuals solutions or tasks, the way of perceiving and knowing the environment, individual characteristics and personal characteristics, and the learning process, as elements of organizational behaviors of individuals, as well as the manner of formation and organizational behavior of workers groups and teams, and the organizational structure of the company as a whole, significantly determine the process of making strategic and operational management decisions. When it comes to the process of deciding on capital investment in the growth and development of the company, the management is instructed to make strategic decisions, whose successful implementation is conditioned by organizational behavior as individuals, as well as working groups and teams, as well as the business system as a whole. In addition, organizational behavior is particularly important in determining the success of the implementation of strategic decisions on the growth and development of enterprises, given the comprehensiveness and complexity of such activities. The strategy as a segment of the management subsystem includes all important planning decisions, which relate both to the harmonization of the company's operations with the conditions in the environment, and to the way of using its internal resources. Therefore, the whole business process must be considered in the planning process, so that all planning decisions, especially those related to the company's strategy, are based on reliable indicators of its internal capabilities and opportunities that prevail in the environment. The firm has to find its place in the general order of things in order to be successful. From such a formulation of the conditions for the success of the company arises the basic task of strategic management to find a suitable place for their company in the market and overall social environment. In this way, the company will be able to maintain and improve its competition by efficiently using the available internal resources. When choosing the appropriate strategy, it is necessary to strive to ensure the competitive advantage of the company environment. This advantage can be achieved by applying certain procedures that improve the position of the company regarding to competitors. Each of these procedures is necessary to study in more detail, due to their specificity. It will help in successfully selecting the appropriate company strategy. If we start from the generally accepted view that the term strategy includes procedures in the behavior of the company aimed at increasing the power of the company regarding the competitive power, this way of defining the goals of the company must be distinguished from procedures aimed at improving internal performance, such as increasing profitability. more efficient organization, more efficient business management, improved staff training, etc. Namely, this is about distinguishing the relative and absolute strength of the company. In other words, the internal weaknesses manifested in the insufficient efficiency of the use of internal resources of the company can be endured, at least for a short time. On the other hand, the deterioration of the position of the company according to the competition may jeopardize the survival of the

company. It can be shown through the analysis of the environment which includes namely the following activities: the review of the impact of the environment; assessment of the nature of the environment, structural analysis of the basic components of the environment, identification of the competitive position, modification of the main opportunities and dangers and strategic position. In addition to the above, it is necessary to point out the fact that the process of formulating a strategy requires a special way of thinking. "When someone wants to reach or maintain a position of relative superiority over a dangerous competitor, the brain works differently than when the goal is to make internal improvements over an absolute model. It's the same difference as going to war and on a diet. "The stated position on the importance of strategy, based on the study of experiences from running a company in one of the most successful economies in the world, indicates that strategic management should strive not for successful business in absolute terms, but for successful business with competitors. Therefore, a good strategy is considered to be the one by which the company can gain a significant advantage over the competition, and with affordable costs engaged financial capital. Strategic management can provide an advantage over competitors in several ways. In that sense, according to (Stoner et al., 2000), it is possible to single out four ways to strengthen the company's position concerning the competitors. The first way is to identify the key success factors in a given business, and then injecting concentrated funds into business areas where strategic management sees opportunities to gain the most significant advantages over its competitors. With such an approach, a company can achieve significant competitive prestige, even though it has no more business assets than the competition in the same business if it is efficient enough in transferring available business resources to one key point. Therefore, it is necessary that the company does not redistribute funds in the same way as its competitors, because there will be no change in its relative power. Another way to strengthen the company's position regarding to competitors is called a business strategy based on relative superiority. This implies gaining a relative advantage by using some differences in competition conditions between a given company and its rivals, which can be achieved: either by using technology and profitability of the sales network and other internal rationalizations for those products that are in direct competition with rival companies; either by using any other difference in the structure of available funds between a given company and its competitors. The third way comes down to choosing an unusual strategy, which aims to disrupt the key success factors on which the competitor has built its advantage. This means first attacking the accepted assumptions that determine the way of doing business in a given activity, considering the possibility of changing the rules of the game. In addition, it can disrupt the status quo gaining a new competitive advantage. The fourth way to gain a competitive advantage is to use innovation. This can be done either by opening new markets or by developing new products. Such strategic activities allow the market to be exploited by strong measures in areas not even affected by competition. That is why this way is called a business strategy based on strategic degrees of freedom. Application of the above four ways of defining the strategy, within the primary function of management - planning - aims to give the company a competitive advantage. In this way, the company is able to gain a relative advantage by applying organizational measures that competitors can hardly follow, as well as to further increase this advantage. Therefore, strategic management should consider and elaborate such concepts, focusing on the thought process and the types of conclusions and programs that should emerge from it. Management in the process of formulating the strategy must take into account the basic mission of the company in a given system of management as well as the criteria on the basis of which its realization is

evaluated. At the same time, companies in transition countries, due to a number of their characteristics and the peculiarities of the environment in which they operate, have difficulty in planning and achieving their growth and development. its functioning is extremely important for the formulation of growth and development strategy. As the main environmental factors influencing the formation of growth and development strategy, they manifest themselves as socio-political conditions, legal regulations, economic development, competition, ecology, and technology. All these interdependencies are of strategic importance for the long-term development of a tourism company. Therefore, it must constantly consider and anticipate numerous internal and external changes that have a decisive impact on its future development. This is especially true if the company decides to expand the scope of work and geographical area of activity because then the need for a strategic approach to managing the entire business of a tourist company is emphasized. . This means that the tourist company should evaluate its own and destination strategic approach in the development and avoid isolation from the appropriate actions of other companies and participants in the formation of the overall offer in the donor area.

3. RESULTS AND DISCUSSIONS

In order to relax the work activities of small and medium enterprises in the field of tourism, a very complex research area has been explored, which requires an interdisciplinary approach, in which different scientific and practical disciplines (economics, statistics, mathematics, psychology, sociology) are intertwined. study and application of management in tourism. From this point of view, management and decision-making is the key to leadership. The aim of this paper is to overcome the differences between the qualification of the workforce and the fluctuation of the workforce in companies engaged in tourism activities. It should be emphasized that the formulations of strategies to be applied for the management of tourism companies are given, so it can be concluded that there is no single formula that ensures success, but each company must engage its market position and choose a specific strategy.

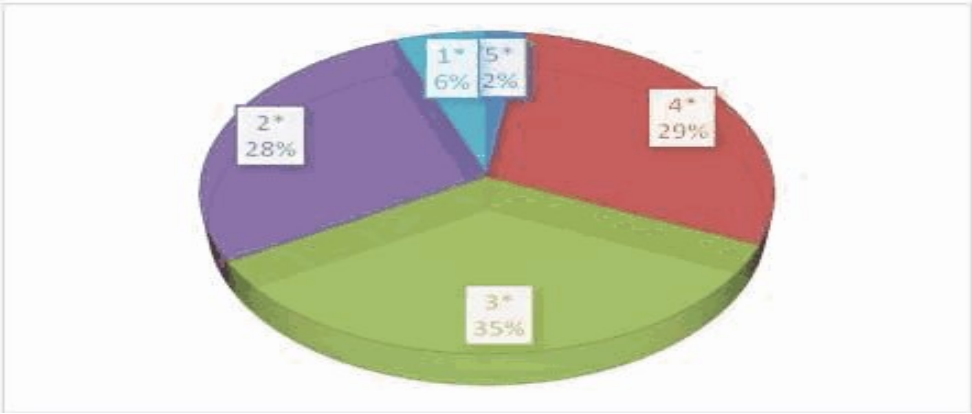

Figure 1. In 2015, among hotel accommodation facilities, the most represented were 3 * hotels (34.8%), 4* (29.3%), followed by 2 * (27.7%), 1 * (5), 8%) and 5 * hotels 2.4%).

Source: Ministry of Trade, Tourism and Telecommunications of the Republic of Serbia, December 2015

An important indicator of a successful strategy for growth and development in tourism can serve as an example we have in a big city such as Belgrade, where the qualification of workers working in the tourism industry affects the success of the entire tourism segment. It should be noted that such a positive trend of growth and development of the tourist segment is not valid in other parts of Serbia at the same time, due to the less attractive location as well as due to the lower qualification of the workforce.

The hotel market in Belgrade is the leader in the Republic of Serbia in terms of performance, given that the largest number of accommodation facilities is concentrated in the city of Belgrade, which currently operates 86 hotels, of which 51 are hotels, 34 garni hotels, and one apart hotel. Of the 21 newly opened facilities that were first categorized in 2015 in the Republic of Serbia, eight are located in Belgrade. On the territory of the city of Belgrade, there is every fourth categorized hotel (86), every third accommodation unit (6,331), and almost every third bed (9,193). Three hotels specialize in a business hotel ("Prague", "Radisson Blu Old Mill" and "In Hotel"), and one for a congress hotel (hotel "M"). The three hotels have five stars ("Hyatt Regency Belgrade", "Square Nine" and "Metropol Palace"). Given that this market relies on the segment of foreign business guests, which is characterized by a continuous growth trend, estimates of further performance of the hotel market in the capital are positive, which shows a positive growth and development trend, as well as continuous improvement of labor quality.

4. CONCLUSIONS

Improving the business position of small and medium enterprises operating in different market areas is imperative in today's market conditions. In addition to many problems that occur in the current business, there is a problem of labor turnover or insufficient skills of the workforce, especially in companies operating in the field of tourism. For this reason, tourism companies should give priority to growth and development strategies. The growth and development of the company are conditioned by certain motives, which lead to appropriate management decisions of a strategic nature. In that sense, the basic motive for the growth and development of the company is the aspiration to improve the quality of the economy and improve the market position. These motives are mutually conditioned because the improvement of the quality of the economy can be achieved only if the company meets the requirements of consumers, expressed in the form of market demand. On the other hand, the improvement of the company's position on the market is conditioned by its business ability, which is manifested in the form of the quality of the economy. The main problem faced by business entities is the insufficient qualification of the employed workforce on the one hand and on the other hand the foreign quantitative harmonization of the workforce with the volume of business. The fluctuation of the workforce (transition from one job to another) is also negative for the business. Relaxation of these negatives that affect business, is done by improving the qualitative structure of the workforce, as well as improving the existing workforce that can always give its maximum, given the experience it has. Constant changes in the market and overall social environment condition the necessity of growth and development of small and medium enterprises operating in the tourism zone. Such conditioned growth and development of the company represents its logical response to the challenges from the environment and a condition for maintaining and improving the acquired position in relation to the competition. The company's effort to maintain

and improve its position in the market is conditioned by the active influence on the factors operating from the environment, as well as the rational use of available resources. In that sense, the management of the company must, with its business policy and development strategy, react to the challenges and opportunities from the environment, as well as to counter the threats lurking from the market. It follows from the above that the company will be at a disadvantage in the market if it does not decide to grow and develop its business potential, which means taking management decisions and the use of strategic activities. The strategy must supports innovation, changes, continuous improvement, strengthening the overall value system and global approach. Competitive advantages that have once been achieved, acquired, and verified as international positions in the global business system are maintained and promoted through the constant search for finding new or better ways of doing business or constantly changing the behavior of a firm as part of a general, strategic concept of action.

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MODERN APPROACHES AND PRACTICES IN PERFORMANCE MANAGEMENT WITH A FOCUS ON THE KEY ROLE OF THE LEADER

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Abstract

In today's market economy and environmental dynamics, the need for high productivity, quality and speed of execution, give rise to a remarkable number of tools and techniques for management, reengineering, change management. However, this leads to more and more wrong strategies, lack of clarity, lack of communication between leaders and teams, poor quality of the results. Very often this is due to incorrect approaches and performance management; the ambiguity of what is expected of employees and teams in the performance of their duties; lack of competence on the part of the team leaders; lack of innovative approaches and practices for performance and efficiency management, etc. In this context, the importance of performance management for organizations today is extremely high, and at the same time, the role of the leader - his / her qualities, competencies, effectiveness - deserves more attention. Leaders have particular characteristics and are directly related to performance management. It is in them that the competencies of leaders as leading figures in the process of implementation and its management are rooted. Each organization is guided by its implementation and presentation, and leaders focus on achieving results. They motivate, inspire and train members of the organization to achieve these lofty goals. The main purpose of this article is to propose and analyze a more up-to-date toolkit to improve performance management practices, focusing on the competencies and qualities of leaders in organizations.

Keywords: management, performance, leaders, competencies, approaches.

1. INTRODUCTION

Organizations today are looking for leaders who can form teams, motivate individual participants and groups of people, create a vision and help these teams achieve a high level of performance, performance and results. Research reveals that gaps in this area may be caused by a lack of proper understanding and the importance given to the phenomenon of "leadership" in general. Many theories of leadership give the world analysis and research of leadership traits, styles, situations, incl. contingencies, transformations, psychodynamics and competencies. Finding and applying the right approaches to improve and identify leadership competencies, especially in the context of managing performance and employee performance, is understood

as part of good management practices of successful companies. The main goal of this article is to study and systematize key leadership competencies in the context of performance management, offering a more modern toolkit for improving performance management practices with a focus on the competencies and qualities of leaders.

In presenting the nature of implementation, it is important to identify and define some key concepts, the use of which underlies this article. Examining the theoretical issues of the issue reveals the use of two terms related to performance management. This is probably due to the different translation of the word "performance". In this regard, and given the constant need to focus on performance or presentation in the article, both terms are used as valid and correct, i.e. for development purposes, both terms (performance appraisal, performance appraisal) are considered relevant and unambiguous.

There are various opinions and findings in the literature on performance management. According to some authors, the identification, measurement and development of results that show individuals or teams is part of an ongoing process related to performance management, thus achieving performance with the strategic goals of the organization (Aguinis,2005, p. 2). According to others, when "employees fail to cope with the tasks at their jobs, part of the organization also fails" (Cappelli, 2008, p. 196). Managing performance appraisal as a key activity of overall human resource management aims to eliminate or at least reduce this possibility. Performance management is the key process through which one works. This is how organizations communicate within themselves about the expectations they want to achieve and stimulate behavior to achieve important goals. It is also about how organizations define their inefficient production plans and development programs or other staff actions.

Performance management began its development based on employee merit assessments in the early twentieth century. It is greatly influenced by the progress and achievements in the research and discoveries of various authors in connection with the overall development of management science, followed by the evaluation of the implementation and management of sites. Today, the term "performance management" generally describes the process of planning employee performance.

In the context of performance management, the leader has a key role to play. In modern specialized literature, the topic of leadership attracts the attention of researchers in various perspectives, incl. and as a significant factor in increasing the performance of people in the organization (Burke,2006, pp. 14-25). It emphasizes that the importance of leadership competencies for successful performance management must be at the heart of formulating and creating leadership programs for development and improvement. Performance management is a way to achieve better results by providing funds for the good performance of employees in organizations in a coherent framework of planned goals, standards and requirements for leadership competence. This framework includes developing a shared understanding of what needs to be achieved and how to achieve it. The aim is to develop people's capacity to meet and exceed expectation while reaching their full potential for the benefit of themselves and the organization. Another goal is to clarify how individuals are expected to contribute to the achievement of the organization's goals - by aligning the individual goals with the strategic goals of the organization. Performance management provides a basis for self-development and self-realization, but it is also important to ensure that the support and guidance that people need to develop and improve is readily available. Performance management can play an important

role in terms of rewarding employees by providing them with timely communication, positive feedback and recognition of their achievements.

2.MATERIALS AND METHODS

In order to reach its results and findings on a more modern toolkit for improving performance management practices with a focus on the competencies and qualities of leaders, this article reviews the observations and research of scientists and authors in the field aimed at the most - already in the direction of highlighting and analyzing a number of conclusions that outline a major problem - the evaluation of staff performance in organizations as a key activity of managers, managers and leaders is often not applied or is applied with many deficits. For this purpose, the methods of theoretical and scientific analysis, comparative analysis, systematic analysis are used - through observations, collection and summarization of information, as well as review, analysis and formation of conclusions of publications on the topic.

Today, many contemporary authors are thoroughly exploring the role of performance management in the effective overall management of organizations. Studies indicate that the key role of implementation is to promote a high work culture so that individuals and teams can take responsibility for improving business processes, as well as develop skills and contributions at all levels in the organization. At the same time, a number of conclusions stand out and are analyzed, which outline the main problem - managing the performance of people in organizations as a key activity of the leader is often not applied or is applied with many deficits (Abduli, 2013, p. 228).

The authors also state that the business goals of the organization, unfortunately, are not priority goals of the evaluation of the implementation and its management and in general - of the team leaders. Encouraging leaders and professionals among existing employees within the company in terms of the importance and role of performance management will save a lot of resources, resources and money (Gardner, Wolf, McGranahan, 2011, p. 2). Therefore, organizations must work to establish this reality in their business practice with emphasis on the importance of leaders in the process. To summarize this principle, researchers conclude that business leaders are the ones who determine what would be a success for their organization and their task is to provide an appropriate context for performance appraisal to analyze the situation in order to give appropriate guidance and recommendations to employees.

Another 2015 study examines the role of performance management in creating and maintaining high levels of performance in organizations (Waal, Van der Heijden, 2015, pp. 5-7). It identifies serious gaps for leaders in (1) performance management; (2) the quality of this management; (3) the key competencies of leaders; (4) leadership style and organizational culture. A serious problem is also identified here regarding the provision of feedback by leaders to their teams, and among the most important reasons for this are: (1) the lack of competencies for the implementation of the performance management process; (2) lack of knowledge to provide feedback; (3) lack of accountability for the interconnectedness and significance of the interaction of the performance management and feedback processes.

Although some research does not focus on business organizations, it deserves attention because it proves another interesting problem related to performance management with an emphasis on the fact that it is not applied as a key activity of the leader (Korir, Rotich, Bengat, 2015, pp. 42-

43). Indeed, the need for productivity, quality and speed generate a remarkable number of tools and techniques for management, overall management, benchmarking, reengineering, change management. However, this also leads to more and more wrong strategies, lack of clarity, lack of communication between managers and teams, which leads to deteriorating quality of public services provided in general. Such research proves that this is due to several main problems (Korir, Rotich, Bengat, 2015, pp. 42-43): (1) wrong approach and strategies to performance management; (2) the presence of too many managers who have multiple interests; (3) ambiguity of what exactly is expected of employees and teams in the performance of their duties; (4) lack of competencies on the part of team leaders; (5) lack of knowledge and skills to adapt to the changes required by the environment; (6) lack of innovative approaches and practices by leaders to manage performance and effectiveness; (7) lack of overall focus on performance management issues through the prism of public sector organizations and their contribution to the service delivery process.

Studies examining the impact of performance management on organizational performance show that the influence of leaders on performance management is not understood at all as a process (Neely, 2005, p. 1269). According to respondents (employees and teams of surveyed organizations), leaders are considered poorly motivated as managers who are unable to "convey" the importance of evaluating the performance of their subordinates, as well as quite incompetent in terms of information and feedback to their teams.

The reasons for this are traditionally structured in two main groups, the first of which is related to the competencies and behavior of the leader (motivation, lack of time, lack of competencies, lack of feedback, etc.), and the second group covers various factors, characterizing the organizational environment (organizational culture that does not encourage performance appraisal activities; relatively low support of senior management to performance appraisal activities, lack of support for others, etc.).

The review above shows that today's leaders need knowledge and skills for performance management activities and especially - specific methodological materials to support the process. To this end, the article offers a toolkit to improve performance management practices by focusing on the competencies and qualities of leaders in organizations - key competencies that leaders can use and emphasize in different situations and stages of their activities. They are the focus of modern innovative approaches to improve leadership competencies in performance management.

3. RESULTS AND DISCUSSIONS

Leadership competencies for successful management of people's performance in work teams cover a wide range of knowledge, skills, attitudes and behaviors, after which for the purposes of this article stand out competencies for successful implementation of activities for feedback and recognition of achievements and for communication and promotion of teamwork.

Leaders' responsibilities include providing feedback in a constructive, candid, and timely context. For the feedback process to work well, it must be a two-way communication process and shared responsibility of leaders and employees. This requires training on both sides - on their roles and responsibilities in the performance management feedback process. Employees'

responsibilities include seeking feedback to ensure that they regularly understand how they are performing and whether they are responding well to the feedback they receive.

Conducting effective and ongoing communication and conversations between leaders and employees is among the most important determinants of whether a task is accomplished or not. This creates practice and experience and derives maximum benefit from training and employee development prospects. The greatest benefit and effect of feedback is when it is provided in close proximity to the event. Also, if the feedback is given only during the discussion meetings on an annual basis when reviewing the implementation, it cannot be useful for the employees if it is provided months after something has happened. In addition, if not given in time, there is no way to improve employee performance on its own - it needs an adequate understanding of its work just in time, as well as relevant guidelines and recommendations to avoid mistakes in their work and improve of his presentation.

Untimely feedback and maintaining the status quo in the context of poor performance of certain tasks for a long period of time impairs the overall performance of the work and impairs the productivity of teams, i.e. this automatically leads to a serious risk of non-fulfillment of the goals of the organizations as a whole. This problem is often related to the inability of leaders to provide feedback, as a result it is unrealistic and does not lead to improved performance and performance. Given these factors, expert advice and training of people (employees and leaders) on providing feedback, which can be provided by a member of the Human Resources Department or by an external consultant, is essential. The basis of the so-called 360-degree feedback, which measures the behavior of people from different points of view against a list of competencies, is not really a complex or multicomponent process. On the contrary, in reality, employees in an organization want an assessment mainly in terms of how well they perform their tasks and how their performance is assessed.

The approaches and competence model for the correct provision of feedback can be developed within the organization or the competencies of the employees provided in the form of a questionnaire. A typical questionnaire can cover aspects of performance such as leadership, teamwork, communication, organizational skills, determination, aspiration and adaptability. Questionnaires can be processed using software developed in the organization or provided by external consultants.

Organizations use a variety of programs and approaches to recognize achievements and reward employees. In addition, these approaches must be flexible and take into account the dynamic nature of the organization's initiatives and what employees themselves consider to be adequate remuneration for their work. The effective system for recognition of achievements and remuneration is smooth and must be subject to constant change. However, such an approach depends very much on the skills of the leader, who can help determine the appropriate combination of monetary and non-monetary rewards. Leaders who are able to create a system for recognition of achievements that is profitable for the company, but also for employees, will undoubtedly help to promote change, success in the organization and effectively achieve its goals.

Today, there are programs and approaches to recognition and reward that encourage creativity and innovation, leadership, teamwork and collaboration, commitment and loyalty; encourage long-term solutions and employees themselves to constantly learn and apply new skills.

Remuneration programs can encourage employees to adopt and apply new approaches with the confidence that competence equals compensation. Future leaders must "experience" this process, and their key competencies must include skills in applying new methods and procedures for recognition of achievements and remuneration as part of the overall process of improving their management skills of performance.

Effective communication enables leaders to create trust, joint work atmosphere, motivate employees, to positively influence their engagement. Communication involves providing feedback to employees that is both positive and constructive. Employees are not able to make informed decisions about their performance and performance without communication and feedback. Lack of communication leads to errors and reduced implementation efficiency. Communication is a valuable tool for inspiring employees, especially when the atmosphere in the organization is that of change. Communication is what reduces employees' potential resistance to change.

Leaders who have the ability to communicate, listen and create clarity in times of change are much more likely to achieve long-term success. Effective communication skills are crucial for all leaders and they should also be part of the overall process of improving their performance management skills. In connection with this, in recent years there has been a growing interest in coaching skills as an opportunity to increase the effectiveness of the leader's communications with both individual employees and the team as a whole.

Leadership training enables employees to work more effectively, and by changing leaders' methods, employees themselves also change their approach to the tasks assigned to them. Coaching motivates others to be the best, enables people to think outside the box, enables employees to "see" ahead and encourages teamwork and collaboration while maximizing results and achieving the overall goals of organizations. Coaching and training are those modern approaches that create partnerships between leaders and employees. The collegial partnership must be built on two-way communication, which is often non-standard, professional or even personal. This type of relationship allows leaders to learn what motivates each employee, and the methods and tools themselves allow leaders to "lead" even more effectively and constantly inspire even during change.

Leaders who are able to lead and structure working groups, promote teams and processes undoubtedly enjoy efficiency and organizational achievement. The success of teamwork depends on several factors, incl. boundaries between team leaders and team members. Leaders who combine interpersonal skills with group processes encourage teamwork, and employee ideas and participation have a long-term impact on the organization's long-term perspective and goals. Leadership determines the level of performance and achievements of the team and its effectiveness. Successful team leadership depends on the professional knowledge of team leaders; the ability to encourage team members and their participation in decision-making; from trust and innovation.

The briefly presented leadership competencies are not an exhaustive list, but are intended to serve as highlights in leadership development programs and successful performance management in organizations.

4. CONCLUSIONS

From the review and analysis of the key leadership competencies, it can be seen that the main role in terms of managing the performance and directing employees in the desired direction of their work have the leaders - they are the ones who know their responsibilities; monitor the manner of fulfillment of the tasks assigned to them (or their non-fulfillment); reveal the reasons why discrepancies between desires and reality in the work occur and give directions for changes, thus every employee in the organization has the opportunity for much more successful performance of their tasks and a higher contribution to achieving the goals of the organization.

In fact, leadership is often seen as the single most critical factor for the success or failure of organizations. Leadership skills play an important role in how change is facilitated. Lack of qualified and competent leadership is one of the most common barriers to successful change. Such barriers include the inability to understand effective change and its implementation techniques, the lack of leadership recognition or rewards for those who make the change, and the inability to motivate other people to change. However, few are able to sustain successful change efforts (Gilley, Dixon, Gilley, 2008, p. 159). Humans are instinctively resistant to change, but it is simply human nature. Change is even more complex than the wide range of innovations and people's different ways of responding to the new environment. Obviously, leaders are critical to change within any company.

Today, businesses need to consider the current need to move to an emerging leadership model and approach in order to survive in an increasingly competitive global community. Organizations need to find ways to develop leaders who are able to retain and motivate their employees. Although research points to some of the problems of companies in terms of effective approaches to improving leaders in the context of change, the development of leadership skills must take into account any information and research that organizations themselves need to create a unique and innovative for its environment a model of leadership and competencies.

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MANAGING INTERNATIONAL COMPETITIVENESS TOWARDS ECONOMIC PROSPERITY WITHIN EU INTEGRATION FRAMEWORK

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Abstract

Enhancing the competitiveness in the era of globalization has become a priority in the agenda of the scientific and policy creation debate for all contemporary economies. The role of a country's competitiveness has been addressed by many scholars aiming to assess the extent to which this concept is associated with economic prosperity matters such as social welfare and attracting foreign direct investments. Along with this debate, there has been a growing interest in understanding the linkages between the competitive forces and the gap in economic progress across the EU members being one of the main concern drivers within the EU. Fitting this gap and achieving greater convergence among the EU countries has been one of the critical goals in shaping the European structural policies reforms. However, following the empirical findings, there has been noticed a little consensus on what are the main sources of a country's economic progress being addressed through the prism of national competitiveness, particularly if being studied in the context of an EU integration. In this context, the study aims to assess the economic performance of the first and last joined EU countries in relation to its linkages with a country's international competitiveness, looking into an Innovation and business sophistication factors' relative importance and contribution to the economic development for the observed period (2008-2017). The findings of the study have brought a better understanding of the contribution of more advanced competitiveness factors and which countries' advancement and competitiveness is grounded on research and innovation.

Key words: economic performance, international competitiveness, factors of competitiveness, research & development, innovation, EU countries.

1. INTRODUCTION

Over the last decades, the globalization has become the overwhelming trend in the world economy. Its multidimensional implications embodied in specialization and diversification, economies of scale, and dynamic international flow of goods, services and production factors, along with a technological process, and increasing concerns for a risk reduction while maximizing gains, have increased the complexity of contemporaneous economies and redefined the role of international competitiveness in assessing economic performance of countries

worldwide (Kharlamova, 2013). Under such a scenario, being characterized with an intensified competition among the economic subjects at all levels (a firm, regional and national level), the foundation of the economic growth and long-term development of a country has become necessarily conditioned on the country's ability to become an important player in the international economic relations and take a meaningful place in the global market.

The assessment of economic progress of the countries over the world through the prism of national competitiveness has been controversial, giving a birth to a number of views it has been explained with. While some, being pioneers of so-called economic school, even deny the Porter's notion of a country competitiveness having a belief that countries do not compete like enterprises internationally (Krugman, 1994; Kohler, 2006), others, belonging to so called management school, support such a concept taking a variety of approaches to define it. In this sense, a number of definitions equate the national competitiveness with the country's productivity and its growth. A different line of studies measures it through the lances of market share and external balances. Another group of scholars emphasize the qualitative aspect of this concept, analyzing it from the perspective of gaining or losing a technological advantage in particular industries. A broader concept of national competitiveness includes the evaluation of economic, social and environmental achievements of a country given that having an increase in production and exports is limited in the case the costs of social and environmental policy goals achievement are found. Some explanations of the concept go even further including the assessment of health, equity, education, leisure and other qualitative factors when measuring the competitiveness (Aiginger and Landesmann, 2002).

Aiming to explain why some countries are more successful in particular industries than the others, Porter (1990) identified four classes of a country's attributes, called a "national diamond" that are employed to determine a national competitive advantage: factor conditions, demand conditions, firm strategy, structure and rivalry, related and support industries. In addition, Porter (1990) adds two additional factors, government policy and exogenous shocks to complement the notion of national competitiveness. Factor conditions (human resources, physical resources, knowledge resources, capital resources and infrastructure), being further classified into category of fundamental and advanced according to the investment requirements and possibilities for upgrading have been identified as core of a country's competitive advantage. Demand conditions, as seen by Porter (1990), do play an important role in determining a national competitiveness, where the demand differences, rather than similarities, are used to explain the international competitiveness of countries. According to Porter (1990), the domestic demand structure is the one that creates the manner in which firms perceive and satisfy the customers' needs. Accordingly, the firms have an intention to continually innovate and improve their competitive position in order to respond to high requirements in terms of product and service features and quality. Different demand conditions in different countries will lead to differences in international competitiveness across the countries. The firm's strategy and structure, as explained by Porter (1990), strongly depend on the environment within the national market. Given that there are significant differences in the business sectors across different countries, affecting the manner in which firms compete, this implies the differences in their competitive advantage. Therefore, according to Porter (1990), it is the country's competitiveness that determines the international competitive advantage of the firms, thus confirming the theory that countries, as firms, compete internationally. Rivalry, that imposes

firms to be more cost efficient, improve quality and enforce innovations, has been identified as a vital factor of firms' competitive advantage in a country (Smit, 2010).

The competitiveness at the country level has been addressed by many scholars aiming to assess the extent to which this concept is associated with social welfare and economic progress of a country. In this context, the authors also have tried to evaluate the relative importance of different factors and indicators of such a competitiveness looking into the differences between the countries' level of technological advancement and innovation capacity as an indicator of the economy's development stage. Having an understanding of the gap on the technology and innovation status between the countries enables an understanding on which countries are those whose economy is based on efficiency and what are those whose advancement and competitiveness is based on innovation (Tudose and Rusu, 2015).

According to the Global Competitiveness Ranking Reports by Schwab (2019), a widely accepted measure used to assess the cross-country competitiveness is Global Competitiveness Index (GCI). A methodology applied in these reports is grounded on assessing different areas – reflected in 12 pillars, (figure 1) of a country's performance. The 12 pillars are distributed to 3 subindexes, each reflecting one source of the country's competitiveness (factors' driven, efficiency driven, innovation driven).

