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**Path to a Knowledge Society-**  
**Managing Risks and Innovation**

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Stanković, M. and Nikolić, V.

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# **PaKSoM 2021**

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Anilambica Kata





# Intellectual Capital of Cultural Heritage as a Development Factor of Service Activities

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**Abstract**—The cultural wealth of our people represents a very important potential for the development of both the service sector and the entire Serbian economy through the presentation of the original cultural heritage and products derived from it. However, how can we use this huge intellectual capital that we all have and turn it into a value that will provide jobs, a better standard of living and economic growth and development of Serbia? The aim of this paper is to answer this question and it refers not only to the economic justification of projects from our cultural heritage, but also to the preservation and protection of cultural wealth, as well as sustainable cultural development. After the general introduction to the concept and classification of cultural heritage as well as the most important characteristics of cultural heritage in Serbia, the definition of the intellectual capital of cultural heritage follows and the presentation of the model of intellectual capital of cultural heritage by Bratian and Beženar. After that, through the intellectual capital of service activities and its definition and structure, the key creators of the value of intellectual capital in Serbian service companies are presented. The problem of the negative impact of globalization on the preservation and protection of cultural heritage is also addressed, as well as the possibility of preserving and presenting cultural heritage thanks to digitalization. Finally, we herewith present the treatment of one of the most important issues of cultural heritage, and that is the issue of intellectual property, as well as the issue of geographical indications of products, which is perhaps the most important development potential of Serbian companies when it comes to cultural heritage.

**Keywords**—cultural heritage, intellectual capital, preservation, protection.

## I. INTRODUCTION

In a knowledge-based economy, the terms knowledge economy and knowledge-based economy are distinguished. The knowledge economy refers to the production of knowledge, while the knowledge-based economy uses knowledge and technology to ensure growth and development and higher engagement of the capacities. The most developed economies are also economies that base their business on knowledge, and the most successful countries are also countries that adapt to changes in the environment thanks to innovation. However, the knowledge-based economy implies more efficient use and implementation, but also the development of existing and new knowledge, which is achieved by connecting and cooperating entities from the private and public sectors.

There are four key factors influencing the knowledge-based economy to play a key role in countries' economic development:

1. extremely large number of information and communication technologies;
2. acceleration of scientific and technological progress;
3. global competition growth;
4. implementation of demand and shifting of consumer attitudes and tastes towards entertainment due to growing incomes and revenues [1].

In order to use knowledge effectively, it is necessary for knowledge to participate more in the service sector, but also for the service sector to grow thanks to knowledge; furthermore it is necessary to increase investment in education and training, view innovation as a key source of economic growth and competitiveness of companies, regions and national economies, to develop and widely use new information and communication technologies.

"The key value of the concept of knowledge economy is that it connects the creative potentials of the human factor, innovation potential and technology, as generators of growth, institutions and economic actors, which is crucial for initiating and sustainability of economic growth and development. The synergetic effect of these key factors has a decisive impact on the productivity and competitiveness of the national economy, which creates realistic preconditions for quality economic growth and sustainable development. This concept is of special importance for developing countries, such as the Republic of Serbia (RS), because the transfer of technological knowledge and skills improves development potentials in the highest quality and long-term sustainable way" [2].

## II. THE CONCEPT AND CLASSIFICATION OF CULTURAL HERITAGE

The backbone of the international legal framework for the protection of cultural heritage is under the auspices of UNESCO (United Nations Educational, Scientific and Cultural Organization) [3]. Within the framework of the United Nations, the organization was established in 1945, and for its main goal, the organization adopted the contribution of peace and security by supporting cooperation between nations, of course through education, science and culture. "Evolving from its original meaning towards the notion of inheritance, the word heritage has gained an additional deeper meaning. In these extended contexts, the term heritage does not mean every heritage, but values, physical, spiritual, natural, cultural and historical, which were created by ancestors, and which are inherited by descendants (heirs) and which due to their importance must be preserved for posterity. Thus, heritage represents the natural, historical and cultural achievements of a certain area" [4].