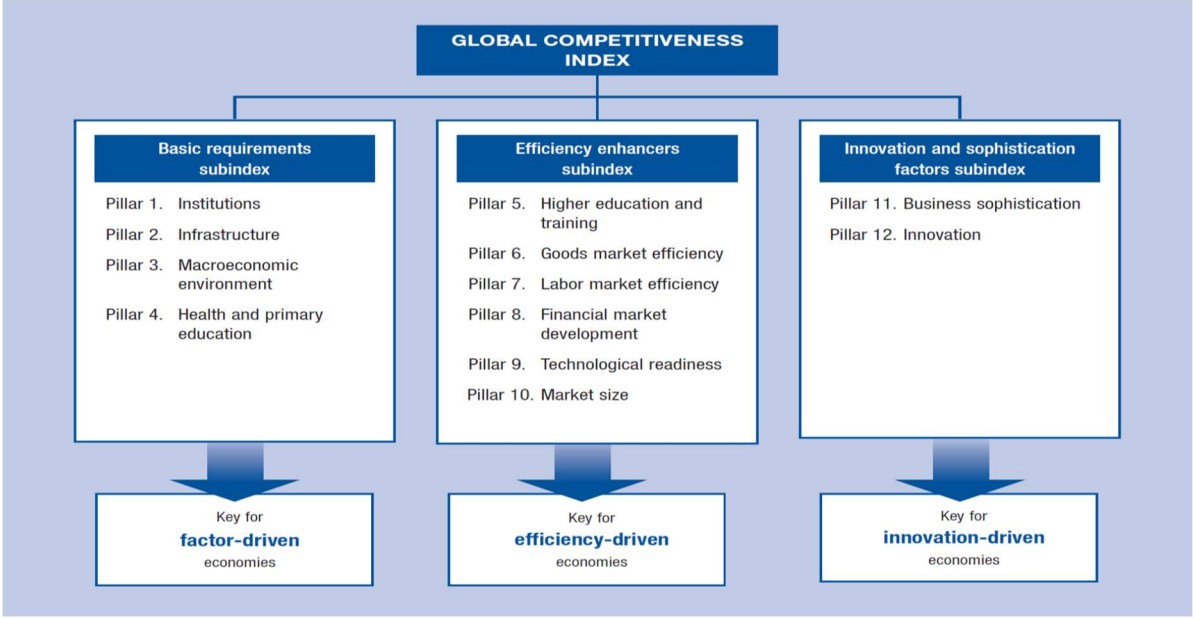

Figure 1. The Global Competitiveness Index Framework (Schwab 2014)

While the first category of the indicators comprises the main production factors (institutions, infrastructure, macroeconomic environment, health and primary education), the second group of the indicators (higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size) is reserved for the main efficiency drivers within an economy. The third group of the indicators (business sophistication and innovation) measures the countries commitment to innovation based on a composite measure, rather than extent to which a country invests into research & development. The composite indicator reflects an innovation status of a country, being assessed through a set of criteria such as: capacity for innovation, quality of scientific research institutions, company

expenditures for research & development, the collaboration between the education and business sector in research & development, government procurement of advanced technology products, availability of scientists and engineers, number of patents and their applications. According to this methodology, each country is awarded a value (running from 1 to 7), based on the performance being achieved within 12 different categories. Having a weighted average of the scores release a ranking of a country that explains what is the main source of its competitiveness (Priede and Neuert, 2015).

The concept of national competitiveness as being first developed by Porter (1998), suggests that there are three stages of a country's economic development, each being characterized by different competition criteria, level of productivity and income. This implies that each country is starting from the stage of factor-based economy, goes through the stage of investment dependent economy and ends up with the stage of innovation driven economy on its path towards achieving economic prosperity. Following this approach, World Economic Forum has upgraded this model including two more transit stages in building economic competitiveness, thus distributing countries into five different categories according to the stage of their economic competitiveness reported in their annual Global Competitiveness Report (Kharlamova and Vertelieva, 2013).

2. COMPETITIVENESS ACROSS THE EUROPEAN UNION MEMBER COUNTRIES

Since the EU report in 2012 the EU economic performance seems to be improved, despite the strong economic and financial downturn that has been recorded in the aftermath of the crisis. A modest growth being recorded as a result of fiscal consolidation, labour market and financial sector reforms gradually restored the confidence and brought back on the track even the economies that have suffered the most in this storm. Nevertheless, with an average index of 4.83, the EU is lagged much behind the other advanced economies in terms of building a smart growth (Schwab, 2017). The lag in building an innovation-based economy compared to other leading economies is noticed in respect to all four areas of smart growth, being identified by the Europe 2020 strategy. Accordingly, with less competitive markets, more rigid regulation and fewer funds to start-ups, the EU is found to provide less favourable conditions to support business development. Similarly, the EU has not achieved significant results in terms of enforcing a digital infrastructure and boosting its innovation capacities which have affected its competitiveness accordingly. In this context, as evidenced through the EU competitiveness report in 2014, the expenditures for research & development, accounted at 1.6% of the EU GDP, were found to be much behind the ones of US (2.8%) as well as much behind the EU 2020 target – 3%. A similar pattern has been recorded when it comes to a process of patent application within the industries, suggesting an existence of the capacity and knowledge gap in their implementation.

Along with such a performance of the EU economy, it is worth of mentioning that the individual EU countries have not performed equally in terms of their competitiveness and achievement of by Europe 2020 identified goals. Respectively, while some EU countries have performed better compared to US and other economic leaders, reaching the values that outperform the EU average, other still lag behind. Accordingly, Northern and Western European countries, identified as innovative economies, have reported expenditures in research & development in

the amount of 3.4% of the GDP, whereas the Southern and Eastern European countries reached only 1% in this regard. The results across the EU countries have been far from homogenous and remarkable also in terms of patent applications, being 16 times higher in the first group, as well as in translating the results of the fundamental research into the tangible products and their implementation. The similar pattern has been noticed in regard to the digitalization, being highly enforced within the Scandinavian countries that are much ahead compared to South-East members (World, Economic Forum, 2014).

Fitting this gap and achieving greater convergence among the EU countries has been one of the critical goals of EU 2020 agenda in shaping the European structural policies reforms. However, following the empirical findings, there has been noticed a little consensus on what are the main sources of a country's economic progress being addressed through the prism of national competitiveness, particularly if being studied in the context of an EU integrations. In this context, the study aims to evaluate the economic performance of nine selected EU countries (Belgium, France, Germany, Italy, Netherlands, Luxemburg, Bulgaria, Romania, Croatia), reflected in GDP per capita, through the prism of its linkages with the national competitiveness of a country assessed through the Global Competitiveness Index framework for the period 2008-2017. In addition, a regression analysis, confronting the group of old (Belgium, France, Germany, Italy, Netherlands, Luxemburg) with the group of the new member states (Bulgaria, Romania, Croatia), is performed providing an insight into their competitiveness profile and contributing power of the third category competitiveness pillars (business sophistication & innovation) to their performance. The findings of the study enable a better understanding of differences between the clustered countries in terms of the role of research & development and innovation in shaping their competitiveness and economic advancement, thus providing a foundation for assessing the challenges current EU countries and upcoming members are faced with on their path toward convergence.

3. LITERATURE REVIEW AND EMPIRICAL FINDINGS

The theoretical and empirical literature on the international competitiveness, relative importance of different factors' and their contribution to the economic growth of a country is vast and versatile. The stands range from those that competitiveness plays an important role in achieving a competitive advantage of a country and its economic advancement (Porter, 1990), to those that it could be "dangerous" for the socio-economic development of a nation (Krugman, 1994; Cerny, 1997), if being an "obsession". Seen one way or another, the significance of the national competitiveness, its generation and sustainability has attracted significant attention among the scholars and policy makers.

The concept of international competitiveness and its impact on economic prosperity of a country has been examined through the prism of a variety of indicators. While many authors have approached this debate assessing competitiveness based on its narrowed definition (price and cost indicators, market shares, and trade balances), a rising number of scholars have directed their analysis on the non-price factors, emphasizing the key role of the research & development and innovation in driving the international competitiveness, export performance and economic advancement of a country (Gittleman and Wolff 1995; Lefebvre, Lefebvre, and Bourgault 1998; Jones and Dunning 2001; Smith 2002; Di Mauro et al. 2005; Xu 2010; Priede

and Gatto, et al. 2011, Tomas 2011, Xiong and Qureshi 2013, Jarreau and Poncet 2012; Pereira 2013; Sandu and Ciocanel 2014; Kaimakoudi, Polymeros and Batzios 2014, Nachum, , Sandu and Ciocanel 2014, Silgoner et al. 2015). A growing interest in this relationship, as explained by Smith (2002), is a result of the fact that we have entered a new era of smart growth with the engine empowered by the knowledge driven industries. The empirical evidence however does not necessarily derive conclusive findings which is mostly a result of the wide range of its definitions, diverse time interval, sample size, methodology and focus used in this examination.

In this view, Rodrigues-Pose and Crescenzi (2008) have investigated the linkages between the investment in research & development, patents and economic growth. The results of the study confirmed the strong positive association between the growth of the patents and economic growth being reflected through the high-technology goods export share increase in total exports. Such a relationship was particularly observed in the more patent intensive industries and higher-income countries. Similarly, based on the examination of 58 countries over the period 1980-2003, Hasan and Tucci (2010) have proved that the economic growth is positively correlated with increase in research & development expenditures and patents. In addition, the study has examined the existence of such a relation between the research & development investments and high-technology goods share in the total exports. The study however revealed the existence of mixed results with positive relationship between the two variables in some of the EU countries and negative relationship in some other EU countries. The negative correlation results occurring mostly in developed countries could be explained by international product life cycle theory according to which the production of high technology goods is found in developed countries only in the product introduction stage, while it moves to developing countries in the declining stage of the product cycle. In the same manner, a number of authors (Hu and Pong 2009, Chu et al. 2012, Zeira 2011, Iwaisako and Futagami 2013) have provided an evidence on the crucial role of investments in research & development and the number of patents for the economic development of a country. Accordingly, it could be concluded that, aside of the individual EU countries case with observed negative correlation over the period of time, an increase in the gross domestic expenditures in research & development induces a rise in inventions, patents and finally in high-technology exports and economic growth of a country.

4. METHODOLOGY AND RESEARCH RESULTS

The study aims to evaluate the international competitiveness of the selected EU countries, with the special focus on the most advanced competitiveness factors. The subject of the analysis are counties that firstly entered the EU in 1958, such as Belgium, France, Germany, Italy, Netherlands and Luxemburg, and the last joined countries in 2007 (Bulgaria and Romania) and 2013 (Croatia), in order to contrast their overall level of competitiveness and evaluate the contribution of innovation factors to the country's economic performance.

In addition to Basic requirements and Efficiency enhancers subindexes, characterized for Factor-driven and Efficiency-driven economies, the research has been focused on the Innovation and sophistication subindex being related to the highest level of competitiveness, or Innovation-driven economies when the basic factors of production have been already exhausted. At this stage of development, the most powerful factor of competitiveness are technological innovations, supported by strong research and development by both private and

public sector, establishment of quality science institutions enabled to generate the knowledge into new technologies, etc. The time period observed in the study is from 2008 to 2017, based on the data available in the World Economic Forum and World Bank sources.

Table 1 provides an overview of the Global Competitiveness Index (GCI), the subindexes: Basic requirements, Efficiency enhancers, and Innovation and sophistication factors, as well as two pillars that belong to the 3rd subindex: Business sophistication and R&D Innovation, for the period from 2008 to 2017 for the selected EU countries.

Table 1. Global Competitiveness Index (GCI) and subindexes Basic requirements, Efficiency enhancers, and Innovation and sophistication factors (2008-2017)

	Indicator Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	GCI	5.14	5.09	5.07	5.20	5.21	5.13	5.18	5.20	5.25	5.23
	1.Basic requirements	5.60	5.43	5.45	5.58	5.52	5.51	5.53	5.56	5.56	5.50
	2.Efficiency enhancers	5.02	5.04	5.01	5.13	5.09	5.03	5.07	5.09	5.18	5.10
	3. Innovation and sophistication factors	5.02	4.95	4.91	5.06	5.21	5.07	5.11	5.14	5.16	5.20
	3.1 Business sophistication	5.36	5.28	5.24	5.30	5.32	5.27	5.34	5.33	5.35	5.40
	3.2 R&D Innovation	4.69	4.62	4.49	4.83	5.09	4.87	4.89	4.96	4.97	5.00
France	GCI	5.22	5.13	5.13	5.14	5.11	5.05	5.08	5.13	5.20	5.18
	1.Basic requirements	5.76	5.60	5.67	5.57	5.52	5.50	5.42	5.48	5.54	5.50
	2.Efficiency enhancers	5.09	5.08	5.09	5.09	5.04	5.00	5.07	5.08	5.14	5.10
	3. Innovation and sophistication factors	5.08	4.90	4.83	4.93	4.96	4.84	4.86	4.97	5.07	5.10
	3.1 Business sophistication	5.50	5.30	5.18	5.14	5.00	5.00	4.98	5.06	5.22	5.20
	3.2 R&D Innovation	4.67	4.50	4.48	4.72	4.91	4.68	4.74	4.88	4.92	4.90
Germany	GCI	5.46	5.37	5.39	5.41	5.48	5.51	5.49	5.53	5.57	5.65
	1.Basic requirements	5.96	5.85	5.89	5.83	5.86	5.90	5.91	5.95	5.94	6.00
	2.Efficiency enhancers	5.22	5.12	5.11	5.18	5.27	5.31	5.28	5.31	5.40	5.50
	3. Innovation and sophistication factors	5.54	5.47	5.51	5.53	5.57	5.59	5.56	5.61	5.61	5.60
	3.1 Business sophistication	5.87	5.82	5.82	5.66	5.71	5.68	5.65	5.70	5.64	5.60
	3.2 R&D Innovation	5.22	5.11	5.19	5.39	5.42	5.50	5.47	5.51	5.58	5.60
Italy	GCI	4.35	4.31	4.37	4.43	4.46	4.41	4.42	4.46	4.50	4.54
	1.Basic requirements	4.53	4.38	4.84	4.84	4.81	4.85	4.82	4.80	4.86	4.90
	2.Efficiency enhancers	4.38	4.37	4.33	4.41	4.44	4.34	4.35	4.39	4.43	4.50
	3. Innovation and sophistication factors	4.19	4.15	4.11	4.18	4.24	4.22	4.26	4.35	4.39	4.50
	3.1 Business sophistication	4.99	4.92	4.81	4.85	4.75	4.74	4.79	4.84	4.84	4.90
	3.2 R&D Innovation	3.38	3.38	3.40	3.51	3.73	3.69	3.43	3.86	3.93	4.00
Luxemburg	GCI	4.85	4.96	5.05	5.03	5.09	5.09	5.17	5.20	5.20	5.23
	1.Basic requirements	5.78	5.85	5.81	5.90	5.96	5.87	6.02	5.95	5.95	6.00
	2.Efficiency enhancers	4.69	4.84	4.92	4.89	4.87	4.92	4.97	5.00	4.99	5.00
	3. Innovation and sophistication factors	4.51	4.58	4.76	4.75	4.89	4.84	4.93	5.04	5.07	5.10
	3.1 Business sophistication	4.87	4.85	4.98	4.98	4.96	4.98	5.00	5.10	5.21	5.20
	3.2 R&D Innovation	4.15	4.31	4.53	4.52	4.82	4.70	4.85	4.98	4.73	5.00
Netherlands	GCI	5.41	5.32	5.33	5.41	5.50	5.42	5.45	5.50	5.57	5.66
	1.Basic requirements	5.81	5.71	5.82	5.88	5.92	5.89	5.95	6.05	6.12	6.20
	2.Efficiency enhancers	5.38	5.26	5.24	5.29	5.35	5.27	5.28	5.31	5.38	5.50
	3. Innovation and sophistication factors	5.20	5.17	5.16	5.30	5.42	5.36	5.41	5.61	5.52	5.60
	3.1 Business sophistication	5.58	5.54	5.55	5.58	5.63	5.56	5.57	5.56	5.61	5.70
	3.2 R&D Innovation	4.82	4.79	4.77	5.03	5.31	5.16	5.25	5.37	5.44	5.60
Bulgaria	GCI	4.03	4.02	4.13	4.16	4.27	4.31	4.37	4.32	4.44	4.46
	1.Basic requirements	4.2	4.13	4.43	4.46	4.63	4.73	4.71	4.57	4.67	4.80
	2.Efficiency enhancers	4.05	4.08	4.07	4.10	4.18	4.18	4.31	4.31	4.43	4.40
	3. Innovation and sophistication factors	3.30	3.29	3.22	3.24	3.30	3.28	3.27	3.37	3.57	3.60
	3.1 Business sophistication	3.69	3.68	3.52	3.55	3.62	3.59	3.61	3.64	3.78	3.80
	3.2 R&D Innovation	2.91	2.90	2.91	2.94	2.98	2.97	2.94	3.11	3.36	3.30

Romania	GCI	4.10	4.11	4.16	4.08	4.07	4.13	4.30	4.32	4.30	4.28
	1.Basic requirements	4.15	4.10	4.36	4.28	4.22	4.32	4.48	4.55	4.55	4.60
	2.Efficiency enhancers	4.18	4.25	4.18	4.09	4.12	4.13	4.32	4.37	4.28	4.30
	3. Innovation and sophistication factors	3.53	3.44	3.24	3.20	3.20	3.32	3.53	3.48	3.35	3.30
	3.1 Business sophistication	3.93	3.79	3.55	3.48	3.47	3.62	3.77	3.71	3.56	3.50
	3.2 R&D Innovation	3.14	3.10	2.94	2.91	2.92	3.01	3.28	3.24	3.14	3.10
Croatia	GCI	4.22	4.03	4.04	4.08	4.04	4.13	4.13	4.07	4.15	4.19
	1.Basic requirements	4.69	4.62	4.78	4.76	4.68	4.69	4.66	4.56	4.60	4.80
	2.Efficiency enhancers	4.08	4.05	3.97	4.01	4.01	4.05	4.11	4.05	4.09	4.10
	3. Innovation and sophistication factors	3.7	3.69	3.32	3.37	3.39	3.46	3.47	3.43	3.41	3.40
	3.1 Business sophistication	3.98	3.76	3.56	3.66	3.66	3.81	3.83	3.74	3.76	3.80
	3.2 R&D Innovation	3.41	3.22	3.08	3.09	3.12	3.12	3.10	3.13	3.06	2.90

Source: Global Competitiveness Report, World Economic Forum, 2009-2018

Based on the data provided in Table 1, the highest value of GCI among the selected EU counties in the observed period have Germany and the Netherlands. Both countries record the highest values not only in overall GCI, but in Basic requirements, Efficiency enhancers and Innovations and sophistication factors, as well as in two pillars under the 3rd subindex (Business sophistication and R&D Innovation). Among the first group of countries, joined the EU in 1958, Italy with the lowest values in all indicators is struggling with the unsatisfactory level of competitiveness. However, these low values of competitiveness indicators in Italy are still above the values for the same indicators in the second group of countries (joined in 2007 and 2013). Although Bulgaria, Romania and Croatia lag behind the old EU member countries regarding the competitiveness, they have among themselves very similar values of all indicators.

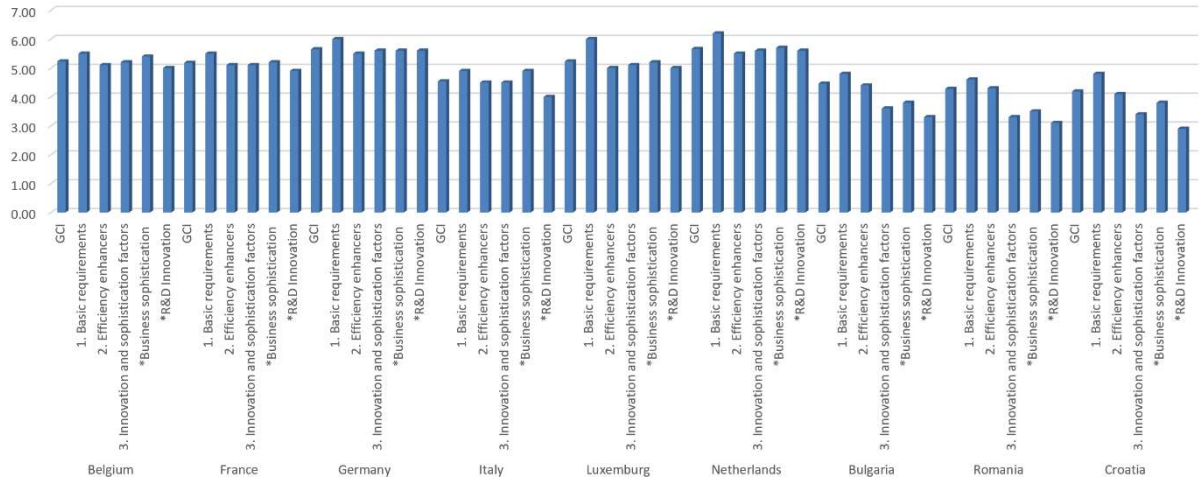

Figure 2. Selected EU countries according to the GCI and its subindexes in 2017

Source: Global Competitiveness Report, World Economic Forum, 2009-2018

The main deference between these two groups of countries, beside the level of competitiveness, is reflected in the level of achieved competitiveness in three subindexes. In the first group of countries, the countries with higher level of competitiveness, the value of all indicators is close. There is a similar value of overall GCI, as well as the value of Basic requirements, Efficiency enhancers and Innovations and sophistication factors (and its pillars). On the other hand, in the second group (Bulgaria, Romania and Croatia), the value of the 3rd subindex Innovations and sophistication factors to some extent is lower than the value of Basic requirements and

Efficiency enhancers. Within this subindex, the value is especially lower for R&D Innovation indicating the need to further improve the competitiveness in the field of innovations.

Tables 2 and 3 show the results of regression analysis. This analysis aims to show the relationship between R&D Innovation and Business sophistication, on one hand, and the country's economic performance measured by GDP per capita on the other hand.

Table 2. Model summary for the regression analysis of the selected EU countries

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.334[a]	.111	.143	2889.17515	.111	.438	2	7	.662	1.556
2	.561[a]	.315	.028	2951.30467	.315	.919	3	6	.486	1.704
3	.715[a]	.512	.268	2083.38449	.512	2.098	3	6	.202	1.001
4	.874[a]	.763	.645	1978.88447	.763	6.441	3	6	.026	1.564
5	.479[a]	.229	.156	7173.18619	.229	.594	3	6	.641	2.470
6	.788[a]	.622	.432	2744.29596	.622	3.286	3	6	.100	2.003
7	.442[a]	.196	.207	452.67665	.196	.486	3	6	.704	2.194
8	.468[a]	.219	.171	926.91256	.219	.561	3	6	.660	1.778
9	.636[a]	.405	.107	1082.63041	.405	1.361	3	6	.341	1.534

1. Belgium: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
2. France: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
3. Germany: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
4. Italy: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
5. Luxemburg: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
6. Netherlands: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
7. Bulgaria: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
8. Romania: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita
9. Croatia: a. Predictors: (Constant), R&D Innovation, Business sophistication, Dependent Variable: GDP per capita

Source: Authors' calculation

The multiple correlation coefficient R from Table 2 shows the linear correlation between predictors (R&D Innovation and Business sophistication) and GDP per capita as the dependant variable. Its high values for Germany, Italy, Netherlands and Croatia indicate strong relationship between R&D Innovation and Business sophistication, and GDP per capita.

Table 3. Regression analysis - coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t.	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1. (Constant)	125724.560	133908.751		.939	.384					
Business sophistication	37944.928	39803.821	.667	.953	.377	.163	.363	.334	.251	3.990
R&D Innovation	38242.022	39379.208	2.652	.971	.369	.330	.369	.340	.016	60.884
2. (Constant)	69300.747	54343.348		1.275	.249					
Business sophistication	18096.475	35101.203	1.004	.516	.625	.233	.206	.174	.030	33.208
R&D Innovation	8770.031	37079.905	.493	.237	.821	.532	.096	.080	.026	37.979
3. (Constant)	371039.484	182469.428		2.033	.088					
Business sophistication	219501.846	107413.224	8.155	2.044	.087	.300	.641	.583	.005	195.771
R&D Innovation	241215.085	110853.146	16.854	2.176	.072	.217	.664	.621	.001	737.477
4. (Constant)	45810.215	46355.023		.988	.361					
Business sophistication	11137.892	10295.794	.260	1.082	.321	.341	.404	.215	.684	1.462

R&D Innovation	6671.590	7239.710	.486	.922	.392	.846	.352	.183	.142	7.036
5. (Constant)	218672.512	165270.715		1.323	.234					
Business sophistication	8908.593	96851.201	.163	.092	.930	.445	.038	.033	.041	24.539
R&D Innovation	18230.514	49997.591	.765	.365	.728	.237	.147	.131	.029	34.264
6. (Constant)	55305.028	206651.952		.268	.798					
Business sophistication	18952.609	32957.089	.249	.575	.586	.281	.229	.144	.337	2.965
R&D Innovation	1352.413	16939.412	.108	.080	.939	.691	.033	.020	.034	29.255
7. (Constant)	7847.847	7685.076		1.021	.347					
Business sophistication	5171.092	6958.286	1.145	.743	.485	.257	.290	.272	.056	17.712
R&D Innovation	3970.756	6081.341	1.626	.653	.538	.329	.258	.239	.022	46.231
8. (Constant)	828.643	8234.285		.101	.923					
Business sophistication	1258.331	38039.900	.228	.033	.975	.232	.014	.012	.003	366.084
R&D Innovation	2849.824	41011.967	.433	.069	.947	.460	.028	.025	.003	298.665
9. (Constant)	6643.987	12392.090		.536	.611					
Business sophistication	592.063	4628.026	.059	.128	.902	.407	.052	.040	.465	2.150
R&D Innovation	4015.117	4540.775	.451	.884	.411	.619	.340	.278	.381	2.621

1. Belgium: Dependent Variable: GDP per capita
2. France: Dependent Variable: GDP per capita
3. Germany: Dependent Variable: GDP per capita
4. Italy: Dependent Variable: GDP per capita
5. Luxemburg: Dependent Variable: GDP per capita
6. Netherlands: Dependent Variable: GDP per capita
7. Bulgaria: Dependent Variable: GDP per capita
8. Romania: Dependent Variable: GDP per capita
9. Croatia: Dependent Variable: GDP per capita

Source: Authors' calculation

Based on the results of regression analysis in Table 3, the contribution of R&D Innovation and Business sophistication to GDP per capita has been examined. β coefficient shows that R&D Innovation has bigger contribution to the country's economic performance measured by GDP per capita. Only in case of France and the Netherlands, Business sophistication contributes more than R&D Innovation.

5. CONCLUSION AND RECOMMENDATIONS

The role of a country's competitiveness has been addressed by many scholars aiming to assess the extent to which this concept is associated with social welfare and economic prosperity of a country. Regardless the prism through which this multidimensional concept is explained, empirical findings on these linkages are not conclusive, particularly if being seen through the prism of EU integration. Despite the fact that EU, as suggested by the Global Competitiveness Report (Schwab, 2014), has recorded a meaningful recovery of its economy in the aftermath of the financial crisis and the fact that its GCI has increased, it still lags behind the rest of the key players in the global market in terms of building an innovation driven, smart growth. This is particularly true when it comes to some EU country members and sophisticated industries, given the fact that not strong cohesion in economic growth, competitiveness and success towards reaching Europe 2020 targeted goals have been evidenced. However, despite the growing interest and policy makers' concern in this regard, not enough attention has been given to assessing such disparities within the EU framework.

In this context, the study aimed to evaluate the economic performance of selected EU countries, measured by GDP per capita, through the prism of international competitiveness, looking into their association and a relative importance of a number of competitiveness factors', particularly those reflecting their innovation capacity, in reaching economic advancement. The empirical results of the comparative study have confirmed that research and development plays an important role for the country's economic performance and overall competitiveness.

Given these findings one could conclude that, despite the convergence process within the EU, the significant disparities, particularly between the Northern and Western Europe as "innovation rich" and Southern and Eastern Europe as "innovation poor" economies, prevail. The lag in building an innovation-based economy is evidenced accordingly between the old and the new member states in respect to all areas of smart growth, being identified by the Europe 2020 strategy. Being characterized by less competitive markets, more rigid regulation and fewer funds to start-ups and research & development, the new EU members provide less favourable conditions to support innovations and business development.

Diminishing the differences in the international competitiveness and economic performance drivers and enhancing the efforts toward achieving greater cohesion in achieving smart, innovation driven, sustainable growth across the EU members would require coordinated engagement from all the stakeholders. Accordingly, larger investments in research & development, information and communication technology, skills development and enhancing the education quality and its linkages with industry, being supported and monitored with enough institutional capacity and effective governance mechanisms would ensure more innovative and competitive business environment. Having these prioritized in the economic development agenda of new EU entrants' that are significantly falling behind should be a necessity, ensuring more innovative and competitive business environment in assessing countries, their successful convergence, a stronger and more coherent smart growth within the EU.

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FIRM AND COUNTRY SPECIFIC DETERMINANTS OF FINANCING OBSTACLES OF THE SME'S OPERATING IN THE WESTERN BALKAN REGION

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Abstract

The objective of this study is to analyze the firm and country-specific determinants of financing obstacles of Small and Medium Enterprises operating in the Western Balkans. Thus, the sixth round of the Business Environment and Enterprise Survey (BEEPS VI) data conducted in 2018 – 2020 covering 41 economies and 28.000 enterprises. In this regard, OLS and probit model has been used to determine the factors of the financial obstacles that face SME's in this region, where the panel regression results reveal that from firm-specific factors, firms' size, age, ownership and transparency have resulted as most significant factors of financing obstacles of the SMEs in Western Balkans. On the other hand, from country-specific factors, bank concentration, regulation and inflation plays a significant role in the level of financing obstacles of SME's in Western Balkans.

Key words: financing obstacles, SME's, probit, Western Balkan.

1. INTRODUCTION

Considering the crucial role of the small and medium enterprises for the economy, they are considered to be the engine for the job creation in any economy (Birch, 1987; Neumark et al., 2011; Ayyagari et al., 2011). The problematic issue of access to finance that SMEs ace in developed and developing countries represent one important policy concern.

There are plenty empirical studies that have demonstrated that small and medium enterprises are more financially constrained then larger firms. Thus the main concern of the scholars and policymakers is why financial obstacles present such a crucial challenge for small and medium enterprises? This paper tries to understand the firm and country specific factors that affect the level of the financial constrains that small and medium enterprises face during their operation in the region of Western Balkan.

The accessibility to external funds represents one of the main firms – specific factors related to the financial constrain that SME face in their growth process. Beside of firm –specific factors, like age, size, transparency, ownership, SME's in developing countries also face and country –

specific factors, mainly due to the legal, regulatory and financial infrastructure differences in developed and developing economies. Apart from studies related to the crucial role of SMEs for economic growth and employment in emerging and developing countries, there is not much evidence regarding the effects of financial transparency on the financial constraints of the SMEs in Western Balkan.

Having into consideration the financial constrain context of the SMEs in the region of Western Balkans, where there is present a high level of bureaucracy, not sufficient and effective economic and financial reforms as well as a political instability, this paper analysis the effect of the financial transparency as an important firm specific determinant of the financial constraints of the SMEs. Thus, the main focus relies on the determining the effects of the firm specific indicators of the financial constrains for the SMEs in the Western Balkan countries: Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia.