Over time, the concept of cultural heritage has received many definitions and

interpretations. The International Center for the Study and Restoration of Cultural Heritage provides over 60 definitions of cultural heritage or cultural property.

According to the UNESCO Convention for the Protection of Natural and Cultural Heritage of 1972, "cultural heritage means the following goods: monuments - works of architecture, monumental sculptures or paintings, elements or structures of archaeological character, inscriptions, most of elements of exceptional universal value from artistic or scientific point of view; group sites: groups of isolated or connected buildings, which by their architecture, unity and integration into the landscape represent an exceptional universal value from a historical, artistic or scientific point of view; famous places: works of human hands or combined works of human hands and nature, as well as zones, including archeological sites, that are of exceptional universal importance from a historical, aesthetic and ethnological or anthropological point of view" [5].

At the time when the above mentioned Convention was adopted, the danger of the accelerated disappearance of non-physical aspects of different cultures, ie social customs that emerged during the historical development of the community, was still not recognized [6].

The UNESCO General Conference held in Paris in 1989 recommended the preservation of traditional culture and folklore, where folklore is perceived as part of the general human heritage and as a powerful tool that connects different people and social groups thus affirming their cultural identity [7].

Thereafter, at the UNESCO General Conference held in Paris in 2003, the Convention for the Safeguarding of the Intangible Cultural Heritage was adopted, defining the intangible cultural heritage as follows: 'Intangible cultural heritage' means practices, representations, expressions, knowledge, skills and instruments, objects, artifacts and cultural premises associated with them - which communities, groups and, in some cases, individuals, recognize as part of their cultural heritage. Such an intangible cultural heritage, passed down from generation to generation, communities and groups recreate, depending on their environment, their interactions with nature and their history, giving them a sense of identity and continuity, and thus promoting respect for cultural diversity and human creativity. For the purposes of this

Convention, only the intangible cultural heritage shall be taken into account in accordance with the applicable international legal instruments in the field of human rights, as well as with the need for mutual respect of communities, groups and individuals, and sustainable development [8]. Intangible cultural heritage or, as it is often called, living heritage, includes traditional crafts and food, customs, social practices and rituals, beliefs, ways of oral expression and performance of folk dances and songs, which are still preserved today, and which the communities that inherit them pass down from generation to generation as a feature of their own identity [9].

In order to be included on the UNESCO World Heritage List, a heritage object must meet at least one of the following criteria: it must represent a masterpiece of human creative genius; represent an important interchange of human values during a certain period of time or within a certain cultural region in the world; it must represent the development of architecture or technology, sculptural art, city plans or environmental design; bear the unique or at least exceptional testimony of a cultural tradition or civilization that is alive or extinct; be an outstanding example of a type of building, architectural or technological ensemble or scene depicting exceptional stages in human history. Furthermore, it must be an outstanding example of traditional human life, land cultivation, use of the sea, which represents the culture of human interaction with the environment, especially when it becomes vulnerable under the influence of irreversible changes; it must be directly or materially connected with events or living traditions, with ideas or beliefs, with artistic or literary work of exceptional universal significance; it must contain an unsurpassed natural phenomenon or areas of outstanding natural beauty and aesthetic importance; it must be an outstanding example representing major stages in the historical development of the country, including testimonies of life, significant geological processes that are still ongoing or geomorphological or physiographic features; it must be an outstanding example representing significant ecological or biological processes that take place in the evolution and development of terrain, fresh water, coastal or marine ecosystems and plant and animal communities; it must contain the most important natural habitats that preserve biological diversity, including those that contain endangered species of exceptional

universal value from the point of view of science and conservation [10].

### III. INTELLECTUAL CAPITAL OF CULTURAL HERITAGE

Ever since the adoption of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage in 2003, intangible cultural heritage has become the subject of many interests in the field of heritage studies and related disciplines, and is considered a guarantee of sustainable development. The 2030 Agenda for Sustainable Development consists of an action plan that includes three dimensions - the economic dimension, the social dimension and the environmental dimension, and 17 sustainable development goals, including respect for three principles: human rights, equality and sustainability. Intangible heritage can effectively contribute to sustainable development through these three dimensions with security and peace as prerequisites for sustainable development [11].