Even though the analyzing context of the financial constrains of the SMEs in Western Balkan can be seen in several studies, most of them involve them in a larger set of developing countries, such as SEE economies (Beck and Demirgüç - Kunt, 2006; Hashi and Toci, 2010; Ayyagari, Demirgüç-Kunt and Maksimovic, 2011; Coskun and Nizaeva, 2018; Nizaeva and Coskun, 2019). While analyzing the determinants of the financial obstacles on the growth of SMEs in Western Balkans, the used methodology in this paper is based on several papers: Beck et al., (2006); Hashi and Toci (2010) and Nizaeva and Coskun (2019). Thus, OLS and probity model have been used in order to determine the effect of the financial transparency as one o the firm specific determinants of financial constrain on the SMEs in the Western Balkans, by using survey data collected from BEEPS – VI, 2018 – 2020.

From the empirical findings it is revealed that there exist a negative and significant association between financial transparency and financial constrain of the SMEs in the Western Balkan. In addition, firms' age has positive impact on the financial constraints of SMEs, while a negative significant relationship is seen between ownership and level of financing obstacles faced by SMEs in Western Balkans. Beside of the firm specific factors, bank concentration, regulation and inflation play important role on the financial constrains that SMEs face in the Balkan region.

Finally, the paper involves the following structure: in the section "Literature Review" there are discussed relevant literature concerning the determinants of financial constraints of SMEs, while in the section "Research Methodology and Data" are presented the research methodology and data. "Empirical findings and discussion" include the main findings and results of the analysis while the last section presents the conclusions and recommendations. To our best knowledge, this is the first paper that has tried to analyze the effects of firm and country specific factors for the case of Western Balkan, by using the recent data from the sixth round of the BEEPS, conducted between the time period 2018 – 2020.

2. LITERATURE REVIEW

The determinants of the access to finance as one of the main obstacles for SMEs in developing economies has been analyzed from different approaches and set of countries (Beck et al., 2005; Beck and Demirgüç-Kunt, 2006; Ayyagari et al., 2008; Hashi and Toçi, 2010; Hashi and Krasniqi, 2011; Coskun and Nizaeva, 2018; Nizaeva and Coskun, 2019).

Hashi and Toci (2010) investigated the nexus between financing obstacles, credit rationing and financing obstacles for SMEs in Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania and Serbia and Montenegro, by utilizing data from BEEPS 2002 and 2005, through logit and ordered logit model. Their findings revealed that older firms are more financially constrained then smaller firms, indicating further that their investment depends more on the internal funding.

Hashi and Krasniqi (2011) by using BEEPS –IV data used OLS regression for six countries dividing them into two country groups: 1st group - Poland, Hungary, Czech Republic and 2nd group - Albania, Macedonia, Serbia, and Montenegro: They suggest that the differences in financing constrains between country groups are due to the growth stages of SMEs and levels of institutional development. Coskun and Nizaeva (2018) by using more recent data of BEEPS V round investigated the firm and country specific determinants of the financial constraint of SMEs in selected emerging Western Balkan economies, by using pooled OLS and ordered probit. They suggest that firm size is crucial determinant of the financial constraint levels of SMEs in these countries while has a positive effect on the financial constrains of the SMEs.

Existing findings in the literature suggest that the higher the transparency of the firms, less financially constrained the firms are, thus SMEs using external financial auditor of their fiscal year, assure their recordings to be in line with the GAAP standards. Thus, more transparent SMEs face less financial obstacles (Hope et al., 2009; Bart et al., 2011). Further, a negative relationship has been seen among firm age and financial constraint of SMEs in the developing countries (Akoten, et al.,2006, Beck et al., 2006; Berger and Udell, 2006; Ayyagari, Demirgüç-Kunt, and Maksimovic, 2013; Afandi and Kermani, 2014). On the other side, the size of the firm is negatively linked with the level of the financial constrain of the SMEs (Beck et al., 2004; Angelini and Generale, 2005; Hashi and Toçi, 2010).

Regarding the ownership, foreign-owned firms have easier access to external financing, thus a negative association is revealed among ownership and level of financial constrains (Schiantarelli and Sembenelli 2000; Hashi and Toçi, 2010; Barth et al., 2011; Coskun and Nizaeva, 2018). Previous studies have argued that high inflation rates negatively affect the financial constrain and the firms growth in the developing economies (Beck and Demirgüç - Kunt, 2006;Beck et al., 2008; Beck et al., 2009).

Scholars have associated the bank concentration to play an important role in the financial obstacles that SMEs face in the developed and emerging economies (Carbó-Valverde et al., 2009; Kira, 2013; Coskun and Nizaeva, 2018).

Regulatory environment also determines the level of the financing obstacles of firms, where previous analyses have demonstrated negative relationship between regulation and financial obstacles of SMEs in developing economies (Haltiwanger, Scarpetta, and Schweiger, 2006).

3. RESEARCH METHODOLOGY AND DATA

This study uses cross – sectional data collected by the 6th Business Environment and Enterprise Survey (BEEPS VI), by incorporating only data for Western Balkan countries. In addition, this survey is conducted as a joint project between World Bank and EBRD, undertaken for the time period 2018 -2020 by including 41 countries, covering data for 28,000 firms.

The definition of the Small and Medium Enterprises varies among countries, yet the most used definition of SMEs defines them as firms with up to 250 full – time employees (Ayyagari, Beck, and Demirgüç-Kunt, 2007; Beck et al., 2005; Hanedar, Broccardo, and Bazzana, 2014; Coskun and Nizaeva, 2018; Nizaeva and Coskun, 2019).

Thus, having into consideration this definition, the large and micro firms are excluded from the last sample of this analysis, where the last distribution across countries is as follows: *Albania* - 334 firms (21.38% of the overall sample); *Bosnia and Herzegovina* - 307 (19.65%); *Kosovo* - 189 (12.1%); *Montenegro* - 128 (8.2%); *North Macedonia* - 308 (19.72%); and *Serbia* - 296 (18.95%).

The financing constrains in this paper are presented as a set of function of firm-specific determinants and country specific determinants. Following the methodology of Beck et al. (2006); Hashi and Toci (2010); Nizaeva and Coskun, (2018), the Ordinary Least Square – OLS model and probity model are used in order to determine the effects of firms specific and country specific factors in the countries operating in the Western Balkan. Thus, the basic equation is set as following:

$$financialobstacles = \beta_0 + \beta_1\, transparency + \beta_2\, FirmAge + \beta_4\, FirmSize + \beta_5\, ownership + \beta_6\, log\_gdp + \beta_7\, inflation + \beta_8\, banc\_concentration + \beta_9\, regulation + \varepsilon_t \quad (1)$$

Financial obstacles is a dummy variable which is a proxy that is derived from the question of the survey: “Is access to finance, which includes its availability and cost, interest rates, fees, and collateral requirements, an obstacle to the operation of this establishment,” and its answer varies from 0 (no obstacle) to 4 (very severe obstacle). The dummy variable is created with value 1 and 0, where “major obstacle” and “very severe obstacle” are scored with 1; the rest are scored with 0.

Transparency as a firm specific factor ranges between 1 and 0, where is value is 1, if the firm has used an external auditor in the last fiscal year, otherwise it takes the value of 0.

Firm Age represents the number of years of the operation o the enterprise in the selected country and it is measured by subtracting the firm’s year of establishment from the year of the survey administration.

Firm Size represents the number of full-time employees of the firm and it is measured from the question: sampling size, thus excluding large and micro firms from the sample.

Ownership represents the percentage of a firm’s shares owned by foreign individuals, derived from the question: % owned by private foreign individuals.

Country – specific factors, include GDP per capita in current $, transformed in its natural logarithm, bank concentration representing the % of the largest three banks as a share of the assets of all commercial banks, regulation environment which is representing the quality of the government regulatory policies and inflation, GDP deflator annual %, indicating percentage of the consumer price index measured as annual change in the cost of acquiring a basket of consumer goods and services.

Table 1 presents the descriptive statistics of the variables included in the empirical analysis. Moreover, the set of the SMEs undergoing the analysis it is consisted of domestic (100%

domestic ownership), foreign (100% foreign ownership), and partially foreignowned (mixed ownership) SMEs. The mean value of the firm's age is 15.45 years.

Table1. Descriptive statistics of firm specific variables

Variables	Observations	Mean value	Standard Deviation	Minimum value	Maximum value
financialobstacles	1562	.1792574	.3836905	0	1
transparency	1562	1.550576	.7170052	0	1
FirmAge	1562	15.45198	10.0276	1	105
FirmSize	1562	1.302817	.4596238	1	2
ownership	1562	4.074904	18.42648	0	100

Source: author's source

Table 2 presents the data for the country specific factors of Western Balkan countries for the year of the administration o the survey in these countries, thus for 2019. In addition, below are presented the data for GDP per capita in current $, rate of inflation (%), bank concentration (%) and regulation (%). As can be seen, in the table is shown that the GDP per capita in Kosovo and Montenegro is 4462.4 and 8,545.5, respectively. In addition, inflation varies across countries, ranging from 0.4 and 2.5 in Albania and Serbia. The lowest and highest level of bank concentration is observed in Serbia and Kosovo with 43.01% and 89.94%, respectively. Regulation of the private sector is seen at the highest in Republic of North Macedonia while lowest present in Kosovo and Serbia. Regarding the domestic credit percentage, Bosnia and Herzegovina and Montenegro have experienced the highest percentage with 54.85% and 53.05%, while the lowest it is noticed in Kosovo, with 34.93%. Finally, the interest rate has scored the highest and lowest value in Albania and Serbia, 9.51% and 3.64%, respectively.

Table 2. Country specific factors in Western Balkan countries for 2019

Country	GDP per capita (current $)	Inflation (%)	Bank concentration (%)	Regulation
Albania	5,209.4	0.4	56.58	0.21
Bosnia and Herzegovina	6,236.0	2.1	44.42	-0.07
North Macedonia	5,634.4	2.4	67.8	0.33
Montenegro	8,545.5	1.6	67.11	0.061
Serbia	7,213.2	2.5	43.01	-0.064
Kosovo	4,462.4	1.0	89.94	-0.033

Source: World Bank indicators.

Table 3 reports the correlation coefficients for the variables considering in the two models.

Table 3. Correlation matrix

VARIABLES	1	2	3	4	5	6	7	8	9	10	11
Financialobstacles	-0.028	1.0000									
FirmAge	0.0160	0.0679	1.0000								
FirmSize	-0.063	0.0308	0.1276	0.0814	1.0000						
ownership	-0.073	-0.070	-0.067	-0.027	0.0586	1.0000					
transparency	0.0187	-0.075	-0.032	-0.040	0.0399	0.0202	1.0000				
log_gdp	0.0086	-0.084	0.1350	0.0764	0.0331	0.0386	0.1133	1.0000			
Inflation	0.0038	-0.049	-0.105	-0.039	0.0070	0.0062	0.1329	-0.024	1.0000		
Bankconcentration	-0.001	0.1790	-0.066	-0.041	-0.008	-0.082	-0.131	-0.507	-0.212	1.0000	
Regulation	-0.042	-0.041	-0.078	-0.055	-0.103	-0.002	-0.082	-0.181	-0.044	0.3222	1.0000

Source: author's calculations

A negative correlation is observed between firm growth and financial obstacle levels of the firms. Older SMEs operating in economies with high levels of concentration in the banking sector seem to perceive access to external financing as a serious obstacle. A negative correlation between log_gdp, the inflation, regulation environment and financial obstacles is observed. According to the data, larger firms tend to be older. Higher regulation suggests the banking sector to be more concentrated. Interest rate is negatively correlated with log_gdp and inflation.

4. EMPIRICAL FINDINGS

Table 4 presents the results of the analysis of the effects of the determinants of the financial obstacle level of SMEs in the Western Balkan countries. As can be seen, two models have been employed: first model reveals the results of the OLS regression, while the second model emphasizes the results of the probit model.

From the first model, regarding the relationship between financial transparency and level of financial constraints of SMEs, can be noticed that the results suggest a negative but statistically insignificant relationship between these two variables. In addition, results reveal that size is not a significant factor on determining the level of financing obstacles of SMEs. Moreover, a positive relationship is determined among the age of the firms and financial constrains in SMEs in Western Balkan, thus the older they get, the more financially constrained they became. Further, a negative but insignificant relationship among ownership and financial obstacles can be noticed among the small and medium enterprises operating in the region of Western Balkan. These findings are in line with other authors results using similar methodology (Hashi and Toçi, 2010; Coskun and Nizaeva, 2018).

Table 4. OLS and probit results of the determinants of financial obstacles of SMEs in Western Balkan

Financialobstacles	(1) OLS	(2) Probit
transparency	-.0240943 (0.500)	-.0228547 (0.467)
FirmAge	.008391 (0.042) **	.0107833 (0.003) ***
FirmSize	-.1006243 (0.255)	.0617063 (0.455)
ownership	-.0024184 (0.268)	-.0044398 (0.084)*
log_gdp	-.0927158 (0.727)	.0716209 (0.776)
inflation	-.0685832 (0.055)*	-.0179502 (0.608)
Bankconcentration	0180 (0.000) ***	.0181063 (0.000)***
regulation	-1.025047 (0.000)***	-.7829459 (0.001)***
Nr. of observations	1562	1562
R^2/ pseudo R^2	0.0298	0.049
*Note: Standard errors are reported in parenthesis and *, **, *** indicate significance levels of 10 %, 5 %, and 1 %, respectively.*		

Source: author's calculations

As for the country specific factor, only bank concentration, inflation and regulation have significant effect on the level of the financing obstacles of SMEs in Western Balkan. In addition, there exist a negative association between inflation and level of financial obstacles of SMEs, while bank concentration plays positive impact on the financing obstacle level of small and medium enterprises in Western Balkan. Further, the regulation environment plays a negative impact on the financing constrain level of SMEs in Western Balkan.

The second model includes the results of the probit model, which also indicated the base model of the analysis, where the findings of this study rely on. The regression results imply that from firm specific determinants, only firms age is positively associated with the financial constraints of the SMEs in the Western Balkan region, while a negative and significant relationship between ownership of the firms and the level of financial obstacles of the SMEs in the Western Balkan.

From country specific factors, bank concentration is positively associated with the level of financing obstacles of SMEs, while between regulation environment and level of financing obstacles there exist a negative and significant relationship for the case of small and medium enterprises operating in the Western Balkan.

5. CONCLUSION

The main objective of this study is to investigate the effect of the financial transparency as important determinants of the level of financial constrain of the SMEs in the Western Balkan countries: Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia. The data are gathered from the six round of BEEPS survey, for the time period 2018 – 2020. In order to accomplish the objectives of this study, two models were conducted: the first model empirically investigated the determinants of the financial obstacles of the SMEs in the Western Balkan countries, by using OLS model. Later, a probit regression is conducted to investigate the effects of financial transparency as a determinant of the financial constraints of the SMEs in the Western Balkan.

OLS and probit results are consistent with other findings, revealing that the firms using an external auditor in the last two years in their firm face smaller financial constrain, while large firms face less financing obstacles than small firms, while older firms are more financially constrained than the new enterprises. In addition, in the context of the ownership, findings reveal that SMEs with high foreign ownership of the firms, report less financial constrains.

Having into consideration such results it is important to emphasize the vital role of the financing transparency as an important determinant of the financing constrains that SMEs face in the Western Balkan region, highlighting the need for the policymakers to address the potential reforms in achieving better financial and accounting regulations, efficient governance and enforcing international accounting standards.

Main limitations lay on the lack of the data availability for the short comes regarding the level of the financial constraint of the SMEs based on self-reported categories rather than data taken from their financial statements. Yet, BEEPS is an important and reliable database available for cross-country and firm level data.

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INNOVATION CONTESTS AS A MEASURE TO GENERATE NEW IMPULSES FOR THE FOREST-BASED SECTOR – THE CASE OF "NEUE HOLZWEGE" IN SALZBURG

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Abstract

As one of the most important contributors to the Austrian economy, the forest-based-value chain has undergone significant changes in the last decades and strives continuously for new ways to create competitive advantages. As a relatively young method, open innovation has proven to be a valuable tool for companies and industries to not only foster innovation but also enhance customer engagement. This case study describes the process of initiating a crowdsourcing innovation contest to generate new impulses for the forest-based sector in the Austrian federal state of Salzburg. The contest "Neue Holzwege" (New Ways in Wood) was conducted in the spring of 2020 as a cooperation between research, academic partners and the regional forest-based sector industry- and small and mid-sized enterprises association. Its aim was not only spawning ideas but drawing attention towards the newly established open innovation platform, build acceptance for crowdsourced approaches, create the possibility to communicate and engage with participants of the contest and to realize the most promising ideas. Furthermore, it shows how this contest could be used to gain knowledge about the nature of crowdsourcing approaches in innovation, as well as the perception of the forest-based sector itself. Through a representative online survey (n=757), the young millennials group was examined, since they represented the main target group of the contest. In addition, the case study describes how the contest was integrated in teaching and how theoretical knowledge was complemented with participation in the contest. Finally, future steps are highlighted regarding the realization of the winning ideas and how the sector can benefit.

Key words: open innovation, crowdsourcing, SME, forest-based sector, wood industry.

1. INTRODUCTION

In 2016, the Austrian government initialized a national Open Innovation Strategy to encourage collaboration between companies, institutions and users to strengthen innovative capacity across the country (BMWFW 2016). This study describes the process of using a user-centric innovation approach to generate new impulses for the forest-based sector in the Austrian federal state of Salzburg. By the means of an open innovation strategy, in this case a crowdsourcing idea contest, different types of innovation were encouraged to be generated by the group of

participants. The extant paper shows the steps that were followed in the process of planning, conducting and assessing the innovation contest, and further, how insight was generated into the perception of open innovation and the forest-based sector among young millennials.

1.1 Background

Open Innovation

The term "Open Innovation" (OI) was coined by Henry Chesbrough, who explains, "in this new model of Open Innovation, firms commercialize external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market" (Chesbrough 2003, p.37). Over the last decade, idea contests (IC) have become one of the most commonly applied methods of OI (Piller and Walcher 2006, p.311). According to Walcher (2007, p.38), ICs can be defined as competitions at which private or public organizers invite a defined or undefined crowd to submit creative contributions on a specific topic within a defined time period and ends with prizes being awarded by a jury, the public or the participants themselves. In 2018, the Austrian state of Salzburg started the "Open Innovation Kompetenzplattform Salzburg (OIKS)" project, which is run by different regional universities as well as research institutions. The project aims to conduct various ICs within different branches important to the Salzburg economy.

The Austrian forest-based Sector in Austria and Salzburg

With roughly 300.000 directly or indirectly employed people, the forest-based sector in Austria is not only economically but also socially one of the country's most important industries (WKO 2019, p.6). In addition, the country is considered to be among the most technically advanced in the wood sector, and the sector's contribution to the overall economic output is almost twice as high as the EU average (Wolf 2018, p.2). More than half (52 %) of the federal state of Salzburg is covered with forests. 80 % of all harvested wood is being used as raw material, 20 % for as fuel wood. Roughly 1.200 companies in Salzburg are active in the forest-based sector, with an export quota of 70 %. The vast majority of these companies are small and medium sized enterprises (SME). Furthermore, the sector's activities are deeply rooted in the historical development of the Salzburg region, since wood has been used for millennia as an aid to mine and extract salt, the region's most important commodity (Dopsch 2003, p.212). In recent times, the sector has undergone profound changes and is facing new challenges and chances, such as a shortage of skilled workers, an increasing digitization of processes, the reliability of raw material supply from regional sources and climate change adaption in forestry (Waldverband 2009, p.6).

Open Innovation Competence Platform Salzburg (OIKS)

To generate new impulses for the forest-based sector which come from the end-user perspective of the sector's offerings, the open innovation idea contest was created. Furthermore, it was seen as a tool to raise awareness and as a temporary marketing tool for the forest-based sector as well as the newly established Open Innovation Competence Platform. This crowdsourcing platform was created the independent research and technology organization *Salzburg Research* in cooperation with private and academic partners as well as the federal state of Salzburg. As one of several idea contests that were or will be implemented within the OIKS framework, "Neue Holzwege" was developed in cooperation with the Salzburg association of the forest-based sector, *proHolz Salzburg* and *Holzcluster Salzburg*. In a kick-off meeting in May 2019,

the project's aims and frame were outlined, and in further meetings over the course of the following weeks details were specified.

2. THE INNOVATION CONTEST „NEUE HOLZWEGE“

This chapter gives an overview of the main steps and specifications that were implemented and defined until the award ceremony and the further progression of the winning ideas as of July 2020.

Figure 1. Cover image of the contest. wooden elements resembling timber construction next to a "digital highway" leading towards the Salzburg Castle (source: own)

2.1 Aim of the Contest

The aim of the contest was how especially small and medium-sized enterprises can create value for customers and raise their competitiveness. The contest called for innovative solutions in the following areas of the forest-based sector:

- Innovative business models (digital marketing and online purchasing)
- Rethinking traditional woodworking (products, brand, communication)
- Regional production (traceability of raw material)
- Raising the appeal of the sector as an employer
- Timber building
- Expand raw material utilization: Reuse and Recycle.

Furthermore, it was encouraged to submit ideas, that did not fit into the abovementioned categories, but gave impulses for the sector in terms of technology, new markets or target groups and production methods.

2.2 Contest Phases

The contest was conducted in the following phases, which spanned from January to July 2020:

Planning (duration 4 weeks): In this conceptual phase, the involved partners of the project got to know each other, and the goals, target group, necessary tasks and steps, jurors, incentives and advertising measures were defined.

Campaign Creation (4 weeks): Preparing the campaign in the online platform, create media content, fostering the online community and raising awareness for participation.

Implementation (8 weeks): The active phase of the contest with the submission of ideas, managing the online community and raising continually awareness for participation.

Evaluation (4 weeks): This phase consisted of (1) the community assessment of the submitted ideas and (2) the evaluation of the submitted ideas by the jury. The combination of both assessments rendered the 5 winning ideas.

Campaign closing (4 weeks): Final event and award ceremony.

2.3 Core Components of the Contest

Online Platform and Community

The contest was set up on the digital platform (crowdsourcing platform) of the open innovation competence center Salzburg (OIKS). Prior to "Neue Holzwege", the first innovation contest was conducted within this platform to generate new impulses and solutions for tourism in Salzburg. Experiences and lessons learned from this previous contest were integrated in the design of "Neue Holzwege". To submit ideas, participants needed to register in the system, thereby becoming an official member of the online community (https://ideen.openinnovation-salzburg.at). This community was actively managed by the project coordinator of OIKS as well as a student researcher from the University of Applied Sciences Salzburg. A submission consisted of a short description of the idea, its title and a cover image. Additionally, participants could attach files and assign another community member to the idea. Besides submitting own ideas, the community members were encouraged to comment, like or co-develop ideas of other members. After the submission phase, the community assessment took place in the digital "arena": community members were presented pairs of ideas and had to cast a vote for their favorite.

Marketing Measures promoting the Contest

The contest was promoted among the already existing 400+ community member of the open innovation platform, that participated earlier in the Tourism Salzburg contest. Furthermore, all project partners used their social media channels to encourage participation and raise awareness for the contest. Several local newspapers highlighted the contest, and presentations were held in higher education institutes, promoting the participation among students. The main target group for the contest were young creative people from the Salzburg region, preferably working in the forest-based sector, or having sector involvement.

Jury and Evaluation of Ideas

The jury consisted of representatives of the contest's clients (proHolz Salzburg and Holzcluster Salzburg), as well as a representative from the academic partner FH Salzburg, the marketing representative of the higher technical college for wood education Kuchl (Holztechnikum Kuchl) and two representatives from different innovative woodworking businesses. The criteria for assessment of the ideas were originality, impact and reach of idea, feasibility and sustainability.

The winning ideas were selected through a two-step process. In the first round, all 140 ideas were grouped into the six thematic categories: A – specific product ideas, B – general product ideas, C – business ideas, D – network, E – communication and education, F – workshops and DIY. Members of the jury were grouped into pairs with different backgrounds (e.g.: academia + business, project client + marketing etc.) to ensure a more balanced perspective. Each pair was given about 48 ideas to discuss and evaluate. The evaluation was carried out with the help of an online tool, by which scores could be distributed for each idea, rendering a preselection of 32 ideas. In the second round, all jury members as well as project coordinators met in an

online session, to select the top five ideas. Each pair of jury members introduced in a one-minute overview the ideas they were given and highlighted their favorites. Again, with the help of an online tool, the top ideas were evaluated to select the five winners. Additionally to the jury assessment, the results of the community voting were included in the final assessment.

Prizes

The prizes were seen as an incentive to participate in the contest. To support the local woodworking or wood-related businesses, prizes were chosen accordingly. For the top five ideas, the prizes included a custom wooden ski building workshop, an overnight stay in a timber hotel, a woodturning course, a coupon for sustainable wood-clothing and an admission to a forest climbing park. In addition, the three most active members of the online community were given a book about wood. The total sum of prizes was 1625 € and covered by the project clients.

Integration of the Contest into Higher Education Courses

Since courses about innovation were taught in the spring semester of 2020 for students of undergraduate and graduate students of Design and Product Management at the University of Applied Sciences Salzburg, the idea contest offered the possibility to complement theoretical input from the lectures with actual participation in the contest. Thereby students could apply innovation tools and methods that were discussed in the course. For a successful completion of the course, each student was obligated to hand in one idea by themselves and one idea as joint effort of two people.

2.4 Submitted Ideas and Winners

In total, 140 ideas were submitted, covering almost all stages of the forest-based value chain, from forest education, to new concepts of wood-processing, support for SME's, and most often, innovative uses and applications for wood or wood-based materials as products. The ideas varied in quality as well how they were depicted and described visually and textually.

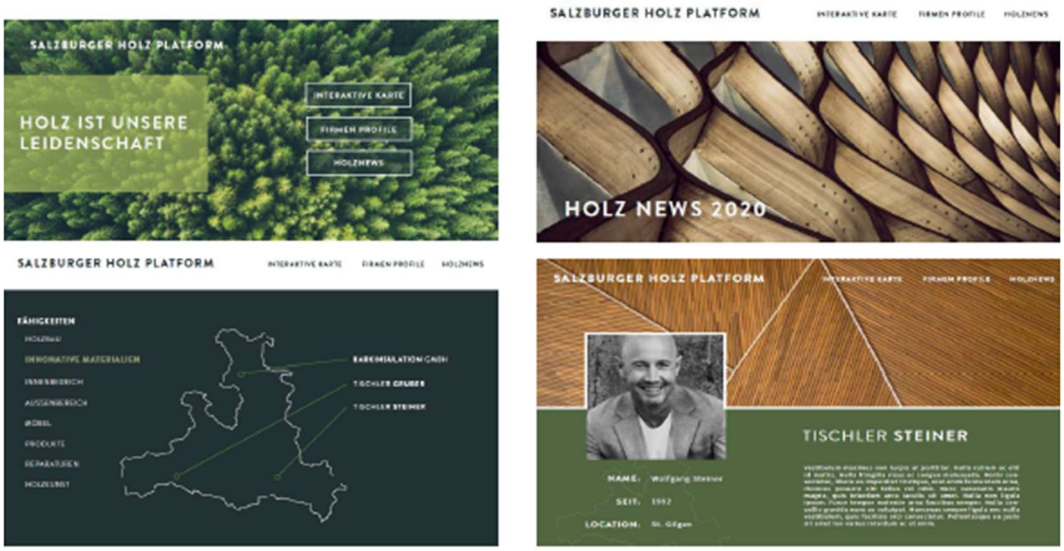

Figure 2. Example of a submitted idea: An open digital platform, connecting companies of the forest-based sector with each other as well as with customers of wood products

Source: https://ideen.openinnovation-salzburg.at/

Figure 3. Example of a submitted idea: modular, easy-to-assemble furniture system made entirely out of wood

Source: https://ideen.openinnovation-salzburg.at/

Since students of the University of Applied Sciences Salzburg (especially those at campus Kuchl) and students of the higher technical college Kuchl were encouraged to submit ideas by their professors and more exposed to the contest due to the its relevance for their field, most of the ideas stemmed from both of those schools.

The evaluation of the jury as well as the community voting rendered the top five ideas. The top three ideas are presented briefly below:

1) Urlaub im Holz (Wood Vacations)

The winning project presented a scalable and sustainable regional tourism concept. Contemporary timber buildings, manufactured by local timber construction companies and run by the local tourism associations serve as simple yet elegant accomodation for hikers, cyclists and other tourists in Austria, thereby promoting the benefits of modern timber construction.

Figure 4. Winning idea: an Austria-wide network of simple but modern timber homes that provide accommodation for tourists

Source: https://ideen.openinnovation-salzburg.at/

2) BikeShit – Wooden Components

Bike parts such as pedals, fenders and handlebars made of bent wood. The first prototypes and an appliance for steam-bending wood as well as a brand concept already exist.

3) Spieltischlerei (Playful Joinery)

This educational concept for young children aims at bringing the young public closer to professions in the forest-based sector, especially in joinery and furniture making. In a workshop with woodworking professionals, children are encouraged to design and build their own furniture.

Figure 5. Award ceremony in June 2020 with contest participants as well as project partners and supporters

Source: http://proholz-salzburg.at/2020/06/10/ideenwettbewerb-neue-holzwege/

2.5 Further Development of Winning Ideas

A workshop held in early July 2020 brought together all contest winners, as well as the project clients and coordinators. After an introduction of the wining ideas, the group used the Business Model Canvas (strategyzer.com, 2020) to work on core issues of their ideas such as value proposition, customers/target group and network with the support of the open innovation project coordinators. The results of this work were presented to conclude the workshop and the participants will use the feedback and generated input to further pursue their ideas throughout the summer. Another workshop in autumn is planned to develop the winning ideas and take further steps towards a realization of the projects.

Figure 6. Idea development in a workshop in July 2020

Source: Team Open Innovation Salzburg

2.6 Additional Empirical Studies

Complementary to the innovation contest, a representative survey of young millennials (20-29 years of age,) was conducted by Design Research Salzburg (DE│RE│SA), the research department of the Design and Product Management faculty, at the Salzburg University of Applied Sciences. The obtained results were used to generate insight of (1) the perception of open innovation and innovation contests, as well as (2) the perception of the forest-based sector. In February and March of 2020, 757 panel members (μ=24.6, σ=2.8; 365 males (48%), 392 females (52%)) of an international market research company (dynata.com) completed the online survey. The participants accurately represent the target group's ratio of women and men as well as the distribution across the nine different Austrian federal states. The findings spawned several publication and presentations in international research journals and conferences and are described in brief in the following.

2.6.1 Awareness of Open Innovation and Innovation Contests among Young Millennials in Austria

Although open innovation (OI) becomes an increasingly valuable method for companies to foster innovation and enhance customer engagement, the awareness of it among the younger general public has not been assessed. The results of this study show, that innovation contests (IC) are more known than the superordinate concept of OI, where gender specific differences could be found. Men have participated in more OI campaigns and report a higher familiarity with ICs. Overall, there is above average agreement that ICs are a contemporary method to create successful innovations. Although participants tend to disclaim the unfairness of ICs, the disagreement is not substantial, which indicates that possible underlying doubts surrounding the fairness of the method might exist in the public opinion. OI has been an important part of the Austrian government's goals for the future for several years and should not be underestimated as an innovation strategy. Therefore, considerations should be made regarding the promotion of the topic to the general public. Moreover, organizers of ICs have to show the conditions and processes as well as the assessments and results of their idea competitions in a transparent manner to avoid any public doubts and misbeliefs. The full publication can be found under: https://bit.ly/2P0wg5W

2.6.2 Perception of the forest-based sector

Further research, which was the topic of a master thesis in the graduate degree Forest Products Technology and Management at the University of Applied Sciences Salzburg, examined the perception of the forest-based sector among young Millennials in Austria. This group, who in the coming years will increasingly occupy decision-making and management positions and gain purchasing power, is highly relevant as a target group for the forest-based sector. So far there have been few studies that dealt with the perception of the sector by a young target group in Austria, therefore items regarding forestry, wood-processing, wood products and timber construction were included in the survey. It turned out that the interviewees basically have a positive image of forestry and the wood industry but are critical as soon as the forest is depicted as a source of raw materials. Indecisiveness prevails on the topic of wood use as a means to mitigate climate change. Advertising measures of the industry don't attract much attention. Timber construction is described as positive in comparison with other construction methods, in particular as aesthetically and ecologically advantageous. However, doubts have been

expressed about the sustainability of wood as a building material and disadvantages in terms of building physics are seen. By means of a subsequent cluster analysis, four clear market segments could be identified with regard to the factors *Timber Construction Affinity* and *Opinion Leadership Wood*. The clusters of *Passive Preservers* and *Active Supporters* are particularly interesting for the industry. They should be specifically addressed by concrete communication measures so that the perception of the industry is developed positively or improved even further. Finally, recommendations for those actions are given. A preprint of the publication can be found under: https://bit.ly/3hO5cDp

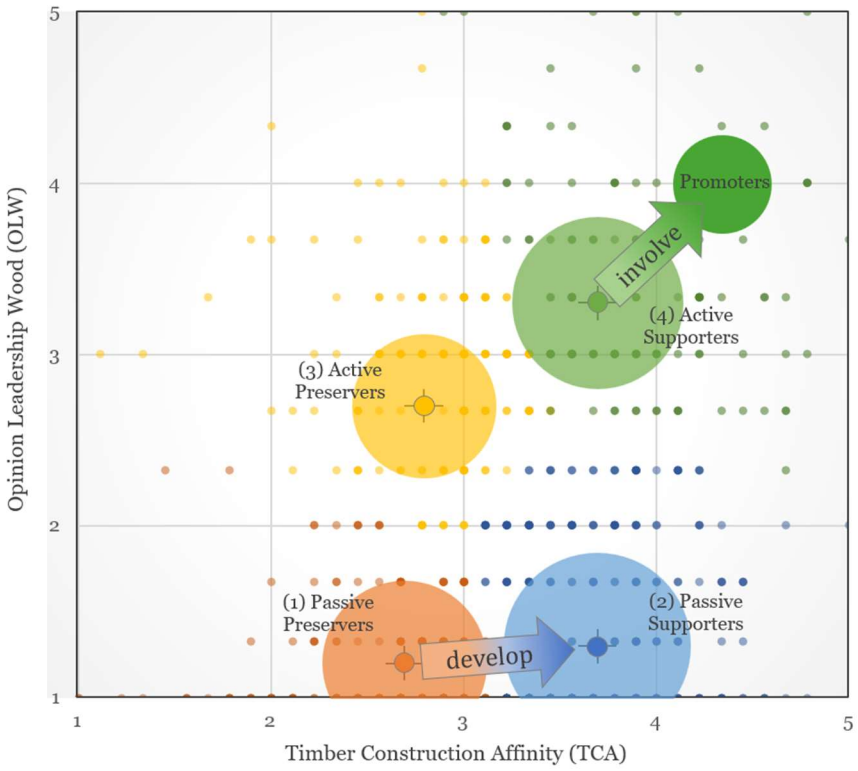

Figure 7. Suggested development for the young millennials market. Clustering factors OLW and TCA were measured on a 5-Point Likert Scale (1=strongly disagree, 5 = strongly agree). Higher values represent a more active communication about wood-related and timber construction topics (OLW) and a higher affinity towards timber construction (TCA) (n = 757)
Source: own

3. CONCLUSION

This study describes the planning and implementation of an open innovation contest that was aimed at generating new impulses for the regional forest-based sector. Furthermore, the contest served as a method to raise awareness for the newly established open innovation platform Salzburg and for open innovation methods in general. The contest-winning ideas are currently developed further into concrete concepts, and steps towards their eventual realisation are in progress. In addition, the contest was integrated in lectures about innovation at a university level to complement theory with the practical application of innovation tools and methods. Empirical research was conducted alongside the contest, generating knowldege about the nature

of open innovation as well as the perception of the target sector, which now can be used to tailor communication measures more specifically towards a young target group. This study can serve as a guideline for establishing a similar user-centric open innovation contest in other sectors, markets or regions.

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based sector, small and medium-sized enterprises, contest.

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CONCENTRATION OF THE SUPPLY SIDE OF THE OIL COMPANIES IN THE REPUBLIC OF SERBIA

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Abstract

One of the aspects of the analysis of the intensity of competition on the domestic oil market is the measurement of the concentration of supply, to which this paper is dedicated. It could be said that they date back to the emergence of production relations and productive forces. That is why it is not surprising that there are different interpretations of these economic categories. The liberalization of the domestic market of oil and oil derivatives has opened the space for building quality competitive relations. Market conditions and competitiveness in practice are determined by concentration in the observed market. The development of market concentration and competition flows takes a long time, and the flow itself is expressed in many relevant markets by many concentration indicators.

Keywords: oil market, concentration indices, competition level.

1. INTRODUCTION

Each market is characterized by a certain level of competition between participants. Based on competitive relations, the market power of participants in the observed market can be determined. For this reason, this paper focuses on the competitive relationships between participants, on the level of market concentration, and on the market power that arises from such relationships.

In economic theory, there are a large number of examples of measuring the market power of companies that determine the degree of limitation of the observed market. A large number of indices are used for this purpose, and the ones we have considered to include in this analysis are the Lerner index, cross-elasticity of demand index, and concentration indices. This paper is dedicated to concentration indices. As such, they are used in the implementation of antitrust policy measures, which gives the results presented in this paper the practical significance. Antitrust policymakers often rely on the calculated values of these indicators to make important decisions regarding the appearance of certain economic entities in the relevant market. They enable the analysis of the current market situation, taking into account the changes that are happening in it, and they are also used to predict and analyze future market trends.

What we would especially like to point out in this paper is that concentration indices are subject to changes that economic entities go through, and they are related to their market share in the

relevant market. Therefore, under these changes, the value of the concentration index also changes. For the concentration indices to be comparable between different branches and periods, they are often subject to appropriate mathematical operations to reduce their value to the interval from 0 to 1 (Zeigenfuss, 2000).

There is a long list of indicators of concentration that economic experts may use to describe as accurately as possible the degree of concentration in the market, or restrictions on competition in the market. The analysis could include the following indicators: Concentration ratio, Herfindal-Hirschman index, Dominance index, Hal-Tidman and Rosenblatt index, Comprehensive branch concentration index, Gini coefficient, Lorentz curve, and Entropy coefficient, (Kostic, M., 2013).

Generally, the picture of the level of restrictions on competition in the market, above all, depends on market participants and the distribution of market share, sales, revenue, region, resources in one market, but also the availability of data. If the level of concentration of the four largest companies in the relevant market is methodologically accurate, the difference in the size of market share between all companies in the relevant market is accurate, as well as the uneven distribution of market shares between companies, the image of the level of competition restrictions in the relevant market can be much clearer. Then could be extracted a series of conclusions and/or further decisions regarding the strengthening of competitive relations within the branch. Taking into account the above, and according to the available data, in this paper, we decided to analyze the results obtained by calculating the ratio concentration (hereinafter CR_4) and Herfindal - Hirschman index (hereinafter HHI).

2. MARKET CONCENTRATION MEASUREMENT PROCEDURE

The concentration of the market on the supply side reflects the degree to which the total sales (supply) in a particular market is under the control of a small number of companies, ie only one company in the last resort. Starting from the theoretical basis presented in the previous part of the paper, a research was performed that includes an analysis of the domestic market of oil and oil derivatives to examine the degree of concentration and conditions of competition. The analysis covers the market of oil and oil derivatives on the territory of the Republic of Serbia. The research was conducted in the period from December 21, 2018, to July 31, 2020, and included the following research steps: developing hypotheses and defining subjects and goals, as well as preparing research; data collection, the definition of the relevant market, and selection of variables; data processing and analysis; presentation of data reached and conclusions.

2.1. Hypotheses, subject, and research goals

Setting hypotheses and defining goals was the starting point in the research. In addition to the active ones, the most important oil companies have been defined, which stand out from other companies in the domestic market of oil and oil derivatives in terms of revenue, and which will be the focus of research. Also, the forms of data that will be collected are defined based on the possibilities of data collection, planned methods of application, and their significance. During each step, certain actions were realized that were planned for each step, so we will explain them first.

The null and alternative hypothesis from which we started are:

H_O: In the relevant oil and oil products market a high concentration between participants exists;

H_1: In the relevant market of oil and oil products a high concentration between participants does not exist.

Taking into account the views from the null and alternative hypotheses, it is clear that the focus is on concentration in the relevant market. The subject of this paper is the analysis of market circumstances in the domestic market of oil and oil products and the verification of initial hypotheses. The period of 9 years of business, 2010 - 2018, was observed. A large number of oil companies operate on the market of oil and oil derivatives of the Republic of Serbia. Based on the data of the Serbian Business Registers Agency, in the period 2010 - 2018, a total of 16 representative economic entities were identified and thus selected, which in that period operated on the domestic market of oil and oil derivatives. In the meantime, one business entity was excluded from the survey due to the initiated bankruptcy procedure, so the final total number of oil companies for the observed period was 15.

The aim of the research should be a more realistic assessment of the degree of market constraints and market power of certain companies in a given market in order to assess market circumstances, as well as giving recommendations to strengthen competition. The results of the research will also be used to undertake economically based activities. Therefore, the research aims to determine the level of limitations of the market of oil and oil derivatives under the obtained results, but also at the measures that should be applied. The measures should take into account the size and complexity of the Serbian market of oil and oil derivatives, but also the economy size itself.

2.2. Data collection, relevant market, and variables for measuring concentration on the market of oil and petroleum products of the Republic of Serbia

In the process of measuring the concentration and market power of participants in a particular market, it is necessary to define a framework within which to analyze the competitive positions of economic entities themselves. The market to be determined, to which the concentration indicators will relate, is the relevant market. The purpose of its definition, ie determining its boundaries, is to identify economic entities that will be in the focus of the application of economic analysis as mutual competitors in that market (Gerald & Ewin, 2008).

Determining the domain of analysis implies determining the relevant market. The relevant market is closely related to the elasticity of supply and demand, depending on the nature of supply and demand of the market itself. Also, the relevant market has a subject and a spatial dimension. Therefore, the determination of the relevant market implies its determination both from the geographical aspect and from the aspect of the product sold on that market. Thus, from the aspect of the activity of participants in a certain market, we distinguish between the relevant product market and the relevant geographic market (Zeigenfuss, 2000).

The area dealing with the definition of the relevant market uses data on price movements, production, domestic consumption, and total sales to form the boundaries of the relevant product market and the relevant geographic market. To define the relevant product market we used the correlation test in price movements, and for defining the boundaries of the relevant geographic market the Elzinga-Hogarthy test. The data used for these tests were taken from secondary sources.

Table 1. Movement of current prices, annual inflation rate and adjusted prices of fuel and electricity in the period from 2006 to 2015

Year	The average retail price of fuel (per liter)	Average retail price el. energy (per kilowatt-hour)	Average annual inflation (%)	Average the retail price of fuel (per liter) in 2006 prices	Average retail price el. energy (per kilowatt-hour) in 2006 prices
2006	80.2	5.1	12.7	80.2	5.1
2007	83.3	5.3	6.5	80.1	5.6
2008	112.1	6.8	12.4	126.0	7.6
2009	99.8	6.9	6.7	186.5	7.4
2010	110.4	6.8	6.6	117.7	7.2
2011	121.4	7.5	5.5	128.1	7.9
2012	124.6	7.6	4.9	130.7	8.0
2013	133.2	7.8	4.4	109.1	8.1
2014	131.5	7.9	4.3	137.2	8.2
2015	130.1	8.1	4.2	135.6	8.4

Source: Republic Bureau of Statistics, review, http://webrzs.stat.gov.rs/WebSite/Public/PageView.aspx?pKey=3, visited on July 5, 2019

The level at which average retail prices of oil and oil products and electricity correlates over ten years (2006-2015) is estimated (Table 1). The correlation testing is performed through prices adjusted to the 2006 level. To eliminate the effect of image distortion provided by testing, we have canceled the effect of inflation. We did this by using data on the calculation, i.e. correctors on the inflation rate, which were determined through the movement of consumer prices obtained from the website of the European Bank for Reconstruction and Development and the Republic Bureau of Statistics website.

Based on the obtained results on the degree of correlation and indicators of statistical significance, we rejected the zero and accepted the alternative hypothesis. It turns out that there is a direct correlation between the prices of the observed products (Table 2). The relationship is statistically significant, which confirms the probability value of r, which is less than 0.05 (0.042/0.027). However, the value of the correlation coefficient that we obtained indicates that these two products are not substitutes (0.661), i.e. the value of r is not above 0.8 (0.661 / 0.685). We believe that similar results would be obtained if similar potential substitutes were taken into account. Thus, the market for oil and oil derivatives independently constitutes the relevant product market.

Table 2. The correlation coefficient of the movement of average retail prices of fuel and electricity. the energy in the period from 2006 to 2015

MPC2006	**Pearson Correlation**	1	,661*
	Sig. (2-tailed)		,042
	N	10	10
MPCee2006	**Pearson Correlation**	,685*	1
	Sig. (2-tailed)	,027	
	N	10	10

* Correlation is significant at the 0.05 level (2-tailed).

Source: Authors' calculation based on the database of the European Bank for Reconstruction and Development, public stat., http://www.ebrd.com/where-we-are/serbia/overview.html, accessed 22.11.2019.

Furthermore, the data required for the Elzing-Hogarthy test were also collected from secondary sources, ie. Statistical Yearbooks of the Republic of Serbia, the Energy Balance of the Republic of Serbia, and the European Bank for Reconstruction and Development web, where the statistical calendar of important variables is presented. Based on the results of LOFI, i.e. LIFO tests, it is clearly determined where the domestic market of oil and oil derivatives belongs (Table 3 and Table 4). The LOFI test measures the share of exports in the production of the relevant market, and the LIFO test measures the share of imports in the consumption of the relevant market. This statement can be followed by the fact that during the last fifteen years, several European well-known oil companies have entered the domestic market, such as Lukoil, OMV, Gazpromneft, Eko.

Starting from the fact that the territory of the Republic of Serbia is a rounded territory where the legal framework, antitrust regulations, and numerous oil companies operate, we concluded that the relevant geographic market of oil and oil derivatives is independently constituted in the Republic of Serbia. The relevant geographic market of oil and oil derivatives on the territory of the Republic of Serbia is also confirmed by the results of the Elzinga-Hogarti test (LOFI / LIFO test), obtained based on the collected data. To make the results more objective, we took into account the period longer than two years (2011-2014), which is part of the time frame of the analysis itself. Based on the criteria presented in Table 3 and based on the data shown in Table 4, it can be concluded that the domestic market of oil and oil derivatives is a very relevant geographic market viewed from the aspect of exports, i.e. part of the wider relevant market from the aspect of imports.

Table 3. Relevant geographic market depending on the value of Elzinga-Hogarty test results (LOFI / LIFO test)

LOFI /LIFO value	Description of the relevant geographic market
< 10%	Highly relevant market
10% - 25%	Poorly relevant market
>25%	Share of the wider relevant market

Source: Hendry, L.C., Eglese, R.W. 1990. Data Envelopment Analysis. Operational research Society. The United Kingdom

Table 4. Values of the Elzing-Hogarthy test (LOFI/LIFO test) for the period from 2011 to 2014

Year	LOFI values	LIFO values
2011	0.091	44.6
2012	0.063	44.5
2013	0.059	43.3
2014	0.052	40.2

Source: Authors' calculation based on the data of the European Bank for Reconstruction and Development, public stat., http://www.ebrd.com/where-we-are/serbia/overview.html, accessed 4.6.2018.

After collecting, supplementing, and verifying data obtained from the Serbian Business Registers Agency, the Serbian Republic Bureau of Statistics, and the European Bank for Reconstruction and Development, the survey included 7 oil companies, with a total market share of 90%. The representative sample contains four to seven large, medium, and small companies, depending on the methodology and instructions for calculating the indicators themselves. In addition to NIS/ie Gazpromneft, OMV, Lukoil, Eko, and Knez Petrol also stand out as large companies. Some of the above also deal with the wholesale trade of oil and oil

derivatives, for example, the Transnafta company. In addition to larger oil companies, a large number of small oil companies have been registered. According to the collected data, a larger number operate unprofitably and are on the verge of bankruptcy, while a certain smaller number successfully manage the market and generate significant revenues.

Besides defining the relevant market, the obligatory step is the selection of the appropriate variable through which the degree of concentration of competitors in the relevant market will be measured. The variable is used to calculate the market share of each economic entity in the relevant market. Taking into account the subject and goal of economic analysis, but also the availability of primary and secondary data sources, in practice it can be used through variables such as profit, income, and production for a certain period, number of employees, total assets, number of branches, sub-branches, and their turnover, distribution of organizational units, number of subcontractors, etc. Combining variables is possible, but only under specific circumstances. In general, economic analysis can also yield contradictory conclusions if different variables are used. At the very least, such results may be seemingly accurate, but substantially far from the desired objectivity. For that reason, it must be borne in mind that each variable brings with it certain limitations. The practical application of the obtained results often depends on the analytical and subjective assessment of the researcher, but also on the circumstances under which the analysis itself is realized. For the purposes of this paper, the results obtained based on the analysis could be applicable only if, when determining the domain of the analysis, they put market power in the foreground. As market power is reflected through the realized turnover on the relevant market, the focus of this research is in the first place the realized income that the companies realized on the relevant market for the observed period.

Annual sales revenue is taken as an adequate indicator for many reasons: it gives us information about the value of sales on an annual basis, regardless of whether the product/service was created in the observed or previous year, and sales revenue is related to the core business of oil companies and excludes revenue generated on the other bases. Annual sales revenues of oil companies can be found in the attached link addresses (based on financial reports), and the percentage shares of revenues of individual oil companies in the total revenue in the branch for the period 2010-2018, are given in Table 5. We will use the percentage shares for the assessment of the indices.

Table 4. The percentage share of revenues of individual oil companies in the realized total revenue of all oil companies for the period 2010 - 2018

Company/Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
NIS/GAZPROM NOVI SAD	54.93	52.70	54.48	60.22	59.59	57.6	53.6	56.6	58.8
LUKOIL SERBIA BELGRADE	12.80	12.42	10.88	7.22	8.38	9.1	8.8	7.4	7.6
OMB SERBIA BELGRADE	10.62	9.84	9.18	7.39	7.22	9.2	8.5	8.0	8.0
KNEZ PETROL SERBIA BELGRADE	6.41	8.82	9.73	8.98	9.70	6.2	7.7	10.6	9.7
INTERMOL SERBIA BELGRADE	3.90	3.72	4.35	4.83	4.94	10.7	11.0	10.3	9.8
NAFTE SERBIA BELGRADE	3.21	3.56	1.34	1.21	1.25	0.9	0.3	0.0	0.0
PC TRANSNAFTA PANCEVO	0.17	0.13	0.14	0.20	0.16	0.0	0.0	0.0	0.0

Source: Authors' calculation based on the data of the Business Registers Agency of the Republic of Serbia, http://www.apr.gov.rs, visited 7.5. 2020

Based on the data about the market shares of oil companies shown in Table 5, it can be said that the market of oil and oil derivatives of the Republic of Serbia is an oligopolistic market with

one dominant company (about 55% market share), several large ones that follow it (about 10% market shares), several smaller (followed by 5-10% shares), and a group of small businesses (less than 1% shares). In the following, based on the collected information, the level of limited competition on the market of oil and oil derivatives of the Republic of Serbia will be determined.

3. RESULTS AND DISCUSSION OF THE OBTAINED RESULTS OF CONCENTRATION AND MARKET SHARE INDICATORS

By combining several indicators of concentration, a clearer picture of concentration in a certain market is obtained. Each indicator of concentration is special for itself, but due to its characteristics, it complements another indicator. But let's go in order.

a. Concentration ratio

Under the practice, and to respect the principle of objectivity of the analysis itself, the calculation of the concentration ratio (CR_4) includes four economic entities. In our relevant market, in the observed period (2010-2018), the value of the concentration ratio of the first four companies ranged between 78 and 85. The degree of supply concentration calculated through this index is shown in Table 6. The CR_4 increased in 2014 and 2017, especially after the declines recorded in 2011, 2015, and 2016.

Table 5. The concentration ratio of the four leading oil companies in the relevant market of oil and oil derivatives in the period 2010 - 2018

Year/CR	CR_4	ΔCR
2010	84.77	-
2011	83.79	-0.98
2012	84.27	0.47
2013	83.80	-0.46
2014	84.89	1.09
2015	82.11	-2.78
2016	78.54	-3.57
2017	82.53	3.99
2018	84.14	1.61

Source: Authors' calculation based on the data of the Business Registers Agency of the Republic of Serbia, http://www.apr.gov.rs, visited 7.6. 2020.

All indicators of concentration, both in this analysis and in general, have certain advantages and disadvantages. The main disadvantage of this indicator is that it shows only the total market share for the four leading companies in the industry, but not the dispersion of participation between them, which is certainly a major omission in the detailed assessment of concentration in a particular market. Thus, if there are four companies in the branch, its value will be 100, the same as in the case of one company, regardless of the distribution of the market share of these four companies. Thus, we can have CR_4=100 for the market when there are four companies of the same size (in terms of turnover) and CR_4=100 for the market when it is dominated by one company with a significantly higher market share than the other three.

A special disadvantage is the market shares of companies that are bypassed in the calculation of this indicator, and certainly affect the concentration of the branch. Such limitations exist and

can be circumvented only by applying and calculating several concentration indicators. By combining several indicators of concentration, a clearer picture of concentration in a certain market could be obtained, because each indicator of concentration is special for itself, and due to its characteristics, it complements another indicator. For that reason, in practice, more indicators of market concentration are included in the analysis, and thus a more objective analytical picture is obtained.

b. Herfindal - Hirschman index

The HHI directly complements the concentration ratio. The HHI index for the relevant market in the observed period 2010 - 2018 ranged between 3.100 and 3.840, which can be seen in the attached Table 7.

Table 6. Herfindal-Hirschman index of supply concentration in the relevant market of oil and petroleum products in the period 2010 - 2018

Year/HHIndex	HHI	ΔHHI
2010	3360.45	
2011	3133.17	-227.28
2012	3286.19	153.02
2013	3838.34	552.15
2014	3793.49	-44.85
2015	3638.90	-154.59
2016	3212.98	-425.92
2017	3538.72	325.74
2018	3768.37	229.65

Source: Authors' calculation based on the data of the Business Registers Agency of the Republic of Serbia, http://www.apr.gov.rs, visited 7.6. 2020.

NIS/Gazpromneft, Lukoil, OMV, Knez Petrol, and Mol are big players in the domestic supply market. This is confirmed by the data on the market share of each oil company in the total revenue, which is shown in Table 1. Therefore, the obtained values of the Herfindal-Hirschman concentration index objectively reflect the distribution of market share and market power concentration in the relevant market (Table 7).

4. CONCLUSIONS

The obtained results of the conducted research give us a basis for drawing interesting conclusions. The results of the analysis of the relevant market for the period from 2010 to 2018 unequivocally indicate a high level of concentration, and resume may be in the next form:

- the concentration ratio for the first four oil companies in terms of the amount of realized income exceeds 0.8, i.e. 80%, and

- HHI index for the relevant market in the observed period ranged between 3,100 and 3,840.

Unequivocally is clear that the supply of the oil and oil derivatives market of the Republic of Serbia is very highly concentrated. The obtained values of the calculated coefficients and the specific state of uneven distribution are caused by the high concentration of supply on the domestic market of oil and oil derivatives, thus, the null hypothesis is confirmed. Specifically, the oil and oil products market is an oligopolistic market with one dominant company

NIS/Gazpromneft, several large ones following it, several smaller ones following them, and the group of the smallest companies (less than 1% participation). As a reflection of these relations on the market, the upward growth of the trend of uneven distribution of market share stands out.

The high values of the coefficients also reflect structural changes and developments in the domestic market of oil and oil derivatives. During 2010, the program of transformation and modernization of NIS/Gazpromneft was realized, which enabled a profitable and stable position of this oil company. Since 2011, the already large market share of NIS/Gazpromneft has gradually increased. That is why it is not surprising that this oil company dominates the relevant market of oil and oil derivatives of the Republic of Serbia. The relative decreases in the values of certain indicators during 2011, 2015, and 2016 are related to the decrease in the number of gas stations (supply quantity) of NIS/Gazpromneft concerning the decrease/increase in the number of gas stations of other serious market participants (Lukoil, OMV, Eko) during the observed period.

It is logical that this analysis also results in a better understanding of the competitive behavior of the leading oil companies in the market. As the market for oil and oil derivatives is relatively small, no increase in the number of participants on the supply side is expected. For this type of market, it is typical for companies to use a limited market to install a large profit margin, and to make as much profit as possible, all at the expense of customers. This kind of situation in the domestic oil and oil derivatives market is subjected to the anti-monopoly policy of both domestic and foreign legislation. Commission for Protection of Competition should pay special attention to the policy of the retail price formation. Formal and tacit agreements certainly exist, but they are difficult to prove. The strengthening of competitive relations, and thus the increase of business efficiency between companies is not expected unless the government reacts to aim to encourage competition between oil companies. Finally, the market for oil products should be further monitored and further researched to reach additional conclusions.

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THE IMPACT OF WORK ON JOB PERFORMANCE: A RESEARCH ON WOOD PROCESSING INDUSTRY IN FERIZAJ REGION - REPUBLIC OF KOSOVA

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Abstract

Employee motivation has always been a major challenge for leaders and managers. Most employees need to feel motivated about their work they do. Some employees are motivated by money, while others are motivated by personal ratings and rewards. Employees who are motivated and stimulated with their work are creative and productive and perform high quality work. The aim of this paper is to analyze the impact of work motivation on job performance concerning the employees in the wood processing industry in Ferizaj region in the Republic of Kosova. Our study focuses in the factors that influences the employees' work motivation, such as monetary and non-monetary factors, and at the same time in measuring the relationship that exist between work motivation and job performance. The quantitative data collection process was conducted through a structured questionnaire sent to 63 respondents online and face to face. The results proved to have a positive relationship between employee performance and monetary and non-monetary motivation. Based on the results from the empirical analysis, we conclude that non-monetary and monetary motivations affect the performance of the workers in the wood processing companies in Ferizaj region.

Key words: Monetary motivation, non-monetary motivation, job performance.

1. INTRODUCTION

Our country which is characterized by the youngest average age in Europe, human resource management is a very important concept because the human factor is a source that can generate comparative advantages between states and organizations. Human resource management is the key to success for every organization, and it is also an important source to cultivate and manage a strategy that is required to attain competitive advantage by all organizations. This paper will would contribute to this factor by exploring motivational factors that would improve the performance of workers in various industries in general and in the wood processing industry in particular. Considering that Ferizaj has the most developed wood processing industry in Kosovo, our research focuses on this location in order to consolidate the performance of employees through motivation in this industry, hereby contributing to the enhancement of organizations

performance which would reflect on improvement of employability. This positive contribution would also be relevant to the University of Applied Sciences in Ferizaj, as potential students are those who have graduated from this University, which is now continuously producing specialized staff for today's market in this field.

The paper presents ideas on how to maintain a higher level of motivation that enables easier employee management and their promotion to achieve higher levels of performance at work.

Work motivation is one of the most important elements that help to increase employee performance and increase success in any organization activity. It encourages employees and managers to form certain positions in decision-making or to initiate concrete tasks in most productive way in production or services.

One of the primary management tasks is to know how to guide and motivate employees to achieve the goals of the organizations. Many researchers draw various theories in an attempt to find out what motivates people at work. Among the most popular theorists are: Maslow, Taylor, Mayol, Mc Gregor & Herzberg. The well-known theory of hierarchy needs, developed by Abraham Maslow's, was built using data from clinical author's studies on a group of neurotic patients (Maslow, 1954). This theory assumes that within every human being there is a group of extremely powerful needs, which can be positioned against one another in a hierarchy.

Based on the review of the literature, we focused the project mainly on the research of monetary and non-monetary motivational factors affecting the performance of employees. Within the structure of the work we have built an econometric model, where as a dependent variable, we have determined employee performance influenced by two independent variables as monetary motivating factors and non-monetary motivating factors.

The purpose of this scientific paper is to explore the correlation of these factors as monetary and non-monetary motivation with the performance of employees as well as the impact of these two factors together with the performance of the employees. The linkage and impact of these two factors to the performance of employees will be verified through correlation and linear regression.

1.1. Development background of wood and wood processing companies in Ferizaj region

After the 1990s, the wood processing industry in Kosovo incurred major changes from a centralized state-run economy organized in factories passed into small and medium-sized businesses where the smallest businesses occupy the largest share and later there were wards and factories.

From a planned state economy, it was transferred to a free market economy with owners and qualifications and diverse experiences.

These factors influence different ways in general and specific indicators of the capacity of wood industry companies (Sejdiu, 2016).

1.2. Data on the structure of industry in Kosovo and the wood processing sector

The structure of Kosovo industry presented in figures 1 and 2 was analyzed according to the number of firms operating in each sector and the importance of each sector in the economy from the aspect of the produced product and the level of export they fulfil (Republic of Kosovo, Ministry of Trade and Industry, Strategy of wood industry 2009-2013, Republic of Kosova).

From Figure 1 one can see that although the Food, Beverage and tobacco represents the largest concentration of businesses (in numbers) the wood sector is the second most concentrated sectors of industry in Kosovo very closely followed by the construction materials industry.

However, when one looks at the annual turnover among industries, the Construction materials industry is the largest one, mainly due to the fact that this is the period when Kosovo has undergone a post-war development (reconstruction and new builds) as a result of destruction during the war and a migration to larger cities of the rural population. Construction industry is followed by the Food, beverages and tobacco, Metallurgy and metal processing, Wood industry etc. If one look at the Wood industry sector, the majority of companies in this sector are micro (Table 1), which represents businesses with less the 10 employees (Sejdiu, 2016), while the largest concentration of businesses (Table 2) in this sector is in the Region of Ferizaj with about 345 companies, or expressed in percentage by about 22.3%.