The concept of cultural capital in terms of cultural heritage, currently includes both tangible capital - museums, archaeological sites, historic buildings, monuments, etc., and intangible capital, from art production, music, entertainment, to old crafts, traditional food and wine production, as well as traditional cultures that encompass the entire lives and lifestyles of human communities. [...] In this sense, heritage can now be perceived as a source of production and a strategic concept for the development of local economies, using categories of study and approaches that are typical of economic analysis [12].

Intangible heritage literally means those things that we do not see or can touch, but that we can feel. And it certainly involves memory. It is very important how people remember or how they think about the past and the things that currently affect them - things without physical presence. They are mostly related to our knowledge system. There are other categories that cannot be seen but can be heard. These are music, language, dance, performances, beliefs, rituals, various social practices, etc. which are not permanent. The notion of intangible encompasses all of the above.

Intangible cultural heritage as a living heritage can be a major source of innovation and development. Inclusive economic development as a dimension of sustainable development is dependent on stable, equitable and inclusive

economic growth, which is based on sustainable patterns of production and consumption. Local knowledge, skills and practices are maintained and improved through generations, providing livelihoods for many people. Performing arts, ceremonial events and other expressions of intangible cultural heritage also involve community members in economic development, including women and youth. Communities also benefit from tourism activities related to intangible cultural heritage. The discovery of various traditions, holiday events, performing arts, skills related to traditional crafts and other areas of intangible cultural heritage – all this is a powerful lever for attracting tourists at the national, regional and international levels [13].

"From the economic point of view, human creativity is a form of capital. It is a development resource that we call creative capital. According to creative capital theorists, the most important factors driving economic growth are: technology, talent and tolerance" [14]. In order to attract creative people, generate innovations and thus stimulate economic growth, it is necessary that all three factors exist simultaneously in the locality (nation state, region, city) that is the subject of analysis or observation [14].

According to Cecil Duwell, Secretary of the 2003 Convention and Director of the UNESCO Section for the Intangible Heritage, the value of the intangible cultural heritage should be determined in the following way: through a greater focus on the transfer of knowledge and skills than on products; through social and economic value more than commercial value; by applying different protection measures in relation to those applied to the tangible cultural heritage; through collective intellectual property rights or direct recognition of the value of cultural identity through the listing of elements of intangible cultural heritage [15].

According to the same author, the economic value of intangible cultural heritage depends on three elements: direct value that is directly related to products obtained from activities related to cultural heritage and these products can be used for own or other people's use or for commercial purposes; indirect economic value refers to the value of knowledge and skills, the value of transfer of knowledge and skills, then the income earned in other sectors through the activities of intangible cultural heritage, social values and prevention of social conflict; non-intervention costs, if necessary by society, costs

of restitution) and social damage (endangering the dialogue and mutual misunderstanding, respect, the origin of the conflict).

#### IV. CULTURAL HERITAGE INTELLECTUAL CAPITAL MODEL ACCORDING TO BRATIANU AND BEŽENAR

Bratianu and Beženar study the area of intellectual capital of cultural heritage through ecosystems that contain valuable artifacts that include rational, emotional and spiritual knowledge. These artifacts form a wide range from historical monuments and archeological sites to folklore tradition and religious ceremonies. These are complex systems of interactions and continuous transformations which indicate that intellectual capital is a dynamic entity that evolves from a potential state to an active, operational state. Furthermore, knowledge develops from an "emergent" state to the state that is embedded in cultural artifacts because development and conservation are in constant dynamics [16].

Before presenting this model, it is necessary to explain the terms "embedded" knowledge and "emergent" knowledge. "Embedded" knowledge is collective - tacit knowledge that is found in organizational routines and common norms [17]. "Emergent" knowledge is gained through learning that is more than lifelong learning. It refers to the fact that we create new knowledge constantly while facing different situations and challenges [18].