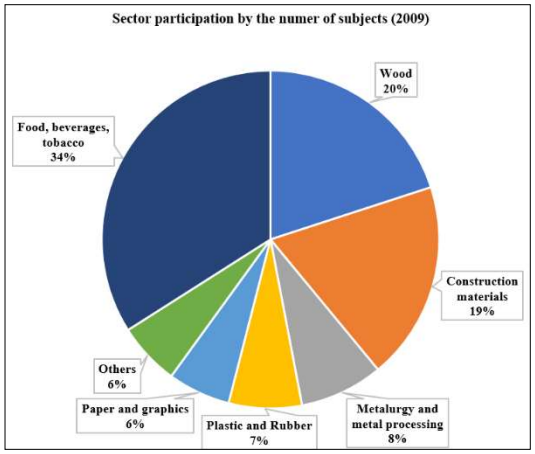

Figure 1. Sector participation by number of subjects (Source: Strategy of wood industry 2009-2013, Republic of Kosova)

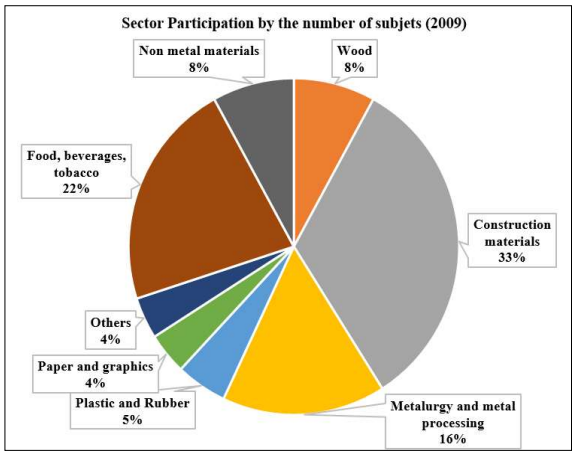

Figure 24. Sector participation by annual turnover (Source: Strategy of wood industry 2009-2013, Republic of Kosova)

Table 1. The structure of companies in wood industry

Magnitude	%	Number of workers
Micro enterprises	58.9	1-9
Small	23.3	10-49
Medium	14	50-249
Big	3.8	Over 250

Source: Sejdiu, 2016

Table 2. Number of companies by regions

Regions	Total
	No
Prishtina	337
Ferizaj	345
Peja	200
Gjakova	219
Prizren	212
Gjilan	99
Mitrovica	132
Total	1544

Source: Sejdiu, 2016

Many human resource management structures have seen that the key to a business's success is to create a collaborative system between employees and institution. They should be in function of each other. Therefore, according to Maslow, motivation is a desire, tendency, and impulse to complete an earlier task or job (Maslow, 1954). While Vroom saw the motivation closely related to performance, emphasizing the fact that the more motivated the employees are in their work, the higher performance and results will be (Vroom, 1964). The theory presupposes that each individual is a rational decision maker who determines which activities he will rely on to receive the desired rewards. For this reason, each employee behaves and responds depending on the personal effort and performance expected from him. The higher the employee's expectations, the more he will try to contribute to his work.

When one considers an important and valuable task, one acts with a high level of dedication and enthusiasm for its completion. Having that in mind, managers need to find creative ways to keep their employees motivated as much as possible. Motivation is very important for any company to improve employee's performance and organization productivity (Vinay, 2014, p. 226). It is a natural process that human performance is motivated and motivation can be related to increasing reward, and with rewards will be a better performance if compared to cases when there is no reward (Ibrar & Khan, 2015, p. 95-203).

The workers who work in private firms need more motivation than those who work in public firms (Sobia, I., Sultana, A., Ahmed, K., & Mehmood, N., 2012). It has been noted that firms that care about motivating their employees have a faster breakthrough than other firms (Nadeem et al. 2014, p. 52-58).

That motivation is a very important factor in enhancing the performance of employees that is proved by other investigators. The authors (Ismajli, et al. 2015, p. 38) explored the importance of motivating factors in the performance of workers in Kosovo municipalities. From empirical results, they proved that employee salaries, professional advancement, and promotion opportunities seem to be the most important motivating factors. According to them, motivated employees are more likely to increase their productivity during the provided service.

According to (Greenwich et. al. 2000, p. 65-67), motivated employees are more oriented towards autonomy and freedom and more self-reliant compared to less motivated employees. If workers do not receive bonuses, they tend to express their dissatisfaction through poor performance and not commitment to their work. It is necessary for organizations to consider workers' needs and feelings about rewards, not only to save industrial harmony securely, it is said that a happy worker is a productive worker (Muogbo & Uju, 2013, p. 150). An effective reward system will enable competition with other firms, which require a particular kind of competency and talent that is more stringent for potential candidates (William, 2010, p. 18).

According to the researchers (Zameer, Ali, Nisar & Amir, 2014, p. 293-298) it has not been noticed that non-monetary motivation is more important than monetary motivation. Their study conducted by the authors in Pakistan proved that job enrichment, work safety, reasonable wages and other additional incentives are important factors that impact employee performance to increase automatically and business achieves its goals easily. We can say that if senior executives put their focus on employee motivation, then it will lead to a positive growth in employee performance.

While the researcher (Uzonna, 2013, p. 210) in his research proved that non-monetary,

motivation such as non-cash bonuses can be an effective and cost-effective way to motivate employees. In conclusion, when we want to introduce a better performance of overseas employees, non-monetary bonuses are more effective motivational than money.

In the free market economy, based on today's globalization, only organizations that follow high performance by paying attention to their employees can have fast and secure growth (Chaudhary & Sharma, 2012, p. 29-35).

2. RESEARCH METHODOLOGY AND ECONOMETRIC MODEL

This research is based on the methodology of data collection through qualitative and quantitative methods. In quantitative terms, data collection was used through a structured questionnaire sent to respondents in an online form and face-to-face. The questionnaire was composed of 17 questions divided into 4 sessions. The first session (A) included questions related to demographic data such as age, sex, education etc. While in the second, third, and fourth sessions, there are questions about employee performance, non-monetary motivation and monetary motivation. In these sessions, the question of Likert 1-5 was used. While the qualitative method is implemented by using secondary sources such as similar research, information from the web, etc.

The study is focused on the research of companies in the region of Ferizaj, which consists of municipalities: Ferizaj, Viti, Kaçanik, Shtërpcë, Shtime presented in table 3.

Table 3. Total of companies in Ferizaj region

	Total of companies	
Region	No	%
Ferizaj	192	57,3
Viti	93	26,0
Shtime	24	6,7
Kaçanik	31	8,7
Shtërpcë	5	1,4
Region	345	100,0

Source: Republic of Kosovo, Ministry of Trade and Industry

According to the data of the Kosovo Tax Agency (2015), the wood processing sector in Ferizaj region employs about 800 workers (this number is thought to be higher especially during the third quarter of the year).

The questionnaire randomly was sent to 63 respondents (in 38 companies), the database was formed from their responses, and their processing was realized with the SPSS program.

Based on the literature review, we have built this econometric model and as a dependent variable is used employee performance whereas as independent variables are used monetary and non-monetary motivation.

$$Equation\ 1\ is: Y = \beta 0 + \beta 1X1 + \beta 2X2 + \mu \qquad (1)$$

Y – Employee performance
X1 – Monetary motivation
X2 – Non-motivation motivation
μ - error coefficient.

3. OBJECTIVE OF THE STUDY AND HYPOTHESES

The objective of this study is to find a link between the performance of employees in Ferizaj wood processing companies and monetary and non-monetary motivation as well as the impact of monetary and non-monetary motivation on employee performance. In this research we have set up two hypotheses that we will test through linear correlation and regression.

H1: There is a positive relationship between non-monetary motivation and employee performance;

H2: There is a positive relationship between monetary motivation and employee performance

3.1. Description of Variables.

3.1.1. Employee performance

An efficient management of employee performance is achieved when setting objectives for each employee, depending on their level of skills, efficiency and results from performance. In the literature review we have encountered different parameters that are used as employee performance measures. In this study, we focused on three performance parameters: Productivity, Quality and Performance (Zameer, Ali, Nisar, & Amir, 2014, p. 293-298).

3.1.2. Non-monetary motivation

The point of this variable is the personal motivation of employees or the psychological state that comes from within. This type of motivation is of great importance today, where job managers bring good performance, innovations and at the same time helps them to keep the stress down (Vinay, 2014). In the revision of the literature, different parameters have been used which affect the non-monetary motivation of workforce. In this study, we have used four factors such as working conditions, job title, job safety and enrichment of work through liability (Zameer, Ali, Nisar & Amir, 2014, p. 293-298).

3.1.3. Monetary motivation

As another motivational parameter, companies also use the financial aspect that authors have called monetary motivation. Usually, managers carefully and accurately design financial rewards that are largely used to motivate employees in order to increase productivity, raise sales, attract new customers, etc. (William, 2010). In the literature review, various factors of financial amplification have been used, but in this study, we focused on three factors such as individual wages and salaries, bonuses and individual incentives (Zameer, Ali, Nisar, & Amir, 2014, p. 293-298).

4. RESULTS AND DISCUSSION

4.1. Descriptive statistical results

From the data gathered we found out that from 1-10 employees had 14 companies; 11-20 employees had 7 companies; 21-30 employees had 3 companies and over 30 employees also had 3 companies. Research shows that 70% of employees belong to male and only 30% belong to the female gender.

Companies/organizations have begun to increase the number of new employees and train/prepare their companies to be more professional and productive at work. This is confirmed by our research, where a large percentage of 44% belong to the age of 23-32, compared to the other age that accounts for a smaller percentage.

The position of workers in an enterprise plays a special role for their motivation at work. From the results we see that 74% of the respondents belong to the worker position, 18% of the respondents make up the position of production managers, 5% are designers and 3% engineers. Based on respondents' responses, we see that the level of employees' education in woodworking companies had this structure: a higher percentage of workers had high school degree 49%, bachelor degree 36%, with higher education 2 %, and employees with low education 13%.

4.2. Employee performance

To describe the performance of workers in woodworking companies, based on the review of the literature, we have presented 3 questions (table 4). From responses, respondents appear to agree almost in most cases that labour productivity influences their performance, as well as the quality of work and performance, or the efficiency at work influences the performance of work.

Table 4. Determinant factors of employee performance

Answers	Nr	5	4	3	2	1
Your performance affects your work productivity	61	65.6%	23.0%	4.9%	1.6%	4.9%
Your performance affects your work quality	61	78.7%	14.8%	1.6%	0.0%	4.9%
Your performance affects fulfilling duty	61	77.0%	14.8%	1.6%	0.0%	6.6%

Increasing labour productivity may come as a result of better management planning by managers, as well as productivity might be increased if we have a higher qualification of employees. Our research shows that 65% fully agree with this statement, 23% agree, 5% neutral, and 7% disagree. Quality of services is a desired goal of company that promotes performance growth, in order to improve the quality of work, first it is necessary to determine what is it, and it is important to financially justify all efforts to improve quality. From the results we find that 93.5% of respondents agree that the quality of work affects employee performance, 1.6 % of respondents have been neutral and only 4.9% disagree at all. Also, the performance of the work affects the performance of the employees, which was confirmed by the respondents, where 91.8% of them agree with the above raised statement, 1.6 % are neutral and only 6.6% do not agree at all that fulfilling their job affects their performance.

4.3. Non-monetary motivation results

Non-monetary motivation involves the benefit of non-tangible values. In this case, non-tangible value may be: careers and social services such as working conditions, job safety, professional growth, promotion, etc. We have reflected the non-monetary motivating factors in table 5.

Table 5. Determinant factors of non-monetary motivation

Answers	Nr	5	4	3	2	1
Working conditions affect my motivation	61	73.8%	21.3%	4.9%	0.0%	0.0%
Safety at work affects my motivation	61	67.2%	23.0%	4.9%	3.3%	1.6%
The position affects my motivation	61	52.5%	19.7%	21.3%	3.3%	3.3%
Enrichment of work (increase of responsibility) affects my motivation	61	55.7%	21.3%	21.3%	1.6%	0.0%

Lack of good working conditions is the main factor for workers to leave the workplace. To avoid reaching this point, companies should offer employees good working conditions in order to motivate them. The results show that 74% of the employees in the wood processing sector in Ferizaj region think that good working conditions provide motivation and incentives to do the work that needs to be done.

Safety at work is an employer's obligation to guarantee the safety and protection of employees, besides, safety is also the motivation for most employees, this is also indicated by the percentage shown in the table 5.

Work title is the result of a great work that employees achieve during their performance.

Job upgrading or job accountability has a tremendous impact on employee motivation (Table 5; question 3), where 77% agree with this assertion, 21% are neutral and 2% disagree.

4.4. Monetary motivation results

Monetary reward or monetary motivation is a financial reward that an employee is required to achieve certain results. Research questions of the monetary factor were: wages and salaries, bonuses, special incentives (table 6).

Table 6. Determinant factors of monetary motivation

Answers	Nr	5	4	3	2	1
Salary and wages have an impact on my job motivation.	61	77.0%	18.0%	1.6%	3.3%	0.0%
Bonuses have an impact on my job motivation	61	75.4%	8.2%	8.2%	0.0%	8.2%
Personal individual stimuli have an impact on my motivation for work	61	77.0%	8.2%	3.3%	3.3%	8.2%

Wages and salaries are given when the objectives set out by the employees are fulfilled. This incentive encourages employees to reach higher levels of work and is a very good reason to meet the company's goals. Based on this research, it turns out that 95% agree that wages and salaries motivate jobseekers, 2% are neutral and 3% disagree.

Bonuses are rewards given occasionally for special occasions or to reward extraordinary work. Bonuses show positive appreciation to employees to give courage or motivation to do excellent work again. According to our respondents, it turns out that 84% of the respondents agree, 8% were neutral, while 8% disagree.

4.5. Empiric results and data analysis

Before giving the results and proving the hypotheses, the following table presents the results for the regression model through two Variance Inflation Factor (VIF) and Tolerance or F test. The F-test explains the relationship between independent variables through tolerance values and VIF values (Variance Inflation Factor) show (it measures) how variance participates in preventing coefficients of regression and how much they are influenced compared when predictive variables are not linearly linked to each other. From the data presented in table 7, we see that VIF's highest value is 1.225, which results to be within allowed values and given that $1 < VIF < 5$ correlation is moderate, and then we say that this correlation is quite high. The lowest tolerance value is 0.817, which means that is higher than 0.10 as the limit of allowed values. Since the values are within the allowed limits, it turns out that the regression model is acceptable, proving that independent variables do not have any strong interrelationships.

Table 7. F-test variance factor influence

Model		Co linearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Non-monetary motivation	.817	1.225
	Monetary motivation	.817	1.225

a. Dependent Variable: performance

Table 8 presents the summary model through adjusted R, R^2, R^2 and standard errors. From the results in the model we notice that the value R is 0.468[a], the value of R^2 is 0.219[a] and the adjusted R^2 value is 0.192. If the adjusted R^2 is converted to a percentage, we gain 21.9%. Ignoring the decimals, we gain the value of 22% changes in employee performance and it is explained through independent variables.

Table 8. Model evaluation

Model Summary b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.468a	.219	.192	.862

a. Predictors: (Constant), monetary, non-monetary

b. Dependent Variable: performance

The statistical values for each independent variable in the model are presented in table 9 n and the results of the Beta coefficient for the independent variables are: Non-monetary motivation .464 and monetary motivation .359. It can be seen that based on the height of the Beta coefficient, the higher impact on employee performance has non-monetary motivation then monetary motivation. As for the significance coefficient shown in the last column of table 9, monetary motivation is .018, $p < 0.05$, which means that the contribution of monetary motivation has a high statistical significance in the performance of the employees. But the second non-monetary motivational variable has value for coefficient significance .067, $p > 0.05$, which confirms that the given contribution of this variable to the performance of the performers does not have a high statistical significance.

Table 9. Evaluation of each independent variable in equation

Coefficients						
Model		Unstandardized		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.868	1.017		.854	.397
	Non-monetary	.464	.248	.240	1.866	.067
	Monetary motivation	.359	.148	.312	2.430	.018

a. Dependent Variable: performance

Correlation results between employee performance and non-monetary motivation suggests that these two variables have a correlation between themselves since the coefficient of significance $p = 0.003$ is therefore less than 0.05, which means that there is a relationship between them. While the Pearson coefficient shows us the strong correlation between these two variables from table 10 we see that $r = 0.373$, which means that these two variables have a low relation between themselves since $r < 0.49$, and also by the sign it is recognized that the relation between them is positive, thus confirming H1.

(H1: There is a positive relationship between non-monetary motivation and employee performance)

The result of the employee performance report and monetary motivation presented in table 11 also confirms a significant, positive, mid-range correlation between these two variables ($p = 0.001 < 0.05$; $r = 0.41 \geq 0.49$), whose results confirm H2.

*(*H2: There is a positive relationship between monetary motivation and employee performance).

Table 10. Employee performance report with non-monetary motivation

Correlations		Performance	Non-monetary
Performance	Pearson Correlation	1	.373**
	Sig. (2-tailed)		.003
	N	61	61
Non-monetary motivation	Pearson Correlation	.373**	1
	Sig. (2-tailed)	.003	
	N	61	61

Table 11. Employee performance report with monetary motivation

Correlations			
		performance	monetary
Performance	Pearson Correlation	1	.415**
	Sig. (2-tailed)		.001
	N	61	61
Monetary motivation	Pearson Correlation	.415**	1
	Sig. (2-tailed)	.001	
	N	61	61

5. CONCLUSION

Generally, the results of the respondents are positive for all the elements that have been analyzed: employee performance, monetary and non-monetary motivation. The results proved to have positive correlation between employee performance and monetary and non-monetary motivation. Also, based on the empirical analysis it can be concluded that non-monetary and monetary motivation affect the performance of the employees in the wood processing companies in Ferizaj region. In addition, the study results show that working conditions are important in the wood processing cabinet system and have a positive impact on their motivation to work, according to the surveyed employees with 95.1% who fully agree.

Apart from the many factors influencing the motivation of employees in wood processing companies, the results show that wage is the best motivating factor showing a degree of compliance of 95%, a factor that influences the motivation of the employees resulting in a higher level of their performance.

In most enterprises, a great importance is dedicated to the rewards of employees for the results achieved in achieving the objectives of the enterprise for which benefits, bonuses or special incentives are given.

It should also be mentioned the level of employee's qualification in enterprises where a percentage of 49% of employees have high school education and close to these are with 36% bachelor degree employees showing that the level of education is quite good for employers.

Finally, although not all motivational factors are found in different enterprises, most of them are oriented to add motivation factors to motivational material instruments, trying to achieve higher performance of employees, which results in achieving the company's objectives. Knowing these motivating factors, it is important for increasing the performance of the enterprise as a whole.

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ENTREPRENEURSHIP AND FIRM GROWTH IN TRANSITION: THE CASE OF KOSOVO

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Abstract

This study explores the development of entrepreneurship in the transition phase and integrations processes with particular emphasis on challenges of firm growth and development in Kosovo. Moreover, this is an investigation of the perception of small business owners/managers' on specific obstacles to growth and develop their businesses. This paper is supported by a special empirical study based on a survey conducted with 200 businesses including 7 regions of Kosovo. It was organized in the first half of 2017 directly with key business actors which identified the main problems of entrepreneurship development and business growth. However, various obstacles have been identified, mainly related to environment of doing business. From the data obtained from the field, statistical factor analysis has been done to measure the impact of various variables on business growth. Additionally, data analysis shows that there is a close correlation between the obstacles and the growth of businesses. The research results raise important issues for discussion and recommendations regarding applications of policies and strategies for the development and growth of businesses in Kosovo.

Key words: entrepreneurship, firm growth, transition, and obstacles.

1. INTRODUCTION

Entrepreneurship as a new discipline of management that during last few decades has expanded extraordinarily on a world wide scale, building upon a sustainable source of new employment, innovation and economic growth (Morales & Roig, 2005). Nevertheless, it is perceived that knowledge on firm growth is still limited (Davidsson & Wiklund, 2000); (Wiklund & Shepherd, 2003). Differently, in south-east European countries including Kosovo the transition started with low level development and under larger number of challenges. The economies of these countries are based exclusively from small firms. In Kosovo small firms are the engine of the entire economy and a key factor of development. Moreover, small firms are considering as an entrepreneurial and the innovation spirit, and plays a crucial role in fostering competitiveness and employment. Small businesses are an individual key to harnessing entrepreneurial spirit and innovation, thus are crucial to ensuring competitiveness and local economic growth (Gashi, 2015). "The growth and survival prospects of new firms will depend on their ability to learn

about their environment, and to link changes in their strategy choices to the changing configuration of that environment" (Geroski, 1995).

In transition countries with a low level of development, uncertainty is caused by the lack of support from institutions and missing information on potential future behavior in the business environment. "Uncertainty is a perceptual phenomenon derived from an inability to assign probabilities to future events, mostly because of a lack of information about cause/effect relationships," (Hoskisson & Busenitz, 2002). Adapting and applying the new mindset of entrepreneurship in practice, including the segments with the impact of business growth is mandatory for these countries.

The existing literature in relation to entrepreneurship and firm growth still considering that is highly fragmented. Therefore, there is ample room for further investigation knowing their importance for the economic development of each country.

2. THEORETICAL APPROACH

In general meaning, freely we can say that entrepreneurship is a multidisciplinary field, in which many other sciences are involved. The eclectic and pervasive benefits of entrepreneurship are generating research questions that were in interst of scholars in a variety of disciplines. These issues have been primarily examined within the context of a scholar's own discipline while ignoring insights from other disciplines. This approach has left entrepreneurship research as a widely dispersed, loosely connected domain of issues. In this point of view, the authors explore entrepreneurship research in accounting, anthropology, economics, finance, management, marketing, operations management, political science, psychology, and sociology. They seek to identify shared interests that can serve as a bridge for scholars interested in using a multi-theoretic and multi-methodological lens to design and complete entrepreneurship studies (Duane & Webb, 2007).

In this paper, will be discussed the unique character of entrepreneurship in transition, and then analyze how this might change over the time parallel as the transition process moves forward. In one of their studies on entrepreneurship in transition economies of the Central and Eastern European economies, Karaye, M., and Ciftci, (n.d), emerging the main characteristics of the entrepreneurship in these countries. In that study, they analyzed transition economies of CE (Central Europe), including the eight most advanced countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia) and South-Eastern Europe, including Albania, Bulgaria, Croatia, Macedonia, and Romania. The transition from a controlled to a market economy is a long process involving various spheres of economic activities. Economic, historical, geographical and cultural legacy of transition economies brought about different performances during the transition period. They identified that Central and East European countries, being different from other transition economies, they had the advantage of having a shorter central planning period because of their geographic closeness to the European Union. For this reason, these countries applied transition reforms more easily. Central and Eastern Europe countries, except Albania, Bulgaria, Romania and former Yugoslav countries, made faster reforms compared to other transition economies (Karaye, M., & Ciftci, M., n.d.).

As observed, transition economies have lower rates of entrepreneurship development than in most developed and developing market economies. The difference is even more visible in the countries of the former Soviet Union, when compared with countries of Central and Eastern Europe. One may relate such differences partly with the legacy of communist planning, which needs to be replaced with formal market-supporting institutions. But, despite these developments now well established, entrepreneurial activity still remains low in many countries. To analyze this long-term issue, it is necessary to highlight the slow paced development of new informal institutions and the corresponding social attitudes, and notably rebuilding the overall trust. It is argued that changes are even slower in the former Soviet Union than Central and Eastern Europe because the communist rule was much longer, leading to a lack of institutional memory. In this contest, Estrin and Mickiewicz, (2010) discussing in the paper edited by IZA[16] say "The implementation of those changes in informal institutions may be delayed until after a full generational change".

What is firm growth? There are many scholars that have made significant contributions in this field. However, discussing the theory in context of what firm growth is, we find ourselves needy to consult opinions considered to be the only true classic theory in this area. Edith Penrose, in her inspiring book, characterizes the phenomenon of growth as follows: "The term 'growth' is used in ordinary discourse with two different connotations. It sometimes denotes merely increase in amount; for example, when one speaks of 'growth' in output, export, and sales. At other times, however, it is used in its primary meaning implying an increase in size or improvement in quality as a result of a process of development, similar to natural biological processes in which an interacting series of internal changes leads to increases in size accompanied by changes in the characteristics of the growing object" (Penrose, 1959).

Additionally, in the light of theoretical explanation many scholars in different points of view tried to conceptualize the growth of business. There isn't any all-acceptable definition regarding this theory. This is a multidisciplinary theory with many implications. But, in a narrow meaning, growth means creation of new values of business, succeeded by many indicators that express growth and success in a certain period. The OECD defines high growth firm (HGFs) as: "enterprises with average annualized growth in employees or turnover greater than 20 percent per annum, over a three year period, and with more than 10 employees at the beginning of the observation period" (OECD, 2007). Further, growth can be achieved in different ways and with varying degrees of regularity, and it manifests itself along with several different dimensions such as sales, employment and accumulation of assets (Davidsson, Leona & Lucia, 2010). Many theories have been developed by different authors regarding the growth of the firm but the last stage that includes the period from 70s – onwards which is based on so called 'new growth theory' mostly involved the institutional theory in new circumstances of transformation systems from controlled to free market economy. Thus, where the influence of institutions in the development of entrepreneurship is too high and the transition stage facing with a lot of challenges.

[16] Saul Estrin, Department of Management London School of Economics & Tomasz Mickiewicz University College London. IZA is Institute for the Study of Labour, Bon – Germany.

3. METHODOLOGY

As mentioned above, was initially organized a preliminary proceeded *face-to-face interviews with owners/managers or other key persons of 20 businesses in the Pristina district. The entire process of data collection was conducted in a period of January until June 20017*. It was a random selection from the business registry. The intention was to test the questionnaire, to generate ideas and learn more about the research problem in order to proceed with the main survey. The same questionnaire, with minor changes, is used in the main empirical research distributed throughout Kosovo.

The process enabled to collect a required rate of 230 surveys. It is managed to ensure 200 valid surveys for analyses. The sample was drawn randomly from the business register, extracted by the Ministry of Trade and Industry/Agency for Business Registration.

The allocation of businesses survayed included 7 regions of Kosovo. The subjects of population of the research are the managers or owners including three sectors: Production, Trade, and Services.

Table 1. Sample structure by region (in percentage)

Gjakova	Mitrovica	Gjilan	Peja	Ferizaj	Prizren	Prishtina	Total
17	18	18	20	19	34	74	200

Source: By author

The growth of businesses can be measured by many different indicators, most common being sales, employment, assets, physical production, market share and profits (Ardishvili et al., 1998, Delmar, 1997, Weinzimmer, et al., 1998 & Wiklund, 1998). Among available alternatives, a researcher would have the choice to a) create multiple indicator indexes; b) use alternative measures separately, and c) find the one, the best indicator. If growth is conceived of as a latent construct with common causes but alternative manifestations, multiple indicator indices make sense (Davidsson , 1991). Different studies have used a range of diverse theoretical concepts of firm growth to measure the numbers within any given economy (Henrekson & Johansson, 2010). In theory, we find that more broadly discussed and frequently used are the three groups of indicators to measure growth. According to some authors (Garnsey, Stam & Heffernan, 2006); (Moran & Ghoshal, 1999) firm growth can be measured in three different ways:

a) inputs (investment, employees);
b) value (assets, market capitalization) and
c) outputs (sales, turnover, profits)

Based on the foregoing considerations for this imperial study, has been made tangible choice and have selected two indicators of growth, *growth of sales* and *growth of employment.*

4. DATA ANALYSES

The questionnaire included a large number of questions, but in this study are analyzed variables related to institutional support and rule of low. The table below shows groups of independent variables and the impact to growth of sales and growth of employment. The measuring method is ranked in a Five Point of Likert scale from 1 (strongly disagree) to 5 (strongly agree). In this

context are measured the perception of owner/managers whether the respective barrier hinders the growth of their business.

First of all, is testing the validity and reliability of the survey data as a prerequisite for data analysis and conclusions. The process is performed in two steps. In the first step, the reliability of the questionnaire is tested and in the next step factor analysis is conducted in order to remove the variables with lower factorial weight (under 0.4). In this micro-test, "α" is used as a measure of consistency on the internal scale, using the SPSS (Statistical Package for Social Sciences). According to Field (2009), values between 0.7 and 0.8 of "α" are considered to be acceptable, as it is seen in the literature, but this is not always correct.

Reliability analysis can be used to measure the consistency of a questionnaire. In this search, the final alpha Cronbach coefficients of all elements ranged at 0.732. The column Cronbach's Alpha if Item Deleted shows the reliability level if a specific variable is deleted from the measure. Checking carefully all variables, it can be noted that if the variable 'Inefficiency of justice system is an obstacle to growth your business' is deleted, the reliability of the scale will grow up to 0.770 and this is a good value that shows that level of reliability at a satisfactory level. After removing the above variable, now the Alpha coefficient has changed to 0.770 and the total number of items entered for reliability analysis is reduced to 29. The Alpha coefficient shows that the measure is very reliable. First of all, to create the factors and compare the impact of different factors as of perceptions of owners/managers are performed the factorial analyses.

4.1. Factorial Analysis

Factorial analysis is one of the statistical techniques with many variables widely used to reduce the number of variables that are related to each other in a small number of important and independent factors (Hair et al, 1998). The term Factorial Analysis includes various interrelated techniques. The most commonly used method of these factor analysis methods in factor benefit is the Principal Component Analysis (PCA). In this method, the first factor is calculated to explain the maximum variance between variables. To explain the remaining variance, we use the second factor and so on.

In factorial analysis, by accumulating variables that have high correlation between themselves, is dealt with creation of general variables (factors). But the focus is to identify variable based on in the highest factor value. Moreover, the purpose is to:

- Reduce the number of variables (if exist the variables with value under 0.4 to exclude from analysis)
- To identify the most important variables

This analysis is based on the extraction of the main components (PCA) and the Varimax method for maximizing variance, so that the results are easily interpretable. But, since this case possesses a dependent variable, throw PCA analysis the intention is to analyze factorization of independent variables and formation of factors. In this context are formed 2 groups of variables with overall variables and are drown the results for each variable and group separately.

A principal component analysis (PCA) was conducted including 11 variables with orthogonal rotation (varimax). The Kaiser–Meyer–Olkin (KMO) measure verified the sampling adequacy for the analysis. As seen in the table 2, the KMO test is 70.9% (0.709), since 0.709 > 0.50, can be concluded that the data set is appropriate for factorial analysis. As shown in the table 4 the

second test presented is Bartlett's test which resulted to be significant (Sig., .000). This means that there are high correlations between variables, in other words the data set is appropriate for factorial analysis.

Table 2. KMO Results and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.709
Bartlett's Test of Sphericity	Approx. Chi-Square	2108.620
	df	435
	Sig.	.000

In the table 3 are SPSS Output data lists the eigenvalues associated with each linear component (factor) before extraction, after extraction and after rotation. The eigenvalues associated with each factor represent the variance explained by that particular linear component and SPSS also displays the eigenvalue in terms of the percentage of variance explained. There are different methods for determining the number of factors. In proceeding of analysis we had selected the Eigen statistic which takes into account factors greater than 1. In table 3, there are 2 factors greater than the value 1 (Eigenvalues). Usually, the first few factors explain relatively large amounts of variance (especially factor 1) whereas subsequent factors explain only small amounts of variance (Field, 2009). The first factor explains 16.8% total variance (in the last column). The first factor and the second factor together explain the 49.8% of total variance. The number of factors resulting from factorial analysis is equal to the number of Eigen- values greater than 1. Since, an Eigen value is the amount of variance explained by one more factor, it makes no sense to add a factor which explains less variance that one variable contain (Hair et al, 1998, p. 365). The data in table 3 shows that the total of the components gained have the Eigen-value indicator greater than 1, as specific characteristic of factor analysis.

Table 3. Explanatory percentage of variation of variables

Total Variance Explained									
Componen t	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumu lative %	Total	% of Variance	Cumu lative %	Total	% of Variance	Cumulative %
1	4.326	14.420	14.420	4.326	14.420	14.420	3.629	12.096	16.841
2	2.535	8.449	34.384	2.535	8.449	34.384	2.362	7.872	33.007

The Rotated Component Matrix is the final result of factorial analysis. The purpose of the rotation is to take advantage of important factors that can be interpreted. Below, in table 4 the Rotated Component Matrix is realized. In the matrix the correlations between the original variable and its factor can be seen. The variable that has the largest weight under a certain factor means that the variable has a relation to that factor. In the case, when the number of data observations is above 350 the factor weight should be 0.30 and above. But weights 0.50 and above are accepted as very good values (Hair et al, 1998, p. 385).

As per perception of owners/managers of SBs surveyed, barriers related to *rule of law* resulted to be with high factorial weight that has its influence on their business growth. Among such barriers, are selected seven determinants, those that are more dominant and have more effect

on growth. In following we proceed with the factorial analysis of the barriers related to the lack of institutional support (LOIS), based on the perceptions of owners/managers expressed in degrees from 1. Strongly disagree up to 5. Strongly agree. From this set of barriers we have extracted four (4) variables with factor values greater than 0.4. Additionally, 2 factors (columns) are drawing and the weights rated on the base of importance of each variable under each factor. According to the data in the table 4, we can see the impact of each variable separately to the growth of businesses, based on a comparison of the highest value.

From the data obtained it can be seen the 'Informal economy' variable has the largest weight (0.873), and in the following the variables with highest value are rated 'Corruption in government institutions' 0.807 'Insufficient of justice system' (0.788), 'tax evasion' (0.762), 'Political influence ' (0.759), 'Organized crime 0.746' and so on. Finally, we conclude that in the first group of barriers, regarding the *lack of rule of law* (LORL) can be seen that all variables resulted to be with factor weight over than 0.50, means that all variables of this group have a high effect on SBs growth.

Table 4. Factorial analysis of variables

Rotated Component Matrix[a]		
	Component	
	1	**2**
Lack of Rule of Law (LORL)		
Informal economy	0.873	
Corruption in government institutions	0.807	
Inefficiency of justice system	0.788	
Tax evasion	0.762	
Political influence	0.759	
Organized crime	0.746	
Corruption in courts	0.712	
Lack of institutional support (LOIS)		
Economic policy		0.690
Access to finance		0.677
Administrative procedures		0.620
Current tax policy		0.538
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 21 iterations.		

All environment factors influence business growth, and the importance of these factors consists on the interrelation of daily activities to institutions and mechanisms that regulate their activities. As of the group of factors related to 'Lack of institutional support', from the table 4 can be seen the 'Economic policy' variable has the largest weight (importance (0.690), following variables 'Access to finance' (0.677), 'Administrative procedures' (0.620), and the last one is 'Current tax policy' rated with factor wight (0.538). Finally, we conclude that in the second group of barriers with the highest weight (importance) values are: 'Economic policy' (0.690) and 'Access to finance' (0.677).

5. CONCLUSIONS AND RECOMMENDATIONS

In the summary of this study, in the light of a multidimensional nature of the problem and the diversity of implications, may concluded that are comprised some of the factors that influence firm growth, and give a logical understanding of the problem. So, despite a considerable progress achieved in entrepreneurship development, Kosovo must strongly fight to reach the main objectives and standards that ensure a comfortable environment of doing business, in order to create the better conditions for business growth. The summary of all findings confirmed that the lack of adequate business environment due to barriers is evident. These barriers are associated with deficiency of institutional support to overcome them. As we have learned from a broad spectrum of theoretical explanations in one side, and results obtained from the field research on the other, we will summarize a series of recommendations for reducing barriers to the firm growth in Kosovo:

1. Improving efficiency of the judiciary system is a priority of priorities for relevant institutions in Kosovo. All court proceedings involving businesses must necessarily be improved, to increase business confidence and provide a more favorable business climate. A unified data management system that would be used to improve efficiency, transparency, and accountability of judicial system, particularly the commercial courts, should be established.
2. Improving capacities of the prosecutorial system in combatting informal economy and negative phenomena of doing business is also necessary. In this case, all action must be fair, balanced and completely independent from political influences. The government should strive to develop a more effective and efficient tax inspectorate ensuring accountable and transparent function. These policies would reduce fiscal evasion by increasing voluntary cooperation and performance enforcement mechanisms.
3. Official authorities need to adopt and implement serious anti-corruption policies and also increase accountability of the people in institutions. The institutions should work to reduce the overall risk of the business environment by improving general services for businesses.
4. Financial barriers, especially the high cost of funding and limited access to finance, seems to be improved, compared with other previous studies conducted in the country, or are less pronounced than other factors. Official authorities should develop and implement financial support policies to alleviate the problem of financial burdens, and devise grant and subsidy schemes to encourage the development and growth of businesses.
5. All administrative barriers related to support services should be eliminated, in that way improving transparency, while budgetary support to local institutions (municipal business offices) serving businesses locally must be strengthened.

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

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IMPACTS ON ECONOMY AND TOURISM IN KOSOVO CAUSED BY THE COVID-19 CRISIS

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Abstract

As COVID-19 reaches everywhere, low- and middle-income countries are racing to respond to this massive and fast-moving challenge. Household income, especially for the poor, will be hard-hit, linked to disruptions in tourism and declining remittances. The economic impacts of the COVID-19 crisis are increasingly hitting low- and middle-income countries and the poor. International travel restrictions and the full or partial closure of businesses and industries in Asia, Europe, and North America have led to a collapse in global travel and are expected to reduce the flows of remittances. Tourism and remittances are important sources of employment and incomes for the poor, respectively. This post assesses the potential impacts of the expected reductions in these income flows by using Kosovo as a case study. The pandemic is likely to have a significant economic toll.

Key words: Tourism, Economy, Kosovo, Crisis, Covid-19.

1. INTRODUCTION

From the survey we conducted with about 100 businesses (resorse CBK), the most common form of ownership in Kosovar businesses is Individual Business (B.I) with a share of 70.3%, Ltd with 29.7% and partnerships, etc. we did not have any that answered the questionnaire.

For each month that the COVID-19 crisis persists, our simulations using Ministry of finance multiplier model for Kosovo suggest national GDP could fall by between 1.5 % and 4.0%. Kosovo is a rising star among emerging economies. Even though several reforms remain to be completed, the reform program launched in 2016 has started to bear fruit: Kosova has achieved economic growth of over 4.2% in the last two years. The tourism sector recorded its highest revenues in 2018-19, another sign of increased stability. Continued efforts aimed at improving Kosovo business climate were expected to lead to even stronger private sector growth and economic diversification in 2020 and beyond.

This progress will almost certainly be interrupted by the COVID-19 pandemic. While the government is taking actions to contain the spread of the virus—including the suspension of commercial international passenger flights, school and sports clubs closures and a nationwide nighttime curfew, and the number of reported infections in kosovo is currently low (29 aprill)

compared to that of many other countries, the global economic slowdown is expected to have major knock-on effects for Kosovo. International travel restrictions are already curtailing tourism to the country. The global slowdown is likely reducing payments received from Brezovica mountains and Rugova and remittances from Kosovars working abroad. These three sources together account for 20.5% of Kosovo GDP. Thus, any disruptions to these foreign income sources will have far-reaching implications for Kosovar economy and population in this pandemic COVID-19.

The International Monetary Fund has approved a €51.6 million (US$56.06 million) loan for Kosovo to tackle the economic crisis caused by the new coronavirus and address urgent balance of payments issues, the international lender said.

It said the pandemic will hit Kosovo's economy hard."The economy is expected to contract by 5 per cent in 2020 as tourism receipts, remittances, exports of goods, and FDI will decrease due to travel restrictions and the effect of COVID-19 in trading partners and remittance-originating countries," the IMF said in a statement. The small Balkan country had expected to see economic growth of around 4 per cent this year. The government said it will inject €180 million into the roughly €8 billion economy to help the private sector cope with the crisis.

As of late on Friday around 250 people were infected with the coronavirus in Kosovo, including seven deaths.

Pandemic COVID-19 government measures and their impact on economic life

After the presentation of the pandemic known as COVID-19 with the recommendation of the Ministry of Health and with the decision of the government number 01/09 [1] dated 13.03.2020 then the announcement of the name of the emergency with the decision 01/11 [2] dated 15.03. 2020, most economic operators have been closed except those authorized by the order of the Ministry of Economy, Employment, Trade, Industry, Entrepreneurship and Strategic Investments (MEPTINIS) number 01/04 [3] dated 20.03.2020. According to the collected data, 64.9% of businesses have been closed, 29.7% have operated with reduced hours and staff, while only 5.4% have operated normally.All these losses, or rather the non-realization of revenues, have influenced these businesses to have difficulties in their operation and liquidity in the realization of payment of obligations such as salaries, rents, loans, etc.

Seeing this situation and based on the practices of the most developed countries, the Government of Kosovo has drafted an emergency package [1] and also the CBK has drafted and issued a decision on the possibility of postponing installments. These measures have helped maintain alive and facilitating overcoming the current situation.

How much have these measures affected and how effective and welcomed have they been by Kosovar businesses from the data we have extracted from the questionnaire:

CBK decision to postpone installments

Postponement of loan installments for businesses and individuals whose incomes have fallen or spent more due to pandemics has not been supported or has not been seen as assistance to 52.9% of respondents, 3% have not yet decided to use courses 44.1 % have used it.

From this we can conclude that this measure issued by the CBK has not been adequate, has not been in good coordination with the business community, chambers of commerce, and financial

operators operating in Kosovo as Banks and other IMF and thus has not resulted as mitigating measure as the interest of the months that have been postponed by the bank have shifted it in various forms to other installments which has made it inadequate.

In our question posed about this issue:

"Should the government subsidize some of the interest in order to help invest and grow businesses?" 87% of respondents agreed that it was necessary to subsidize a part or all of the interest, 9% of them said they should not and 4% did not see it as necessary help. Based on that, we can say that it was a hasty decision and the government had to consult with businesses and chambers of commerce. Emergency package from the Ministry of Finance.

On 3.04.2020, the Ministry of Finance issued the decision no. 31/2020. pension contributions, etc.) Based on the data extracted from the questionnaire, 81.1% of them have applied to this extent and 18.9% have not applied.

As can be seen in the graph, only 2.7% of respondents can survive over 6 months if the situation does not improve. This gives us indications that the government, relevant ministries, CBK and all other actors that have an impact on the regulation of economic life in the country have not taken sufficient steps to cope with the situation for a period longer than 6 months and thus it is seen that 24.3% of businesses are in critical situation, 54.1% can survive a maximum of 3 months and 18.9% could mitigate up to 6 months. This makes us realize that we are in a very critical situation for the collapse of the economy. What the government should have done better, what the business managers should have done better in this critical time and not experienced before. We have given our recommendations in this paper based on our findings and analyzing best practices. of other countries.

What the government should have done differently

The government when drafting the emergency fiscal plan had to consult with the business community because according to our findings 86% of respondents stated that the package was not enough (graph no. 9). The government had to draft a plan together with other actors. that regulate economic life and determine which businesses will be helped as some have been allowed to work and have benefited from the scheme which has affected that the shared budget has not been enough.

It has also had to find alternative ways to increase this budget by seeking help from international bodies by reviewing the budget.

The CBK, on the other hand, had to be clearer on how to complete the installments, it had to look at the possibility that the part of the interest on the installments that have been postponed should be fully or partially subsidized, where the survey conducted has this opinion. another 87% of respondents (Chart 7), so that businesses can be more liquid in covering other expenses, as according to our data referred to Chart 10 it is seen that 24.3% of the activities surveyed are at a critical stage and at risk shutdown. Inadequately, only 44.1% used this opportunity to postpone the decision.

What businesses had to do differently

In order to be prepared for emergencies, businesses need to keep in mind that in their management or management they have qualified managers, ie professional managers, as this

would help them create long-term policies and policies for emergencies. As can be seen from the survey, 62% of respondents are businesses that provide services. These businesses had to find alternative ways to operate using information systems in order to carry out the operation (online consulting, other online services), in bars and cafeterias it is seen that They would be able to operate the "Take Aëay" sales system as this was allowed by the Ministry of Commerce, and the boutiques could also use online sales and online orders so that they could operate and not be. at a loss. As can be seen from the data extracted from the questionnaire, only 13.8% have used alternative online channels.

As of April 22, Kosovo has 434 confirmed cases, and 17 deaths. With the number of people hospitalized dropping and those recovering outnumbering new positive cases, Kosovo has started to gradually ease some restriction measures in mid-April. The country remains under lockdown, but business hours have been extended and an increasing list of businesses can resume their activity provided they respect strict social distancing and hygiene measures. Schools, universities, public transport, restaurants and cafes remain closed and international travel has virtually stopped. Only repatriation flights continue, but returnees are expected to stay in quarantine for two weeks. Kosovo extended the state of natural catastrophe for another two months until June 23rd, enabling the government to continue using extended powers to deal with the situation. If the outbreak remains under control, a gradual opening is expected to continue with the government trying to a figure a way to salvage some of the forthcoming tourist season. These measures were preceded by amendments to the penal code adopted on April 18th, with harsh punishments for those breeching the lockdown or quarantine. Since detecting its first case on March 8th, due to its proximity and close links to Italy, Kosovo adopted some of the toughest restrictive measures in Europe. In urban areas, only one person per household can go out for a maximum of 90 minutes per day after applying for permission in the government digital platform, while pensioners should stay inside and will receive their pensions by post. A weekend curfew is imposed nation-wide. Small businesses, individuals affected by the pandemic measures and students will be able to hold off on rent payments for April and May according to a new normative act. For judicial and administrative procedures (except domestic violence and custody cases), the clock has been put on hold. On March 28th, Kosovo sent a team of 30 doctors and nurses to help fight against the COVID-19 pandemic in north Italy, one of the worst hit areas in the world.

Key Policy Responses as of April 22, 2020

The government will bear the interest costs. The government has also adopted tax deferral measures allowing all companies (except banks, telecommunication, public enterprises and companies in the chain of supply of essential goods) to defer payment of profit tax until after September. Tourism, active processing and call centers – as well as small businesses with turnover of Lk14m or less – can defer payments of profit tax to next year.

2. MONETARY AND MACRO-FINANCIAL

To address the liquidity bottlenecks of companies and individuals, the Bank of Kosovo announced a temporary change on the provisioning requirements , effective from March 12th to May 31st, enabling clients to ask banks and other financial institutions to defer loan installments without penalties. On March 25th, the Bank of Kosovo cut its key policy rate -the

weekly repo, by 50 basis points to a new historic minimum of 0.5 percent. The Governor announced that the banking sector is liquid and well capitalized, and the central bank stands ready to provide unlimited liquidity for as long as needed.

The Bank of Kosovo CBK suspended dividend distribution for 2019 and 2020 for banks until the end of June in order to boost capital and support lending during this period. The central bank also halved the salaries of its supervisory board and top management for the duration of the pandemic. To urge the use of internet banking and reduce the number of people requiring services in bank premises, the central bank also waived the commissions for transfers in local currency.

2.1 *Exchange Rate and Balance of Payments*

Kosovo has a floating exchange rate. The Bank of Kosovo intervenes only in pre-announced purchases to boost reserves or to smooth excessive and disruptive short-term volatility. No measures regarding the exchange rate market have been announced

3. HYPOTHESES

The first hypothesis is accepted as correct, because if the pandemic lasts for more than 3 months, about 45.9% of businesses will be closed and this will cause the increase in the number of unemployed only in the interviewed businesses will remain unemployed about 228000 persons or 71% of all employees in the companies we have analyzed this will affect the demand for products.

The second hypothesis has been accepted as correct, as 87% of businesses have stated that it is necessary for the state to intervene in interest rates and for the government to pay the difference, in order to save businesses from bankruptcy. This fiscal package is temporary and very short-lived.

4. CONCLUSION

Looking at the search

In conclusion, we can say that the CBK should play a more active role in regulating the healthy economic life in the country by reviewing interest rates, interest subsidies or other forms in order to overcome the economic crisis and so that businesses can grow.

As well as businesses need to be careful in real management and do market analysis and trend analysis of the global economy and use the development of technology to create new markets to exploit these channels to reduce costs because any government package cannot be salvation it can be a help but not depend only on this resource to be able to stay in the game.

Achievements

Based on the data, it has been possible to verify the hypotheses raised, it has been possible to point out the shortcomings in the emergency fiscal packages set up by the government, as well as the shortcomings of the CBK decision regarding the postponement of this case. our businesses in managing unusual situations.

Future work on this topic

This paper has a scientific and study basis, it can be used by other institutions for various purposes, be they state or business communities, but also other researchers in order to further develop this issue. The paper has a scientific basis as it has primary primary data.

But given the situation in which the work was done, the small number of respondents (about 100 respondents who had sufficient elements for analysis) the work could be expanded in the future.

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4. Information and Strategy

- E-business
- Benefits from Information Systems
- Globalization and Information Systems
- Small Medium Enterprise and Information Systems
- Public Administration (policies and regulations)

T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

17th -18th September 2020, Mitrovica, Kosovo

HIGHER EDUCATION IN THE ERA OF GLOBALIZATION AND TECHNOLOGY: THE CASE OF KOSOVO

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Abstract

The impact of globalization combined with technology advancement on economy, politics, and society is ongoing. Such impact is reflected in the education system as well supporting development and competitiveness in the knowledge economy. Internationalization of higher education is result of globalization, and integration of information systems is affecting the evolution of these institutions and stimulating education reforms as well. Kosovo is not an exception to the changes that globalization and the information technology have brought about in higher education in Europe and worldwide. The process of internationalization and utilization of IT in the education sector has continued to accelerate in the last decade. This is best indicated, when due to the outbreak of the COVID-19, Universities within a week have moved from in-class learning to online teaching. Therefore, this study investigates the impact of globalization and the technology on the higher education sector and the national policy reforms toward internationalization and digitalization. The research was conducted in the context of Kosovo, more specifically at the University of Applied Sciences in Ferizaj (UASF), and the qualitative method is used for the realization of semi-structured interviews with the management and the competent personnel of UASF.

Key words: education, globalization, information systems, internationalization, digitalization.

1. INTRODUCTION

The research focuses on the impact of globalization and technology on the education sector and responses of Universities toward internationalization and digitalization to successfully comply and meet the challenges of globalization. Globalization and technology have increased economic competition with rapid expansion and integration of global trade, and significant transformation of the global economy. These changes have also required gradual transformation and efficient use of knowledge, by enhancing the emphasis on the education sector supporting development and competitiveness in the knowledge economy. The pressure of globalization is effecting the Higher Education Institutions (HEIs) and educational stakeholders toward development and implementation of education policy reforms, and the internationalization of Higher Education (HE) is the strategy used by Universities to respond to the impact of globalization (Cornelius, 2012). The national strategies toward internationalization of

education, varies from country to country, dominated by developed and European countries which have a national strategy for internationalization, counties with a section on internationalization within the national strategy, or no strategy at all (Crăciun, 2018).

With regard to embedding information and communication technology (ICT) in education sector, the digital information and use of data collected is resulting in the increase of institution, teacher and student performance. Through the use of modern technology institutions are able to develop activities in different countries, reach every individual, communicate effectively, organize educational programs, and enhance the level of success (Köylüoğlu, Duman, & Bedük, 2015).

Kosovo is not an exception to the changes that globalization and the information technology have brought about in HE in Europe and worldwide. The internationalization of HEIs has continued to accelerate in the last decade, supported by higher use of information technology (IT) which has resulted in the digitalization of administrative activities, communication and promotion of education programs, and recently due to the outbreak of COVID 19, culminated with move from traditional in-class delivery of education into online teaching.

The goal of the research is achieved through several objectives: the study of literature provides us with the possibility to analyze the role the nation-state play, toward internationalization and digitalization of education sector, while the interviews conducted with the management and the competent personnel of University of Applied Sciences in Ferizaj (UASF) provide us with the possibility to identify and analyse the UASF endeavour toward internationalization and digitalization, and too what extend the information systems and networks are used in managing administration procedures, communication, teaching and learning, review and examination within the UASF staff.

2. LITERATURE REVIEW

2.1 Internationalization of Higher Education in the Era of Globalization

Worldwide, internationalization of HE has become a priority, with the growing interest in mobility of students, internationalization of curriculum, and integration of international dimensions into teaching, research and service (Wit, 2020). With the increase of globalization and regionalization, and the requirements of the knowledge economy, the majority of Universities in the last decade have included internationalization in their mission statements, with focus on the strategic management of international education (Cornelius, 2012). Similarly, many international organizations such as the Organization for Economic Cooperation and Development, the United Nations Educational, Scientific and Cultural Organization, the European Union, International Association of Universities have positioned internationalization at the top of the reform agenda (Wit, 2020). In this regard, the educational institutions with European Universities topping the list, have used different approaches and strategies toward internationalization, including advocating for policy changes at the national level, enhancement of institutional and program strategies, increase the quality of research, teaching and other services to society (Wit, 2020), in line with integration processes and global trends.

Universities in Europe and worldwide have worked toward internationalization of their campuses by extending their cooperation in activities like study abroad programs, research

activities, participation in international in class or online courses with focus on advancement of students skills, and programs with cross-cultural understanding (Tahira Jibeen, 2015). To boost internationalization countries offer scholarships for student mobility and exchange programs, and other forms of partnerships. The US Fulbright Scholar Program supports about 8,000 students in over 160 countries each year (UNESCO, 2013), and over the last three decades, more than 10 million students have participated in Erasmus+ programmes like learning mobility of individuals, cooperation for innovation and exchange of good practices, support for policy reform, sports and other activities. (EU, 2018). According to (Wit, 2020), in the period 2010–2020, the number of international students doubled to 5 million, whereas within OECD Europe countries, the international student mobility has increased from 7.6% in 2013 into 8.8% in 2017 (OECD, 2020).

Other forms of cooperation are based on building and increasing national system and human capacities, through the cross-border education by offering support to improve services at the national and University level, which leads toward quality improvements, good governance, and strong competition (Mulliqi, 2011).

Despite considering internationalization of HE as a strategic priority among governments worldwide due to the benefits in many aspects like economic, political and academic, (Crăciun, 2018) in his reseach stated that these phenomena are more widespread among developed countries in general, and more specifically at and European countries. “Countries which have a national HE internationalization strategy are: 13 in Europe, 5 in Asia, 2 in Oceania, 1 in North America, 1 in the Caribbean, and zero in Africa, Central America, the Middle East, and respectively South America”. The author further argues that in counties where universities depend on public money, without clear direction at the national level for internationalization of HE “it can limit the scope and undermine the effectiveness of internationalization strategies at the institutional level” (Crăciun, 2018).

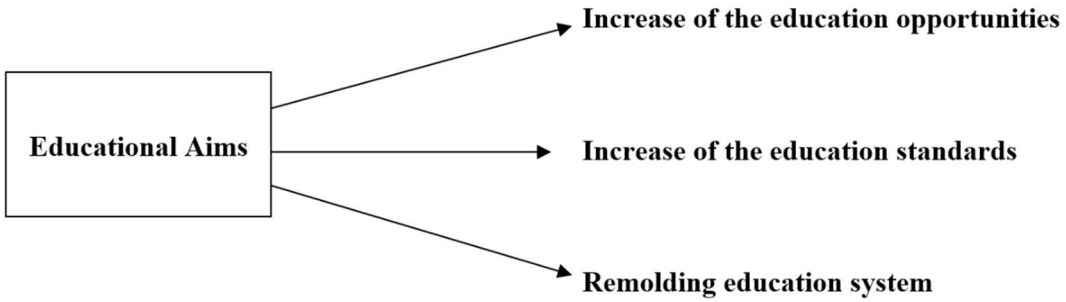
2.2 Information Systems in Globalization Processes

Globalization has also effected the development and advancement in technology, and Friedman in his book “The World is flat” analyzes the global environment, developments and competition in the area of technology. He calls governments, businesses and individuals to prepare and be innovative in the world that is moving faster (Cho, 2007). Utilization of information systems in education should be considered a priority and included within the national strategies worldwide. ICT offers access to information and knowledge, supports learning and development of new skills, and enables students to communicate, work and share their work globally, have access into digital information which support them in decision making and other processes (Tella & Adu, 2009).

The widespread use of ICT in HE is changing the leaning process, so Universities are integrating ICT to support acquisition of knowledge and technology skills, reform the educational systems, ensure open access to education, and offer more opportunities for businesses and individuals (Pavela, Fruth, & Neacsu, 2015). The authors further highlight some obstacles regarding E-learning and ICT use like lack of knowledge on ICT, resistance from the University staff and students to change, lack of materials in the area of ICT, difficulty in using ICT, and less communication and interaction between students and teachers.

In response to the technology advancement and the use of the ICT in education and e-learning, many developed countries have developed policies at the national level for creation of the national information infrastructures, and Universities have developed strategies for integration of ICT in processes and systems, research and learning initiatives.

When discussing the advantages of using information systems and networks in education sector for increasing education opportunities (Selwyn & Brown , 2010) presents in three ways:



Source: Selwyn & Brown, 2010), Education, nation states and the globalization of information networks, Journal of Education Policy, 661-682

The basic features of the figure are:

- it emphasizes the importance of constructing education networks in increasing educational opportunities, so that in class education and learning shifts into online teaching, and students and teachers have access to teaching and learning resources, regardless of geographical distances;
- educational networks lead toward improving educational standards, and offers more opportunities for lifelong learning, creative thinking, abilities to learn independently and continuously.
- restructuring completely the education system, by digitalization of teaching and learning, and raise education to the world level.

3. GLOBALIZATION AND INFORMATION SYSTEMS – THE KOSOVO CASE

3.1 Kosovo toward Internationalization of Higher Education

Kosovo as a new country is part of the global integration processes and investment in people, skills and knowledge become an important element for the county to participate and compete in the global economy. The free movement of capital, goods and services has also boosted the necessity for international education and internationalization of university campuses in Kosovo. Higher education plays a major role in fostering knowledge, innovation and increasing of skills, and the key driver in economic and social development (Hoidn & Kärkkäinen, 2014).

Reforms at the higher education system in Kosovo began once the war ended and the main priorities were stabilization and re-establishment of education, whereas from the academic year 2001/2002, it started to implement the reforms based on the principles of the Bologna Process, as part of the higher education policy reform in Europe. The policy reforms in HE in Kosovo calls for European and International focus, and the HEIs targeted in KESP 2011-16, and KESP 2017-2021 makes specific reference on “the need to increase academic mobility of academic

staff and students, as well as participation in international programmes of higher education and scientific research (KESP, 2016). Internationalization of HE has become a benchmark for Kosovo Universities as well, reflected in strategic approaches and objectives for increase of participation in international programmes and establishment of international networks.

Strategies to support and promote internationalization of HE in Kosovo include international mobility of students and staff, participation in university exchange programmes, networking of universities, development of joint study programmes, research and innovation programmes by participating in European mobility schemes like the Central European Exchange Programme for University Students (CEEPUS), Tempus, Erasmus Mundus and Erasmus+ Learning Mobility, Horizon 2020 (EACEA & Erasmus+Kosovo, 2017), and other international partners from the USA and South-East Asia.

Despite the moderate progress made toward internationalization of HEIs in Kosovo, the challenges of integration within the region and the European Higher Education Area (EHEA) remains limited mainly due to the financial constraints, lack of scholarships available, visa-related issues, language problems, and the limited joint degree programmes and programmes taught in English (EACEA & Erasmus+Kosovo, 2017).

3.2 Imntegration of Information Systems in Education

Globalization has increased the need for access to information, and the advancement in technology has speeded the information flow, establishment and maintenance of international and national commercial relationships, and diffusion of knowledge throughout society. Knowledge and technology have become increasingly complex in the global market, leading to a new role of information, technology and learning in economic performance (OECD, 2016), and transformation of HEIs through the use of ICT.

Kosovo as a new country recognizes integration of the information systems in all sectors, including the education sector. Kosovo's Economic Reform Programme "recognizes the need for further extension of the ICT network infrastructure and its link to socio-economic development" (EU, 2019), Kosovo National Development Strategy 2016-2021, identifies the need to develop and integrate technology infrastructure in each sector, and the Kosovo National IT Strategy elaborate a specific strategy for promoting the development of the Kosovo IT industry and digital transformation. The Digital Agenda for Kosovo 2013-2020 - is in compliance with "A Digital Agenda for Europe" (EC, 2014).

In relation to the information technology policies, the readiness of HEIs in Kosovo for implementation of digital technologies has been reflected to greater extend in managing administration procedures, communication and promotion of education programs through social media and to a less extent in teaching and learning, review and examination. The challenges were due to the lack of ICT equipment, lack of knowledge and awareness of staff on using the modern information technologies, lack of management motivation to move into digital processes and other aspects.

However, starting from spring 2020, the outbreak of the COVID-19 caused Kosovo Universities to close their campuses and start online teaching, so in a short time period faculty member started to teach online and students attended their courses on the internet. It was a massive shift to move into online education, and Universities launched online programs in order to ensure the normal teaching operation, "so the digital technologies and online resources now

extend across all fields of teaching and learning" (Limani, Hajrizi, Stapleton, & Ratkoceri, 2019).

Such a change in a short period of time was accompanied with a lot of challenges, like lack of online teaching experience from academic staff and students, the need for preparation, or support from educational technology teams. It also required modification of teaching methodology, student homework, and teaching material in order to keep high level active learning (Bao, 2020).

While this situation has brought the education sector into new perspective in Kosovo and around the world, further research is needed to analyze the quality, quantity, difficulty, and teaching to effectively deliver online education.

4. METHODOLOGY

The methodology of this paper is based on the study of literature, scientific papers, reports on the impact of globalization and technology at the education sector, more specifically the internationalization of HE and the use of ICT to connect with the education system. The research is also based on the study of policy-related and historical background of Kosovo higher education and its development toward internationalization and digitalization of education processes.

In addition, the research methodology includes semi-structured interviews with the management and the competent personnel of UASF to assess the policy endeavors at the Institutional and individual level to promote the process of internationalization, and the level of use of IT so the digital technologies and online resources extend across all fields of teaching and learning. Policies, plans, programs, strategies and approaches of UASF to map the global trends and impact of internationalization are analyzed.

5. RESULTS AND DISCUSSIONS

The focus of the information collected with the surveyed individuals was on the UASF policies toward internationalization, and the level of use of the information systems and networks in managing administration procedures, communication, teaching and learning, review and examination within the UASF staff.

The UASF has made a positive movement toward internationalization and integration of the information systems in the educational and administrative process. According to the management within the policy reforms in HE in Kosovo that called for international focus, UASF started collaboration and partnership with the University of Applied Sciences in Salzburg (UASS) back in 2009. This cooperation was part of the Twinning Project with the Department of Forest Products Technology & Timber Construction at the UASS, and continued within the HigherKOS Kosovo 2015 and HERAS projects financed by the Austrian and Kosovo Government.

New curriculum has been developed together with the support of UASS with more attractive and modern study programmes, and workshops for improvement of academic and management capacities were held. In addition, there were mobility of staff and students from both

Universities, organization of job fair and other activities which contributed to further enhancement and development of the staff and students' capacities and at the same time strengthened cooperation with industry. The successful cooperation between UASF and UASS continues even today through participation in joint international programmes that support modernization and internationalization of UASF.

Management also stresses that UASF has also participated in other EU programmes and projects in order to build international cooperation and partnership networks, as a road toward internationalization and integration in the European Higher Education Area (EHEA).

Other priority field within the UASF as stated by management and other competent personnel were digitalization of processes as part of the E-Governance 2009-2015, Kosovo IT Strategy and Higher Education Management Information System, 2015 – 2017 for the development of Information system platform through which all matters pertaining to students, subjects, programs and faculties are managed.

When it comes to technology use, the findings show that implementation of digital technologies into teaching and learning, review and examination have been reflected less, mainly due to the lack of willingness and knowledge from the academic staff. However, with the outbreak of the COVID-19, there was a positive and swift response from the management and staff toward the emerging educational needs created, and online platforms were included in order to support the continuity of learning for students.

5.1 Discussions

The impact of globalization and technology is changing the landscape of HE in Europe and worldwide, so internationalization of HE and utilization of IT is the strategy used by Universities to successfully comply with and meet the challenges of globalization. Internationalization and digitalization of HE between states is talked about as a strategic priority for governments, a section on internationalization and digitalization, or no strategy at all.