The authors start from Edvinson's dynamic model which includes time that enables continuous transformation from potential to operational state as a result of linear and nonlinear integrators (integrator is a powerful field of forces that combines two or more elements into a new entity based on independence and synergy). These elements can be physical or spiritual in nature and can have the ability to interact in a controlled way. The property of independence is needed to combine all the elements into a system. The synergy property allows to create extra energy from the work system. This is the feature that distinguishes linear from nonlinear integrators. Potential intellectual capital is the result of the integration of all intangibles in the ecosystem, from the past and the present. "Embedded" knowledge in all forms of cultural heritage and social structure continuously integrates "emergent" knowledge created by social interactions and defines the potential intellectual

capital of ecosystems. This potential is transformed into operational intellectual capital by the linear and nonlinear integrators that exist in the ecosystem. Linear integrators in ecosystems are all technologies and associated processes that bind people to work together, all infrastructure systems and all regulations that function within ecosystems. They are called "linear" because their effect is based on linear mathematical operations. Nonlinear integrators represent management systems of organizations or at higher administrative levels such as villages, cities, regions, cultural organizations, local traditions and various other forms of management. These integrators can produce a synergy that produces a higher level of ecosystem than the combined contribution of its individual components. Any organization may have a higher potential level of intellectual capital, but a lack of efficient integrators can lead to a very low level of operational intellectual capital (human, social, and structural capital) and its poor performance.

As stated earlier, knowledge can be rational, emotional, and spiritual and can be integrated at different levels of organization, network, and ecosystem. It can be embedded in artifacts, structures, legislation, traditions, folklore, natural landscapes and other elements of cultural heritage. Also, knowledge can be the result of human activity and can be integrated with linear and nonlinear integrators. The result is operating capital that transforms itself into value for the community within the ecosystem and for tourists who spend time within the ecosystem. For cultural heritage ecosystems, the economic dimension depends on business service that is directly related to operational intellectual capital. Even when all monuments, art and embedded knowledge contribute to potential intellectual capital, their value can mean to tourists only if the operational intellectual capital is at a high level and if it is supported by the accompanying strong infrastructure. In the ecosystem, the most important nonlinear integrator is the management, on which the transformation of intellectual capital into its operational form depends the most. It integrates rational knowledge. The culture of communities and their tradition, lifestyle and hospitality represent emotional and spiritual knowledge. Transport and communication systems are linear integrators and their contribution is essential for support in living and working conditions. The beauty of the landscape, places of cultural

heritage, monuments of culture and art are emotional and spiritual means for attracting tourists as well as rational drivers of economic development.

The authors of this model believe that it could serve and help various stakeholders to implement knowledge and to arrive at best decisions to increase the value of the operational intellectual capital of a particular ecosystem.

#### V. THE INTELLECTUAL CAPITAL OF CULTURAL HERITAGE AS A SOURCE OF COMPETITIVENESS OF SERVICE COMPANIES

"Creativity and creative industries underlie all thinking about development in the 21st century. In the past, creativity was treated as a gift from God, then it was considered the work of genius, and today it has already become a democratic heritage. Namely, politicians and managers, athletes and students, artists and engineers, scientists and real estate agents, bankers and lawyers, and everyone else would like to be creative. Therefore, creativity has acquired the status of a basic determinant of the competitive advantages of entrepreneurs, companies and national economies in a turbulent global market. Hence, an economy in which creativity is a source of competitive advantage in the market is a key factor in modern business" [19].

In many developed economies, it is considered that the focus should be shifted from the traditional model of understanding cultural activities that are based not only on entertainment and consumption, but also on production, ie on the creative aspect of the cultural sector.

In cultural heritage research, one of the key issues related to the benefits of cultural heritage and its impact on the development of the local economy is cultural and creative entrepreneurship. Cultural entrepreneurship should be understood as a special type of entrepreneurship, given that it is influenced by the cultural and artistic sector and people - from agents to artists and creators. In the last thirty years, the cultural sector has been recognized as a significant economic sector in many economies, the sector that is just as important as other segments of the economy [20].

According to Throsby, cultural entrepreneurship can be defined as a management process through which cultural workers seek support in creativity and autonomy

in order to improve their capacity to adapt and create artistic and social value [21].

In business sense, cultural heritage can be understood as a sector of activity consisting of organizations that provide products or services related to the understanding, protection and promotion of objects, sites, monuments and other forms of tangible and intangible cultural heritage. The business side of cultural heritage can be placed among the service and experience economy, as well as in the political context through activities such as tourism, where value can be understood in terms of market position or in terms of a sector that has its own value system [21].

Cultural heritage can be viewed as a combination of goods and services that include the following groups: tangible cultural goods (buildings, books, monuments, works of art, artifacts, landscapes); intangible cultural goods (language and knowledge, folklore, oral history, traditional customs, aesthetic and spiritual beliefs) that are much more difficult to preserve compared to physical cultural goods; cultural natural heritage (rural areas, natural environment, flora and fauna, biological and geographical diversity, cultural landscapes that are an important part of tourism) [22].

The best explanation as to where cultural heritage is located among different activities can be understood from the production cycle of value chain models [23]. Value chain models include the creation, production, distribution and consumption of cultural goods. The value chain can be used by policy makers to identify needs for cultural and creative activities. It can be used as information support for policies and measures, as support for design and to address entrepreneurial needs. The value chain includes five phases: 1. Creation: determining the origin and author of an idea or content (eg sculptors, writers, design companies) and creating an individual product (eg craft products, art paintings); 2. Production: cultural forms that can be reproduced (eg TV programs), as well as specialized tools, infrastructure and processes used in their realization (production of musical instruments, printing of newspapers); 3. Distribution: bringing mass-produced cultural goods to consumers and exhibitors (wholesalers, retailers and renters of recorded music and computer games, film distributors, etc.). In digital distribution some products and services go directly from producers to consumers; 4.

Exposure/Reception/ Transmission: it indicates the place of consumption and commission of cultural experiences either live or in direct transmission to consumers by providing or selling access to consumption, ie participation in cultural activities with a duration (eg festival organizations and productions, opera houses, theaters, museums). Transmission is related to the transfer of knowledge and skills that do not have to involve commercial transactions and that take place in informal circumstances. This includes the transmission of intangible cultural heritage from generation to generation; 5. Consumption/participation: the activities of the audience and participants in the consumption of cultural products and participation in cultural activities and in experiences (eg reading books, participating in carnivals, listening to the radio, visiting galleries) [24].

Entrepreneurship in the field of cultural heritage must be related to the strategic goals and mix of policies implemented by public institutions and private companies in terms of good preservation, maintenance and accessibility of cultural goods and their integration into the existing environment in a productive, educational and efficient manner. The availability of goods and services to the public is a fundamental factor in maintaining community identity, heritage and the possibility of national and international contacts in terms of good practice and sustainable strategic management [25].

Cultural entrepreneurship is performed by cultural companies and the people who are employed in them, and can vary from single-employee enterprises such as authors, writers, architects or musicians, to large enterprises and corporations with a special organization, directors and boards. Their role is to create links between artists and creators on the one hand, and the market for cultural goods and services on the other hand.

In order to better understand the part of the service activities of the public sector that uses cultural heritage as a resource, a transaction matrix from the study of Klammer, Petrova and Minoza can be used, which shows the supply and demand for services related to cultural heritage [26].

Entities that provide financial resources are taxpayers, companies and households. Allocators are the central bodies of government and local self-government that are responsible

for cultural policy. Consumers are government agencies that are responsible for distributing grants to suppliers. The users are service activities. This model could be applied in bureaucratic systems in which service providers are not autonomous in relation to the state [27].

However, at the same time, all these subsidized institutions are very slow to develop business models that can meet the needs, expectations and lifestyles of consumers of cultural goods and services.