Kosovo as a new country since 2001/2002 started to implement the reforms based on the principles of the Bologna Process, as instrument for unifying European countries to work toward regional integration of higher education, and the policy reforms call for European and International focus reflected at the government strategy as a section on internationalization. Kosovo also recognizes integration of the information systems in the education sector, reflected in national strategies and policy papers, and the readiness of HEIs for implementation of digital technologies in managing administration procedures, communication and promotion of education programs was greater, whereas to a less extent into teaching and learning, review and examination.

Based on the interviews conducted with the management and competent personnel of UASF, there are endeavors at the Institutional level, reflected at the UASF strategy toward internationalization and regional integration of higher education, and increase of the use of IT for a more productive, effective, optimum and maximize success rate. At the individual level, it requires from the academic staff to be more inovative, and extract their knowledge to support digital transformation.

Integration and use of information systems in UASF and other Kosovo Universities, as of spring 2020, due to the outbreak of the COVID-19, extended across all fields including teaching and learning. Despite the readiness and willingness of management, academic staff and students to embrace these changes in a short period of time, there were challenges mainly due to the lack of online teaching experience, preparation, the need for modification of teaching methodology and student's homework, and teaching material in order to keep high level active learning.

6. CONCLUSIONS

Internationalization of higher education remains a priority among counties dominated by developed and European counties reflected in the national strategies for internationalization. Kosovo is among the counties where internationalization and utilization of the IT in the education sector has continued to accelerate in the last decade. However, in order to have a well-defined path there is a need for a clearer direction at the national level toward internationalization and digitalization, and be prepared in the field of policies, resources, programmes and technologies.

At the institutional level UASF and other Kosovo Universities need to further strengthen the strategy toward internationalization and increase of the use of IT for a more productive, effective, optimum and maximume success rate. At the individual level, it requires from the management and academic staff to be more inovative, motivated, and show their demand, knowledge and willingness to support digital transformation.

The new situation created with the outbreak of the COVID-19, and the emergency need to shift from in class leaning into online education, showed the need where utilization of ITs in the education sector is not only choice but a necessity.

While this situation has brought the education sector into new perspective in Kosovo and around the world, further research is needed to analyse the quality, quantity, difficulty, and teaching to effectively deliver online education. Other limitations are that the research is done only with the UASF, not with other Kosovo Universities.

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T2P International Scientific Conference

Theory to Practice as a Cognitive, Educational and Social Challenge

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SERVICE CENTRE IN THE FUNCTION OF DELIVERING VALUE TO CITIZENS

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Abstract

When the public sector is mentioned in everyday speech, the first association of citizens is related to the cumbersome state apparatus with complicated procedures. Numerous challenges of organizational, managerial, systemic, marketing, informational and communication nature certainly hinder and do not contribute to the efficiency of the administration's work. In order to avoid this identification, the state must improve the delivery of value to citizens. By developing multidimensional activities in the public sector, it is possible to actively influence the improvement of services to citizens in providing personal and other documents, their satisfaction with the services provided and improving the reputation of the public sector in the surroundings. The emphasis is on achieving synergistic effects through strategic harmonization of certain dimensions of the service program for citizens. Citizens' expectations (and analysis of their level of satisfaction with services provided in the past) are essential and the basis for creating multidimensional activities that should contribute to improving public sector services. The goal of this research task is to conceptualize an adequate combination of service activities programs in accordance with the requirements of citizens and deliver them such value (quality, service, price ...) that will meet their expectations. This is a creative aspect of improving the work of the public sector. The results of the research indicate that the best combination of 8P (product, price, promotion, place people, process, productivity-or performance, physical evidence-or philosophy) must create a new quality of services to citizens exemplified in an integral, consistent and unique program. Full harmonization of elements of the program of service activities leads to the satisfaction of citizens' expectations while minimizing the costs of services provided, but also to increasing the image of the state in the international community.

Key words: service centre, public sector, marketing tools, value delivery.

1. INTRODUCTION

The public sector, which integral part is the Municipal Administration, represents the state sector through which the representatives of the public authorities conduct policy and manage the state (Drobnjak, 2015). The efficiency of the public sector at all levels is crucial for order in the country, but also any form of citizen security (property, legal, economic), which equally

affects the standard, education and any form of citizen protection (Drobnjak, 2015). The service centre is an example of a new relationship with citizens in which parties do their jobs in one place, quickly and efficiently. However, part of the population consists of elderly citizens, some come from rural areas and there are insufficiently educated residents, therefore, satisfaction with the services provided may be below the expected level. The issue is employees who need to be motivated to work more efficiently. In this context, it is necessary to examine the causes of citizens' dissatisfaction with the work of the municipal administration, but also the applicability of the concept of the for-profit sector to local self-government. The main goal of the research is to determine the level of interdependence of the phenomenon of market orientation of local governments and their impact on organizational performance, i.e. better meeting the needs of service users. The aim of the research is to comprehend the possibility of improving the performance of city administrations by implementing the concept of marketing for-profit sector. The concept of marketing mix 8P as well as some private sector tools such as TQM and CRM, conceptualize an adequate combination of service activities programs in accordance with the requirements of citizens and deliver them such value (quality, service, price ...) that will meet their expectations at the same time raising education and motivation of employees. Based on the set research task, it is possible to set the following hypotheses: I Local government management based on instruments of the for-profit sector significantly improves the satisfaction of public service users. II an increase in citizen satisfaction will provide a mandate for public authorities; III an increase in the efficiency of the public sector increases the country's image in the world.

The paper identifies the causes of problems and dissatisfaction of citizens with the work of the Municipal Administration, presents the results of research, assessments of their level of expectations, as well as proposals for improving the work of this sector of public authority. The strengths, weaknesses, opportunities and threats to the development of the service center were pointed out, as solutions for increasing the image of the public authority.

2. REVIEW (ANALYSIS) OF THE SITUATION

The municipal administration, as part of the public sector, works directly with citizens. It is not uncommon for citizens to remain dissatisfied when using their services. It is in the interest of the management of this sector to remove bottlenecks and raise to a higher-level services provided. Along the way, a problem was identified. Namely, the municipal administration faces numerous challenges of organizational, managerial, systemic, marketing, informational and communication nature.

1) Challenges of organizational nature are manifested in a complicated system of providing information and issuing the necessary documentation scattered in a system "several types". This way of working is the cause of: a) loss of time and energy of service users which spend while staying in the municipal building, b) staying at the wrong counters, c) entering the wrong offices, which interferes with the work of employees, etc.

2) Challenges of a managerial nature arise from the position of a bureaucratic hierarchical structure that is, as a rule, rigid, slow and inefficient, with a deficiency necessary for the efficient provision of services to citizens.

3) Challenges of a systemic (normative) nature are shown in a number of complicated regulations and procedures that are difficult to interpret even for users with secondary education.

4) Challenges of marketing and narrow information and communication nature are the result of partially identified weaknesses of organizational and managerial nature (discipline and responsibility of employees at low-level; demotivation of employees caused by undeveloped incentive mechanisms, etc.); and partly at the educational level with a pronounced deficit of professional knowledge of employees in key positions in charge of giving adequate guidelines and competent recommendations for solving various demands of citizens that real life imposes.

The development of the service center stands for a model that will adequately minimize the identified weaknesses, eliminate existing challenges and improve the work of administrative bodies by efficient and effective provision of services to citizens.

a. Causes of citizens' dissatisfaction with the work of the municipal administration

Municipal administration represents only one part of the public sector. It includes a set of administrative organizations that perform public affairs (Sirola, 2017,p.18)According to Kotler et al. (1999, p. 33), the following groups of consumers can be recognized in the role of consumers of services provided by the municipal administration: visitors (business visitors and tourists), residents and employees (professionals, children, pensioners…), business sector (entrepreneurs, investors, industrial sector) and exporters (Exports and other national markets outside the place where the services are delivered).

There is a wide range of services provided by the local self-government, but the question arises: Does it perform them in an adequate and efficient way and how satisfied are the users of services in this part of the public sector with them?

In order to provide an answer to this question, we used secondary data obtained by CeSID from a public opinion survey back in 2005, as well as primary sources of data obtained from the survey conducted in the period from 1st to 21st December as part of the second phase of development T2P Service Centre case studies. The sample consists of 50 respondents, aged 18-70 years. When it comes to gender structure, 31 (62%) respondents are men and 19 (38%) are women. When it comes to education, the largest number of respondents, 28 (56%) are with a secondary education, while 20 (40%) are with a higher education.

The public opinion poll conducted by CeSID back in 2005 showed a devastating situation, citizens are of the opinion that ordinary people cannot influence the work of municipal institutions (Mojsilović, 2008, p. 9). For a democratic system of government, this is a very devastating statement, because the citizens elect the same representatives. The reasons for this situation can be found on both sides, in political institutions, and within the citizens themselves (Mojsilović, 2008, p .9). What is a general characteristic of citizens is the lack of interest in politics and understanding of its importance, but also ignorance of how it can be influenced. We are of the opinion that awareness should be raised among citizens on the importance of politics, because it indirectly affects people's daily activities (for example, if the municipal administration stops financing the work of cinemas, we may be deprived of watching the movie) (Mojsilović, 2008, p. 10). Unfortunately, it happens that citizens sometimes want to enter political life, but they do not know how and by what means to do so, which is often the reason why citizens consider themselves insufficiently influential. This is often the reason why citizens

consider themselves insufficiently influential, which creates a feeling of insecurity and dissatisfaction. Disinterest and ignorance is a frequent target of politicians, so certain political structures use it and remain in certain positions for many years. In this way, politicians around them "create a halo of secrecy and the illusion of the importance of their own business." Of course, manipulation, inaction and inefficiency of the public sector are most often hidden behind this mask (Mojsilović, 2008, p. 10).

Through the conducted research, we tried to discover the sources of citizens' dissatisfaction. The recruitment and hiring process of workers in the public sector raises doubts about the professional performance of entrusted tasks by employees in the municipal administration. When being asked about the way to get a job, the smallest number of respondents - citizens answered "through their knowledge and work", only two (3%), and the largest number of respondents, 29 of them (53%) of them answered through a party connection, or some other connections 18 (42%). The following graph shows the summarized research results.

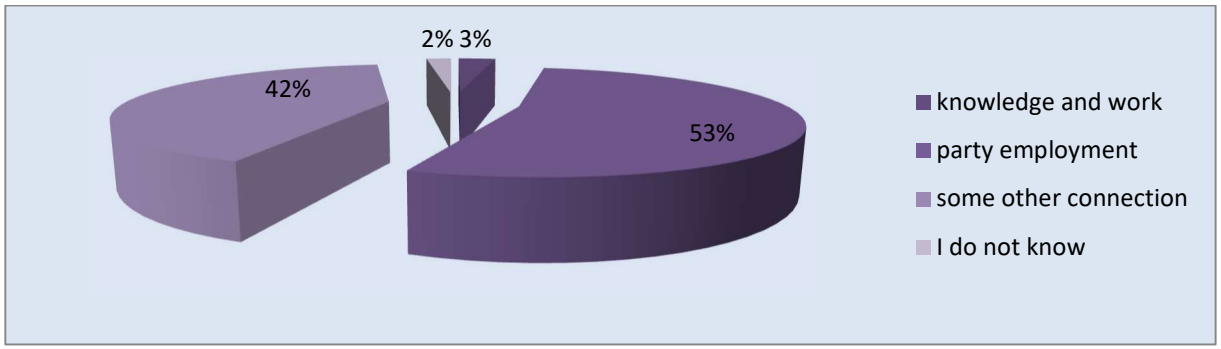

Figure 1. How public sector employees get a job

Source: authors

The manner of communication and correspondence of the employees of the Municipal Administration was a variable that the respondents also evaluated. The following graph indicates the basic objections that citizens have to the work of public sector employees

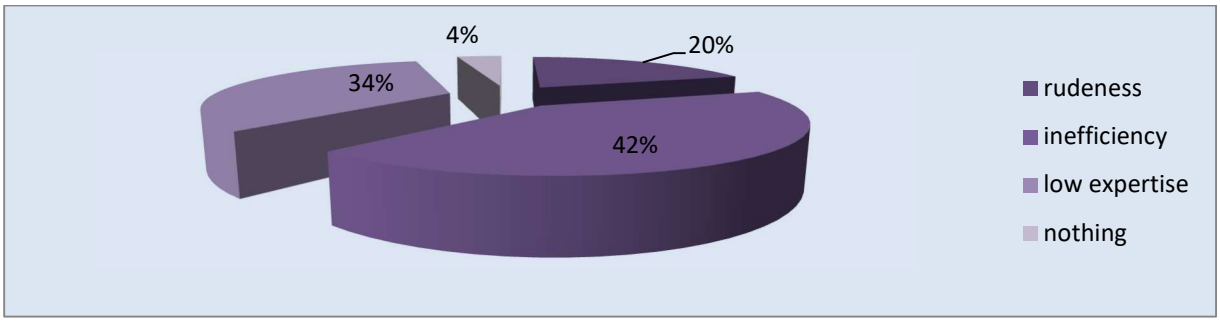

Figure 2. The biggest objections to the employees in the municipal administration

Source: authors

The largest number of respondents, 39% of them, stated that the Municipal Administration employs an insufficient number of professionally employed persons, which creates a negative impression on the work of employees, but also on the work of this part of the public sector. Also, a large number of respondents believe that employees are not efficient enough, 34% of

them are of that opinion, while 20% of them are not satisfied with kindness.

With reference to the above, the public sector is characterized by (Drobnjak, 2015): higher number of employees than the real needs are; insufficient number of professional and creative staff in key positions; low level of discipline and responsibility; big bureaucratization; too many unnecessary regulations; high corruption.

The development of the Service Centre - physically and technically arranged space in the municipal building within which it is possible to exercise the rights and perform civic obligations in one place, is imposed as a solution. However, although the service centre is a good solution for everyone, there is a fear that it will not encounter the acceptance and an absolutely positive assessment from the citizens.

Table 1. SWOT analysis of service center development

Strengths	Weaknesses
All services in one place Time savings Work efficiency Citizen education - I can get some information how to exercise my rights Unique access for all users Service (inclusion of vulnerable groups Population) Lower service price Better access to information	Monotony in the work of employees Insufficient close contact with employees, and citizens remain deprived of "freedom" in conversation
Opportunities	**Threats**
Providing greater support to citizens Obtaining feedback on further improvement the Centre's work Further progress through a clearly defined training system and staff development	Failure to recognize the importance to build Centre Older people are used to the old system of wo

Source: authors

The incentive to deliver value to the users of the service centre can be given by the market oriented local self-government, which is discussed in more detail below.

3. RESULTS AND DISCUSSIONS

Urban areas are the driving force of economic growth (70 % of public investment in Europe is undertaken by local and regional authorities (CEMR, 2016, p.3)). Therefore, it is not surprising that public authorities strive to increase the efficiency of this level of state administration. Kotler and Lee (2007, p. 7) are of the opinion that the public sector can improve its performance by using private sector marketing tools. "Government can provide higher quality, speed, efficiency, convenience and fairness to citizens using a marketing approach." (Mintz, 2006, p. 40) To this end, we single out a few, which may be in the service of the public sector.

The marketing mix strategy in the field of services, which influences the raising of the quality of service packages for target users-citizens, is implemented by a combination of 8Ps. The

whole concept meets the needs of citizens and raises the delivery of value to a higher level. In addition to 4Ps- (McCarthy, 1960, cited in The Chanel Post, 2018), products, pricing, distribution, and promotion add more people, physical evidence, the process, 7Ps (Booms and Bitner, 1981, cited in The Chanel Post,2018), and 8Ps relationships (Chaffey and Smith, 2012 cited in The Chanel Post,2018), which are gaining in importance in the era of digitalization. An effective marketing mix should also be aligned with the firm's available resources.

The product is still the basic instrument of the marketing mix. As such, attention is paid to it from all levels of government. The creation and development of products and services takes place outside the public sector, based on the recognized needs and desires of consumers, in accordance with the target market. Namely, politicians are the ones who identify and propose ideas related to products, and the public administration later develops them and creates other marketing mix instruments. (Kaplan and Haenlein, 2009, cited in Širola, 2017, p. 91).

As the products of the municipal administration often have no alternative, this market has numerous specifics. The price (fee for use) of public sector services is usually not a factor influencing the level of demand, while higher demand does not mean revenue growth. Unlike the for-profit sector, where price significantly helps to achieve the goals of business entities, in the public sector, these principles are not applicable, since there are no profit maximization goals (Širola, 2017, p. 92). Determining costs, as a starting point for pricing, often encounters difficulties. Usually the cause should be sought in an inadequate public sector billing system, which is not compatible with the commercial one.

Promotion - Activities carried out within the promotion, along with economic policy and regulations are a powerful tool that influences the attitudes and behavior of consumers. Promotion as a marketing tool provides information and information, encourages consumer confidence, but as in the for-profit sector attracts new customers. The promotional mix of the public sector must meet the needs of the target market of public sector services users, but also those who "pay" for those services, and are not their users (Širola, 2017, p. 94).

Place (distribution) - With the development of the service centre, the delivery place of the service to consumers is clearly formalized, and the payment for the product or service coincides with the place of delivery. In this way, the availability of products or services is similar to that in the for-profit sector, where special attention is paid to the optimal number of delivery points, i.e. the optimal cost-income ratio (Širola, 2017, p.95). Similarly, the public sector must ensure a balance, between the positive effects on consumer satisfaction on one hand, and the spending of public funds on the other.

People - Employees are the first line of interaction that users of public sector services have with them, and the impression of them affects the creation of subjective value of services (Ozretić, 2010, cited in Širola, 2017,p. 95). Therefore, it is not surprising that people (staff) are a key element of marketing mix, service, but also the public sector that perform a sales and production role in parallel (Cowell, 1984, cited in Kearsey and Varey, 1998,, cited in Širola, p. 96). In this context, it is necessary to ensure the full commitment of management bodies to the selection, training, but also the motivation of employees in the public sector.

Physical evidence is particularly important in the domain of service delivery. Namely, the service is intangible by nature, which carries a certain risk for the customer. This can be reduced by providing physical evidence of the service you are delivering, or by including the place

where the service occurred and the place where user-service interactions take place. This applies to things like interior design; visibility of the space, atmosphere, and attitudes of the staff ... Physical evidence provides certainty that in a service, each component of the 8Ps model of the marketing mix is in line with the values of the brand.

Processes are ways and mechanisms of creating and delivering value to end users. Processes within the organization affect how well the service will be performed. These include policies and procedures, automated service delivery, data confidentiality, user involvement, or information availability (Širola, 2017, p. 95). Also, well-optimized processes must be provided to keep costs to a minimum. These are probably the most significant factors influencing the perception of public service users, and here is the most room for improvement in service delivery (Kearsey and Varey, 1998, cited in Širola, 2017, p. 95).

Partnership is emerging as a new marketing mix instrument. By introducing this new tool, it seeks to give importance to mutually beneficial relationships between the two parties, the public sector, and service users on the other.

DIN ISO system (9000 - management, 14000 - environment and health, 26000 - social responsibility), installed to enable for-profit and non-profit organizations to design and monitor quality standards and develop a quality management system, thus providing easier comparison with the quality of other entities (Širola, 2017, p. 167). The DIN ISO system corresponds to the TQM approach and is designed to measure the level of quality in the producer-user relationship. The whole concept is designed to provide more with less. Namely, the demand of citizens for different service structures is growing, and the public sector is ready to allocate less and less money for these purposes (Tachiki, 2009). TQM appears as the only solution. It provides quality improvement at a reasonable price and in a very short time. TQM is a customer-focused management system that includes all levels of employees in upgrading or continuous improvement. Total Quality Management (TQM) is a management approach to achieving long-term success through customer satisfaction (Hsieh, Chou and Chen, 2002, cited in Tachiki, 2009). Achieving quality requires a national institutional framework that supports such activities, as well as the establishment of Quality Awards. The main public sector actors working to improve quality are citizens, civil servants and politicians - i.e. stakeholders. At the heart of this triad of stakeholders is national and local government policy (Tachiki,2009).

The results of the survey in which a significant percentage of respondents, 39% of them said that employees in the public sector do not have enough competencies, thus in this context, it is necessary to ensure their professional development, i.e. mastering the necessary knowledge and skills, but also to provide the motivation system of employees. The following table summarizes the results of a survey on the most common causes of employees' dissatisfaction in the public sector, which reduce the efficiency and motivation of employees in the first line of value delivery to citizens.

Table 2. Factors affecting employee satisfaction (in percent)

	Very dissatisfied	Dissatisfied	Moderately satisfied	Satisfied	Very satisfied
Collegial relations	0	0	13	40	47
Hierarchical level of employee-superior relationship	0	7	13	43	37
Continuity of employment	7	20	30	27	17

Possibility of advancement	7	10	43	23	17
Education	7	13	30	37	13
Independence at work	3	27	20	33	17
Work conditions	10	7	37	33	13

Source: authors

According to the assessment of employees by various variables, we notice that employees are most satisfied with relationships with colleagues (47%), and least satisfied with the Hierarchical level of employee-superior relationship 37%.

It has been pointed out several times that all the resources available to the municipal administration should be put in place to motivate employees. The following table summarizes the results of employees' research on the factors that most motivate them to better performance.

Table 3. The most important factors of employee motivation (in percent)

	It does not motivate	It motivates me minimally	It motivates	It motivates me a lot	Maximally motivates me
Work conditions	7	20	27	37	10
Praise of the superior	3	14	34	38	10
Safety at work	10	15	30	36	9
Good relations with colleagues	0	0	14	71	15
Facing challenges	0	8	26	34	32
Opportunity to promote new ideas	20	17	10	30	23
Possibility of rewarding	13	7	13	30	37
Salary amount	7	13	40	20	20
Reputation of the municipal administration	3	3	13	30	50

Source: authors

The conducted research showed partly unexpected results. Namely, 50% of the respondents stated that they are most motivated by the reputation of the institution where they work. In second place is the possibility of rewarding 37%. While facing challenges is in third place with 32%.

Motivation of employees with reward and benefit systems based on progress in their own competencies, can be supplemented by some of the following principles: a) employ decent people with a smile; b) work coordinators must provide their own examples of courtesy and responsibility; c) employees must behave like entrepreneurs who make customers satisfied (Kotler,& Lee, 2007, cited in Jovanović, 2019, p. 8).

The concept of consumer relations marketing (CRM) is another way to improve the satisfaction of users of public sector services. Successful implementation of the CRM strategy in the public sector cannot be implemented overnight, by simply installing appropriate software packages (Kotler, &Lee, 2007, cited in Jovanović, 2019, p. 8). It is necessary to make changes at all levels, including public policy, employee training, marketing systems, information management and the like.

The best method of obtaining feedback on employees is provided by a system of periodic surveys, based on which interviewers get a new perspective on how citizens perceive their

services (Kotler, Lee, 2007, cited in Jovanović, 2019, p. 9). The American Customer Satisfaction Index (ASCI) is a good solution. Through this index, it is possible to see the attitude of users towards some of the essential problems of citizens, as well as how successful the society is in eliminating them (Kotler, Lee, 2007, cited in Jovanović, 2019, p. 9).

4. CONCLUSION

The public sector is the basis for the functioning of the entire social system, as well as its existence. "The quantity and quality of the fruit that society can harvest depends on the strength and stability of that" tree ", because a bad" tree "does not bear fruit. Therefore, the level of development of a society and its constant progress depends exclusively on the quality of mental and material resources and their efficiency in the public sector" (Drobnjak, 2015).

This research represents an extension of previous scientific knowledge and the intention was to point out and emphasize the importance of market orientation of this sector of society. The research conducted in the paper led to the following conclusions. Consumers of public sector services expect higher value delivery by the Municipal Administration. Namely, there is a large percentage of consumer dissatisfaction with the impossibility of greater participation of citizens in the public authority system, and also, a large percentage of citizens believe that employees in municipal administration are characterized by a low level of expertise and efficiency in performing entrusted tasks. The market oriented local self-government enables the raising of organizational performance of the public sector, which ensures a higher level of satisfaction of citizens. This confirmed the hypothesis I.

Improving the place of delivery (which is provided by building a service centre), dedicated to pricing, non-aggressive promotion of services, employees who work efficiently, advisory and synchronized with each other, reduction in citizen waiting times, raises the quality of delivery. The application of DIN ISO standards and CRM concept, the positive impression of the public is raised to a higher level, which achieves repercussions on the image of public authority, which confirms Hypothesis II.

Only by integrating all the mentioned activities, i.e. a holistic approach to public sector management, can it achieve targeted benefits, behave socially responsible and create the impression that it is a complete service to citizens who do not spend their money in vain. Such an approach raises the country's reputation in the international domain, which confirms Hypothesis III.

It should be said that this study also has certain limitations. Namely, the sample on which the research was carried out is small, and all respondents are of Serbian nationality. This opens room for some future research on a larger sample in several countries, which would make the results more complete because it would allow comparing the satisfaction and efficiency of individual countries.

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DATA MINING STRENGTHENING DECISION MAKING IN CRIMINOLOGY

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Abstract

Data mining has a wide application domain in almost every industry where the data is generated. That is why data mining is considered as one of the most important factors in database and information systems. Data mining is a process of extracting knowledge from huge amounts of data stored in databases and data warehouses. Criminology is an interesting application where data mining plays an important role in terms of prediction and analysis. Crime analysis plays an important role in devising solutions to crime problems and formulating crime prevention strategies. The purpose of this paper is to evaluate the performance of data mining methods, which can be used for analyzing data collected of the past crimes. We identified the most appropriate data mining method to analyze the collected data from sources specialized in crime prevention by comparing them theoretically and practically. This study helps the crime branch for better prediction and classification of crimes.

Key words: Information Systems, Decision Support, Data Mining.

1. INTRODUCTION

Crime is a complex social phenomenon that has grown due to major changes in society. Law enforcement agencies need to learn the factors that lead to an increase in crime tendency. This study focuses on crime prevention, which is an important component of an overall strategy to reduce crime and to strengthen public safety.

Supporting Decision Making (SDM) in crime prevention has attracted a great concern and attention. Decision making is very important in crime prevention in order to decide accurate actions and law enforcement strategies. Law enforcement agencies face a large volume of data that needs to be processed and turned into useful information. Data mining approach has been exposed to be a proactive decision-support concept in preventing and predicting crime. By processing criminal data, law enforcement agencies can use models that may be important in the crime prevention process. Data mining is a great tool that allows criminal investigators who may lack extensive training as data analysts to discover huge databases efficiently and quickly.

The database may be specific, such as databases for a domestic violence offense or be associated with a crime pattern. The Database Management System is designed for case management and overall crime counting and not for data analysis. The addition of data mining methods to the

database management system enables a system that functions as a criminology expert. Crime analysis can produce a superior result by integrating data mining technique into Decision Support System (DSS). The DSS is required in crime analysis because it has the capability to improve the quality of decision making for crime prevention.

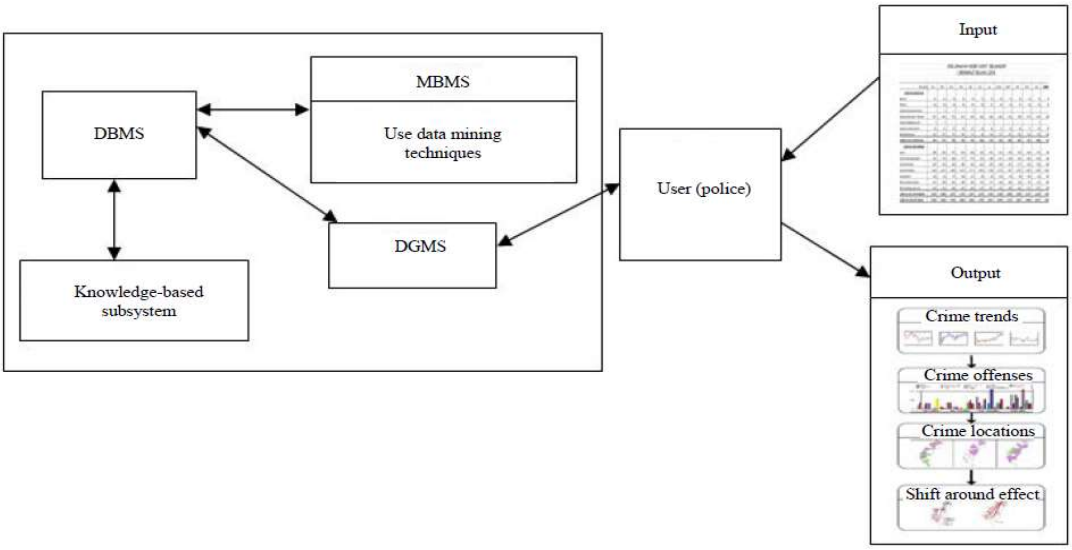

Figure 1. Conceptual framework of DSS for SDM in crime prevention

Source: Noor et. al., 2015, p. 17-34

2. DATA MINING FOR DECISION SUPPORT

Data mining is the computer-assisted process of digging through and analyzing enormous sets of data and then extracting the meaning of the data and it is the process of analyzing data from different perspectives and summarizing it into useful information (Thongsatapornwatana, Ubon, 2016). The objective of data mining is to discover relationships, patterns and knowledge hidden in data. Data mining is the process of analyzing data in order to discover implicit, but potentially useful information and uncover previously unknown patterns and relationships hidden in data. Data mining plays an important role in terms of prediction and analysis. Data mining support derives from computer technologies which help law enforcement agencies to make more accurate decisions.

Decision support systems (DSS) are defined as interactive application systems which are intended to help decision makers utilize data and models in order to identify problems, solve problems and make decisions. Decision support systems (DSS) are classically designed to serve the management level of organizations (Jantke et. al., 2003). They help managers, in this case law enforcement agencies make decisions that are semi structured, unique or rapidly changing and are not easily specified in advance.

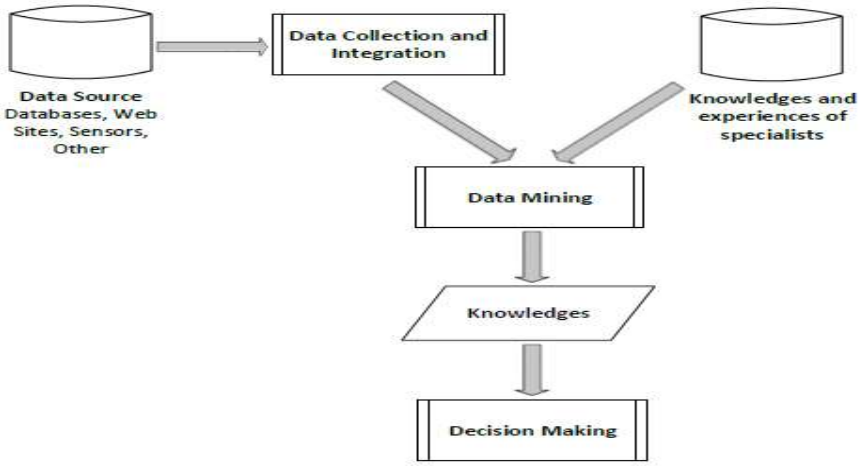

Figure 2. The background of data mining

Source: Thongsatapornwatana, Ubon, 2016

DSS use sophisticated analysis and modeling tools. Data mining extends the possibilities for decision support by discovering patterns and relationships hidden in data and therefore enabling the inductive approach of data analysis (R. Rupnik et. al., 2006, p.225-230).

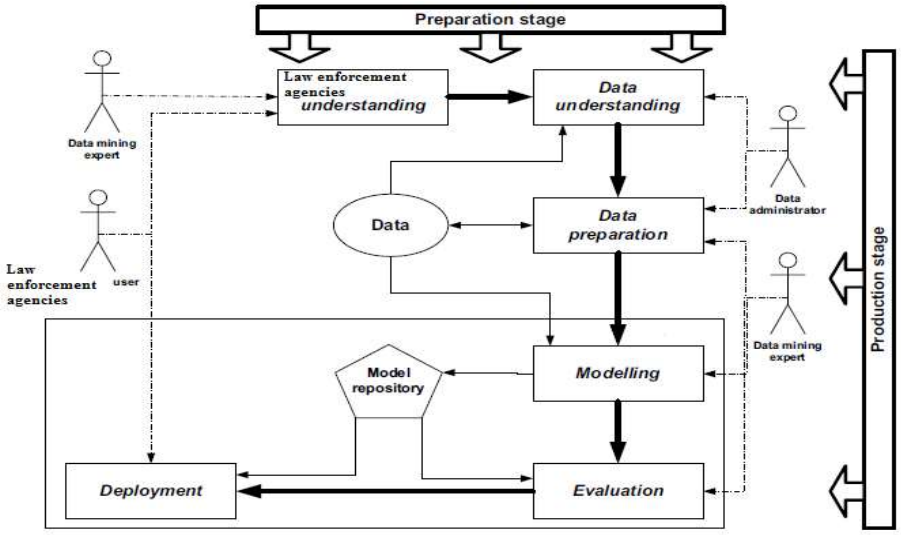

Figure 3. The Process Model of DM on DSS (tailored to law enforcement agencies)

Source: Rupnik, Rok & Matjaž, Kukar, 2007

The paper introduces data mining based decision support system, which was designed to enable them to use data mining models to facilitate decision support with only a basic level of knowledge of data mining.

3. METHODOLOGY

In this study we compare theoretically and practically the data mining methods to discover the most suitable method for our data. The methods are compared by applying machine learning algorithms to the WEKA (Frank et. al., 2010) environment. The implemented algorithms are: EM, COBWEB, DBCSCAN, Hierarchical Cluster, Make Density Based Cluster, K-Mean, Farthest First, Filtered Cluster. Methods have been applied to these data to determine their effectiveness in crime prediction and prevention. The data analyzed is extracted from the database of law enforcement agencies. The number of instances or records is 90.

Table 1. Dataset details

The name of the dataset	Number of examples	Number of input attributes	Number of possible classes	Total number of attributes	Values that are missing
Crime Dataset	90	6	2	7	0

The data relates to areas where crimes occur and to the information about the perpetrators. Some of the features we have considered are: the area where the crime occurred (urban or rural), age (from 17 to 55 years old), employment status (whether employed or not), gender, education (middle school, high school, university), civil status (whether married, single, or divorced) and whether the person who committed the crime was previously convicted or not. Crime dataset is in ARFF format.

3.1 Clustering

Clustering is a partitioning of data into groups of similar objects. Presenting data from a few of these groups certainly loses some details, but it achieves simplicity. It models the data according to his groupings. Data modeling puts clustering in a historical perspective rooted in mathematics, statistics and numerical analysis. From a learning machine perspective, groups correspond to hidden patterns, group search is learned without supervision and the final system presents a data concept. Clustering is the main subject of active research in various fields such as statistics, pattern recognition and machine learning. DM adds clustering, complications with large data sets with many attributes of different types. So we have unique processing requirements based on such algorithms.

a. Hierarchical clustering methods

The method will create a hierarchical decomposition of a given set of data objects. Based on how the hierarchical decomposition is formed, we can classify hierarchical methods. This methods are given as follows:

1. Agglomerative Approach
2. Divisive Approach

Agglomerative Approach is also known as Button-up Approach (Abdullah, Hamdan, 2015). Here we begin with every object that constitutes a separate group. It continues to fuse objects or groups close together.

Divisive Approach is also known as the Top-Down Approach (Abdullah, Hamdan, 2015). We begin with all the objects in the same cluster. This method is rigid, i.e., it can never be undone once a fusion or division is completed.

b. Partitioning based Methods

Partition methods move the instances from one group to another, starting from an initial partition. Such methods usually require that the number of groups be predefined by the user. The partition algorithm divides data into many subsets. One of the most commonly used algorithms is EM (Expectation – Maximization) (Mohammed J. Zaki, Wagner Meira Jr, 2014). This algorithm tends to work with isolated and compact groups. The basic idea is to find a clustering structure that minimizes a certain error criterion, which measures the "distance" of each instance to its representative value. The EM algorithm is used to find the parameters in a model.

"K-means clustering" in data mining is a cluster analysis method which divides n observations into k groups where each observation belongs to the nearest cluster (Mohammed J. Zaki, Wagner Meira Jr, 2014). K-means algorithm is an iterative algorithm that tries to partition the dataset into K pre-defined distinct non-overlapping subgroups (clusters) where each data point belongs to only one group. It tries to make the inter-cluster data points as similar as possible while also keeping the clusters as different (far) as possible. It assigns data points to a cluster such that the sum of the squared distance between the data points and the cluster's centroid (arithmetic mean of all the data points that belong to that cluster) is at the minimum (Amelio, Alessia & Tagarelli, Andrea, 2017). The less variation we have within clusters, the more homogeneous (similar) the data points are within the same cluster.

c. Density Based Methods

The basic idea of "density-based" methods is that for every instance of a group of zones near a given radius must contain a minimum number of instances. These methods identify the clusters and the distribution of their parameters. The algorithms produce clusters in a determined location based on the high density of data set participants. It aggregates some range notion for group members in clusters to a density standard level. The DBSCAN (Density-Based Spatial Clustering of Applications with Noise) algorithm detects arbitrary groups and forms and is efficient for large databases. This algorithm is based on this intuitive notion of "clusters" and "noise" (Amelio, Alessia & Tagarelli, Andrea, 2017). The key idea is that for each point of a cluster, the neighborhood of a given radius has to contain at least a minimum number of points.

d. Based Model Methods

These methods use a hypothesized model based on probability distribution. By clustering the density function, these methods locate the clusters and reflect the data points' spatial distribution. Model-based clustering methods find characteristic descriptions for each cluster, with each cluster representing a concept or class. The most commonly used methods are decision trees and neural networks. In a decision tree the data is represented by a hierarchical tree with each leaf referring to a concept. Each leaf also contains the probabilistic description of that concept. Some algorithms produce classification trees to represent the data. The COBWEB algorithm yields a clustering dendrogram called classification tree that characterizes each cluster with a probabilistic description (Pankaj SAxena & Sushma Lehri, 2017). The algorithm assumes that all attributes are independent. It causes us to achieve a high predictability of the values of the nominal variables, given a set.

4. EXPERIMENTAL RESULTS

To conduct this study we used WEKA software based on the approach and familiarity with its use. The WEKA software package has different programs for different techniques and algorithms. WEKA is a collection of machine learning algorithms for data mining tasks. The algorithms can either be applied directly to a dataset or called from your own Java code. WEKA contains tools for data pre-processing, classification, regression, clustering, association rules, and visualization. It is also well-suited for developing new machine learning schemes.

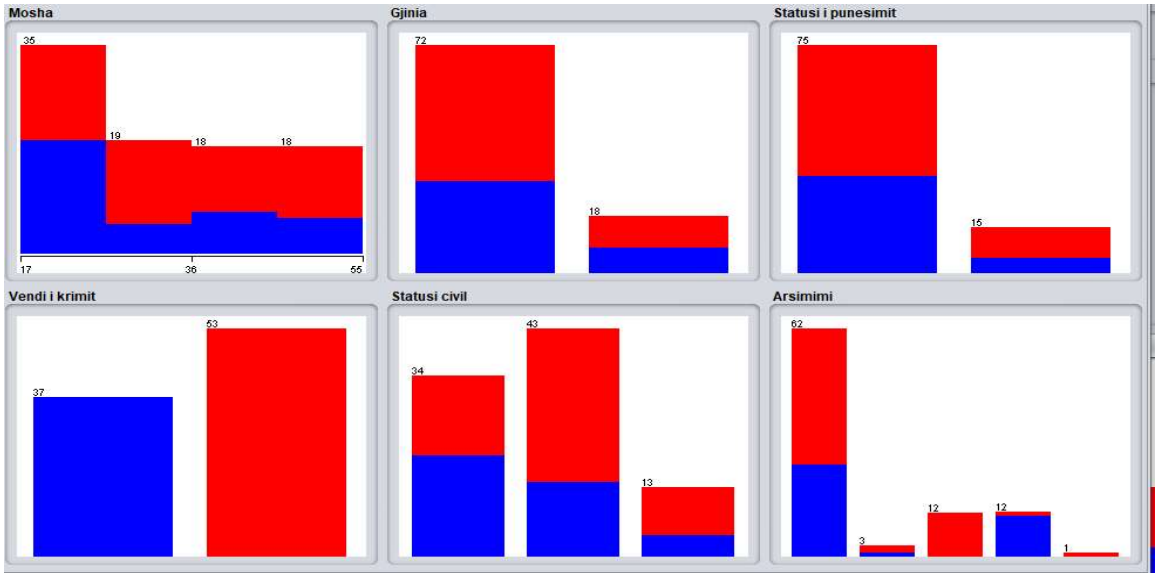

Figure 4. Pre-processed data visualization

Source: Author

Figure 4 shows the data in the pre-processing phase. Then on this data we implement machine learning algorithms that will help to create models. Model estimation experiments were done using training set. Table 2 presents a comparison of the results of the algorithms applied to our data in WEKA.

Table 2. Comparison of the results of the algorithms applied in WEKA (by the author)

Algorithm	No. of groups	Clustered Instances	No. of iterations	Time to build a model	Log Likelihood	Non Clustered Instances
EM	3	0 52 (58%) 1 35 (39%) 2 3 (3%)		0.5 s	-6.69022	0
COBWEB	102	3 1 (1%) 5 1 (1%) 6 1 (1%) 7 1 (1%) 8 1 (1%) 10 1 (1%) 11 2 (2%) 13 2 (2%)		0.03 s		0

		14 1 (1%) 15 7 (8%) 19 1 (1%) 20 1 (1%) 22 1 (1%) 23 1 (1%) 25 5 (6%) ...				
DBSCAN	3	0: 12(34%) 1: 14(40%) 2: 9 (26%)		0.03 s		55
Hierarchical Cluster	2	0: 73(81%) 1: 17(19%)		0.02 s		0
Make Density Based Cluster	2	0: 75(83%) 1: 15(17%)	3	0.02 s	-7.43104	0
K-Mean	2	0: 75(83%) 1: 15(17%)	3	0 s		0
Farthest First	2	0: 69(77%) 1:21(23%)		0.02s		0
Filtered Cluster	2	0: 75(83%) 1: 15(17%)	3	0.02s		0

In this paper we used some algorithms (Table 2) and among them is K-mean algorithm, which is an algorithm applied to data mining clustering methods. This algorithm provides clear results which are easy to interpret. Model construction is done by modifying the parameter values and this algorithm groups the crime data in less time to build the model. We converted our data to CSV format. The K-mean algorithm was applied to these data. The visualization and what came out of this algorithm are shown in Figure 5 and Figure 6.

```
kMeans
======

Number of iterations: 3
Within cluster sum of squared errors: 133.52267774699902
Missing values globally replaced with mean/mode

Cluster centroids:
                                                Cluster#
Attribute                      Full Data               0               1
                                    (90)            (75)            (15)
========================================================================
Mosha                            33.1889         31.8267              40
Gjinia                                 M               M               M
Statusi i punesimit              pa pune         pa pune   I/e punesuar
Vendi i krimit                   rurale          rurale           urbane
Statusi civil               i/e martuar     i/e martuar     i/e martuar
Arsimimi                        I mesem         I mesem          I larte


Time taken to build model (full training data) : 0 seconds

=== Model and evaluation on training set ===

Clustered Instances

0       75 ( 83%)
1       15 ( 17%)
```

Figure 5. Result of K-means algorithm

Source: Author

The number of clusters is two (0 and 1) and the instances are grouped according to this scheme: Cluster 0 has 75 instances or 83% cluster, while cluster 1 has 15 instances or 17% cluster. The number of iterations is 3.

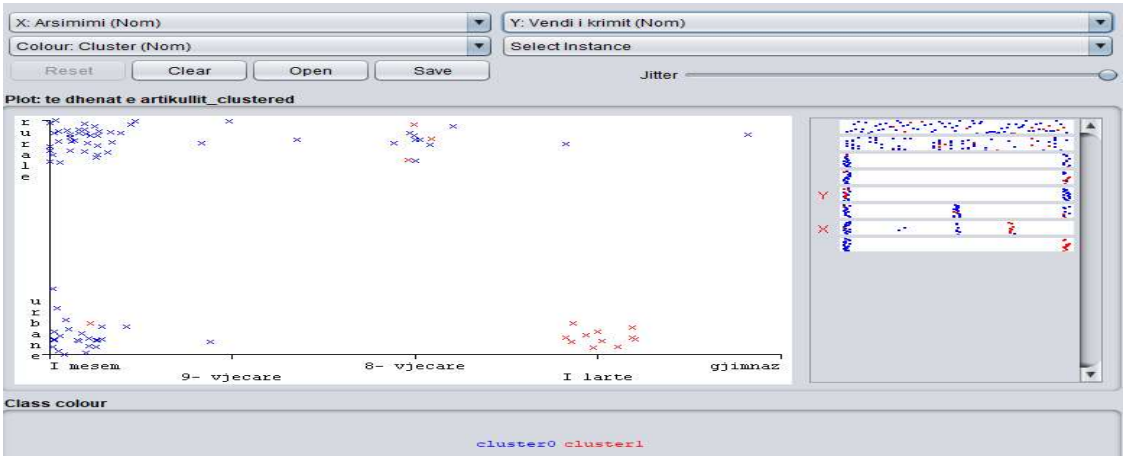

Figure 6. Result of K-Means Algorithm

Source: Author

According to the results of the K-mean algorithm, the persons who commit the most crimes are jobless and with secondary education.

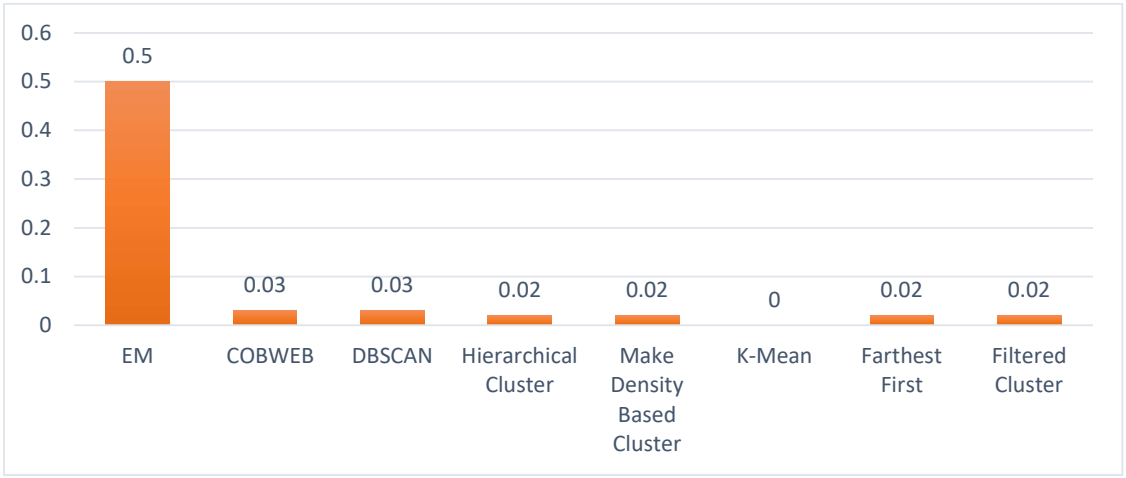

Figure 7. The time to build a model

Source: Author

The implementation of this algorithm has clustered the data in the least amount of time to build a model, exactly 0 seconds. This is shown in Figure 7.

Comparing this time with the time of other algorithms for the same number of instances (90), this algorithm has the shortest time, so it is faster.

5. CONCLUSIONS

The results of the experiments performed in this study indicate that data mining is applicable in the field of criminology. The K-mean clustering method aggregates the data in less time to build

a model, compared to other methods. This technique shows promising results for the crime prevention problem because the accuracy rate is high in our experiments. The k-mean clustering algorithm is easy to interpret and simple to implement.

Data mining methods make a major contribution to identifying crime areas and the characteristics of those who commit crimes. What is more important is that the methods are used in the decision making process. Decision making is very important in crime prevention in order to decide accurate actions and law enforcement strategies. Through our data analysis law enforcement agencies can create strategies, operating in areas where most crimes occur or for the perpetrators, their features (from our study were those who were unemployed and with secondary education). Adding data mining methods to specialized databases (about crime) makes it possible for a system to function as an expert in criminology. In this way, these methods contribute to predicting the likelihood of a crime occurring and as a result to prevent it.

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DIGITAL TRANSFORMATION OF ORGANIC FOOD PROCESSING INDUSTRY - A WAY TO IMPROVE COMPETITIVENESS IN THE GLOBAL MARKET

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Abstract

In the age of digital economy, the market conditions are inviolable, due to the changes in consumer behaviour. The term digital transformation is the second name for the fourth industrial revolution, which is being held under the influence of technological innovations. It refers to organizational restructuring due to the application of new information and communication technologies. Due to the digital transformation, there is a radical change in business – it moves from traditional business methods to digital business, which significantly accelerates market activities. Development of digital technologies in the business such as several varieties of e-commerce, app stores, online advertising, cloud computing, artificial intelligence, machine learning, participative networked platforms, high speed trading, as well as online payment services influence companies to change their business in order to be competitive. Organic food processing industry in the digital economy consists mainly of small and medium enterprises. Its comparative advantage is the flexibility of the production process and easy adaptation to market needs. The main problem in this industry is insufficient visibility, small capacities and production fragmentation. One of the ways to help companies in the organic food processing industry is to be acquainted with modern possibilities of technological development as well as to provide assistance in the digital transformation of companies. This paper presents the process of digital transformation of a company in the organic food processing industry.

Key words: organic food processing industry, digital transformation, information systems.

1. INTRODUCTION

Organic food refers to specific methods of production of crops and livestock aimed to protect natural resources and conserve biodiversity (Pradhan et al., 2019). It is becoming very important in today's world since it has high nutrition value is essential for human health. According to FiBL and IFOAM (2020), there is a growing global demand for organic products in the world. The total organic area in the world reached 57.8 million hectares; while the cultivated area in

Egypt is about 105.9 thousand hectares and it is one of the main pillars of the development of a sustainable economy.

The organic food industry is mostly composed of small and medium enterprises (SMEs) with over 98% of active economic entities in this branch. One of the comparative advantages of these companies is reflected in the flexibility of the production process and easy adaptation to market needs. The main problem of these companies is insufficient market visibility, small capacities and production fragmentation. In order to help them to become competitive in the domestic market as well as to increase their share in the foreign market and exports, they need a professional help.

A noticeable failure of organic food processing companies in the rural parts of the Western Balkans is insufficient online market visibility. Companies do not make sufficient use of modern funds information and communication technologies and the Internet in order to attract new consumers and markets, which significantly affects the results of their business. Observing competitors on worldwide, all the necessary information about the company, such as business history, contact data and, most importantly, a catalogue of products with prices, can be found on the Internet pages of these companies. In this way, the potential consumer can immediately find out online and decide on the purchase of a particular product or even negotiate modification of certain products according to their needs.

The aim of this paper is to present the digital transformation of the SMEs from rural areas of the Western Balkans that produce organic food. The process of digitisation is performed by implementation of online cooperative that connects SMEs in the area of organic food production and processing.

Given the awareness of the online promotion of companies from the organic food processing industry in rural areas of the Western Balkans is small, the paper presents the conducted research on a sample of 16 SMEs. Based on the results of the research, conclusions were made about the current degree application of Web applications in the companies from this industry, as well as expert recommendations for increase of this degree in the observed enterprises.

This paper is organised as follows. The next section describes the concept of digital transformation in the organic food processing industry. Section 3 defines the problem statement, while the section 4 briefly explains the online cooperative session. In the penultimate section, we describe evaluation and discussion, before concluding the paper in the final section.

2. DIGITAL TRANSFORMATION OF THE ORGANIC FOOD PROCESSING COMPANIES

Digital transformation refers to adopted transformation of business and organizational activities through replacing non-digital or manual processes with digital processes or replacing older digital technology with newer digital technology (Aydin, O. et al., 2020). In the process of digital transformation, organic food processing companies have become aware of the great potential of business over the internet due to the progressive growth of internet use in day-to-day business. Steinmann et al. (2015) believe that if the product is presented online in a way that suits the needs and desires of consumers, then it leads to a positive perception and evaluation of the brand and the possibility of its expansion towards other potential stakeholders.

A website is usually the first or the only way of online interaction between the customers and the company. The customers often make decisions about staying on a website in a few seconds from entering the site. Because of that, it is very important to design the site in such a way that the most important data are available and clear, trying to retain the customers as long as it possible does. In addition, the design of the site, the way of presenting the product, as well as the detail of the display of information greatly influence the final decision of customers to buy a particular product (Lowry et al., 2014).

In the age of digital economy, the Internet is an easy and accessible communication tool that can significantly improve the relationship between organic food processing companies and potential customers. According to Weathers et al. (2007) there are three ways for companies to communicate with customers via Internet: by using the images, by letting the customers to control the web presentation, as well as by provision of the information from alternative sources.

Yoo & Kim (2014) state that online sales provide interactive environments that are implemented by using a variety of tools and technologies that facilitate shopping better than classic way of shopping that prefers the using of catalogues. Through the Internet, it is possible to use innovative technological solutions such as the tools for visualization (eg zooming, 3D and video display), which satisfies the consumer's need for a sensory experience of the product. Modern information and communication technologies like artificial intelligence and machine learning are the tools to "understand" consumer behaviour and identify their hidden needs.

3. PROBLEM STATEMENT

The online cooperative project goals include the following:

- The system has to be designed to accomplish the requirements for developing the modern web application that is easy to maintain and reuse;
- It has to be rooted in a sound of conceptual and development framework for managing and displaying different organic food companies and their products;
- It has to enable intuitive dynamic relationships between products, product comparison, commenting the products, showing recently browsed products and product ratings;
- It has to enable the search by category, price and demand management, shopping with registration, shopping without registration, order management, banners and actions;
- It has to enable Google Analytics integration, custom reporting by using artificial intelligence tools such as machine learning for intelligent analysis of customer behavior, creating the loyalty program, gift cards, promotional codes and coupons.

4. ONLINE COOPERATIVE TOOL SESSION

Suppose we have the customer that wants to discover the organic food companies in a region of Western Balkans. By typing the keywords organic food companies, or similar, the browser finds the web site of the online cooperative and the customer opens it by click on it. Home page of the online cooperative called “Virtual Shopping Mall” (Figure 1, link: https://sabor-shop.org/page/stores) shows the list of stores offering the organic fruits and vegetables, as well

as products made from organic raw materials. There are sixteen organic food companies offering the organic products in the current phase of the development. By clicking on the specific store the details about organic food company, as well as the data about the products of that company are presented (Figure 2, link: https://sabor-shop.org/page/store/9). The customer has the opportunity to discover the organic products of the selected company, as well as to buy them online.

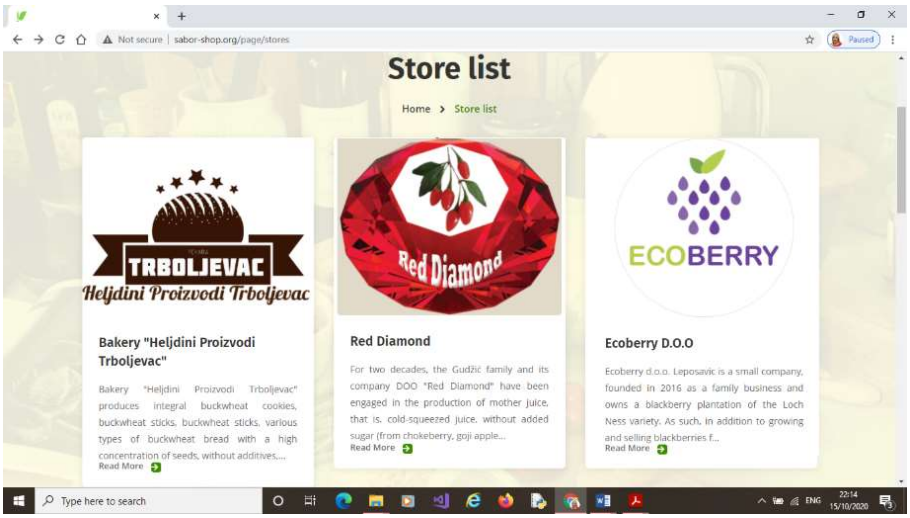

Figure 1. Online cooperative of the organic food companies

If the customer wants to search for the organic products by category he/she will choose the Search by Category button (Figure 3A), that enables him to find similar products (Figure 3B, link: https://sabor-shop.org/page/articles?category=12) and to buy them.

Also, there is the possibility to generate the Google Analytics reports, as well as to discover the details about the products that are bought. The data about registered customers who bought the products are stored in the database creating the customer's profile that can be analysed by using the artificial intelligence and machine learning techniques in order to explore and predict the customer experience and behaviour.

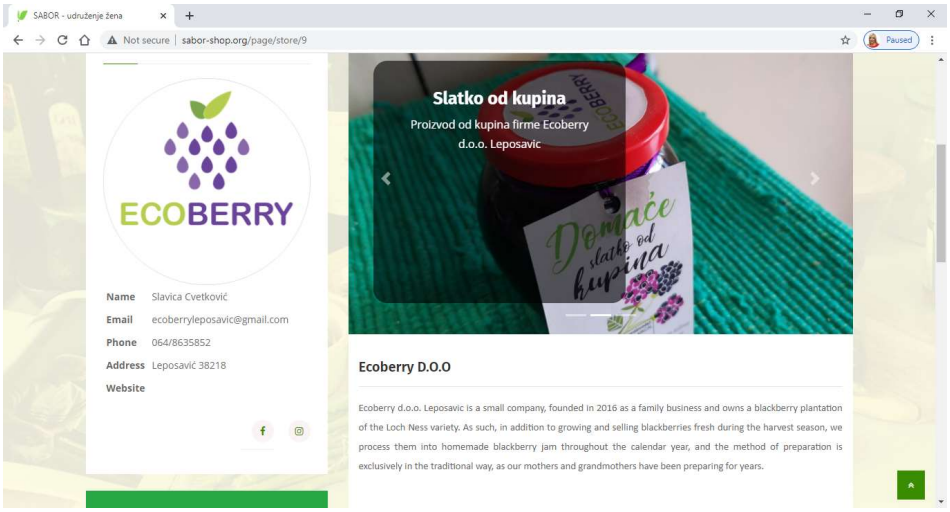

Figure 2. Product details of the specific organic food company

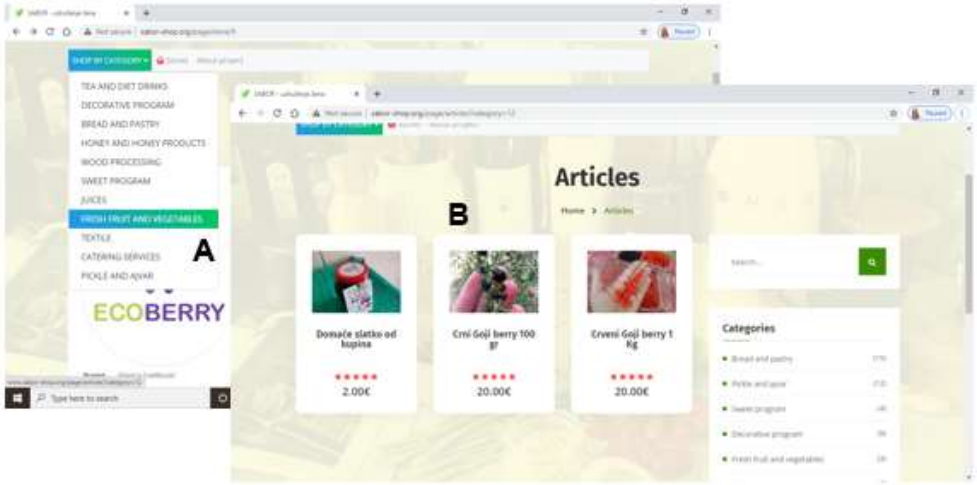

Figure 3. Search by category in the online cooperative

5. EVALUATION AND DISCUSSION

The main aim of the online cooperative tool is to support the process of digital transformation of the companies in the organic food processing industry. To gain initial insight into how users perceive and experience the online cooperative, a formative evaluation was conducted with 16 SMEs. The objective was to measure the level of usefulness of an online cooperative that is implemented as an information system in the form of web application. Although the online cooperative is not completed yet, and its functionalities are being improved, the participants experimented with the current version in order to learn how it might assist them in their future work.

The moderators demonstrated the use of the online cooperative tool to the participants. Having done so, the moderators then instructed the participants to run and to use the online cooperative tool, by completing tasks which corresponded to the application scenarios described in Section 4 within three months. Finally, the participants completed questionnaires about the online cooperative tool.

In creating our survey, we consulted the guidelines for creating questionnaires about evaluation of usefulness and ease of use software's system and user interfaces (Periman, 2009). The questions were designed on a 5-point Likert scale (the possible answers ranging from 1 to 5, from strongly disagree to strongly agree, or such like), but free-form qualitative judgments and comments were also encouraged.

The questions in the questionnaire were related to the following criteria:

- relevance (5 questions) - issues like benefits for individuals and organizations in finding new customers, support when looking for potential resources and partners, organizational support
- organization of information (5 questions) - issues like sequence of screens (interactions), simple and natural dialogue, and logic and terminology related to organic food product

- perceived usefulness (5 questions) - issues like selling of organic products more efficiently, improving company performance, increasing productivity, increasing inter-organizational collaboration, enhancing effectiveness on the SME,
- ease to use (5 questions) – issues like learning how to use the service, straightforwardness, using it without written instructions, clear and understandable interaction with the online cooperative tool.

Table 1 summarizes the evaluation results. Due to space limitations, the figures shown are rounded averages of the ones obtained for specific questions related to the same criterion.

Table 1. Results of formative evaluation of online cooperative by 16 SMEs

Criterion	Percent of Likert-scale answers (1 – lowest, 5 – highest)				
	1	2	3	4	5
Relevance	1	1	2	4	8
Organization of information	1	1	1	4	9
Perceived usefulness	1	1	1	3	10
Ease to use	2	4	2	4	4

Two observations follow from Table 1 immediately. First, most of the participants thought that online cooperative offers functionalities relevant for their job (the Relevance criterion), that it would be useful in their everyday job activities (Perceived usefulness), and that it is easy to use (Perceived ease of use) – over 50% of all participants answered the corresponding questions with '4' or '5' on the Likert scale. Second, a lot of reluctance is observed in answers to questions related to Organization of information. Many participants did not like some of the labels in the user interface, and some thought that certain labels were even redundant. This may indicate a need for possible changes in the user interface of the online cooperative tool.

6. CONCLUSIONS

In this paper, the online cooperative toolkit was presented as the prototype of a web-based application for digital transformation of the companies in the organic food processing industry.

Familiarisation with such a Web service would help SMEs in this area to be acquainted with modern possibilities of technological development as well as to provide assistance in the digital transformation of the companies. This would directly affect the faster and easier representing these companies, both in the domestic and foreign markets, an easier networking as well as increasing competitiveness. In addition, this would make it easier including SMEs in the supply chain of large companies, increasing productivity, as well as improving and accelerating many other business processes.

The evaluation of the online cooperative tool shown that there is a high relevance and perceived usefulness of the tool, but the organization of information has to be improved.

In the future it will be implemented the intelligent analysis of customer behaviour by using the artificial intelligence and machine learning techniques.

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