Transformation implies overcoming three important challenges: fragmentation of the supply of cultural heritage - it is very important that in addition to offering the main and most famous products and services of cultural heritage of which there is often an overload, there is also a supply of lesser known goods and services. It is also necessary to reconcile the views of entities at different levels such as different institutional structures and stakeholders regarding the preservation, conservation and use of cultural heritage. The problem also arises in terms of the monopoly of information where there is inflexibility of the supply in terms of informal communication, so very often consumers obtain information on their own from the media, literature and other sources; cultural communication - such communication is rich in figurative meanings and interactive contexts. Entities presenting cultural heritage often neglect the intangible dimensions of cultural heritage at the expense of tangible, material heritage. Care must be taken that behind the consumers are people with their perceptual abilities where the presentation evokes in them certain feelings and memories; redefining values - The public sector when it comes to cultural heritage is very slow to develop business models and proposals related to meeting the needs of consumers seeking experience, especially when it comes to digitally literate young generations. In addition, it very often lacks strategies to improve the production mechanisms of intangible cultural heritage, launch new products that will attract demand and create new skills and new jobs.

#### *A. Entrepreneurship in the Field of Cultural Heritage*

The success of entrepreneurship in the field of cultural heritage depends on several factors on the supply and demand side that are related to: the characteristics of cultural heritage goods and services (physical and digital) and their

cultural, aesthetic and authentic values; the level of income of users, education, professional interests, the possibility of intellectual and spiritual perception; economic and social values and environmental values; pricing policy, fees and other service costs; intellectual, emotional and spiritual impact on visitors (tourists), as well as the achieved social prestige and satisfaction, including the reduction of social exclusion [28].

Chang and Vizomirski classify the components of cultural, ie creative entrepreneurship into five categories. Each entrepreneurship model should contain at least one component from each category in its combination. Therefore, entrepreneurship is constantly recombining components [29].

#### **VI. THE IMPACT OF GLOBALIYATION ON CULTURAL HERITAGE**

The process of globalization, in addition to its positive effects, has certainly led to indigenous and small communities adopting a way of life that is detrimental to the preservation of their traditions and local customs.

Old crafts represent a very important part of the intellectual capital of cultural heritage in terms of possession and transfer of skills and knowledge.

Globalization has also led to mass production which is cheaper and suppresses the individual production of traditional crafts.

In addition, global climate change is affecting the lack of key natural materials needed to make old craft products. All this results in young people's lack of interest in old crafts.

Tourism is one of the most developed economic activities in the world and includes the largest international and domestic population movements. As such, it can and does put great pressure on the world's cultural heritage. The negative impacts of tourism on cultural heritage can be different. Inadequate communication between visitors and the local community as well as the lack of adequate presentation of the heritage site can lead to the wider community not understanding and appreciating the site lses which reduces political and institutional support for financing the protection and preservation of the heritage site. Inadequate implementation of laws on the protection and preservation of cultural heritage in cultural and tourism policy at the regional and national levels may, over time,



reduce the application of these laws. In addition, when planning cultural projects, it is necessary to recognize all potential conflicts between cultural projects and the principles of preservation and protection of cultural heritage. Otherwise it leads to the loss of authenticity of cultural heritage and less interest in the tourist site. Poorly planned and uncontrolled tourism activities can destroy physical appearance, biodiversity, the environment, and the infrastructure of the environment in which the local community lives and works. The animosity of the local population also causes disrespect for local customs, religious sites; they can also face attempts to illegally access local practices, knowledge and beliefs, as well as illegal trade in protected or stolen cultural heritage objects.

When it comes to the development of the local economy, it can be endangered by bad promotional programs that do not encourage the arrival of tourists or programs that encourage the arrival of tourists to the most visited places, which leads to uneven visits, so less attractive places fail to relieve the most attractive places. Poor programs can also be caused by a lack of professional staff in terms of planning, design, architecture, interpretation. Even if there is professional staff in the local community, it can happen to hire staff outside the local community, especially in terms of presentation and interpretation of cultural heritage, which leaves the local population without a job opportunity. Poor management of the promotion, distribution and sale of products of local craftsmen leads to negative economic effects on the local population, but also to the degradation of their cultural integrity [30].

In order to prevent the negative impact of globalization, and take advantage of the positive impact, UNESCO in 2001 in Paris proposed an international regulation of a new standardization instrument to preserve traditional culture and folklore that would encourage communities to preserve the rights and capacities to practice their own cultural heritage as well as development of own approaches for its management and maintenance. In that sense, the loss of cultural heritage can be stopped only if the means, conditions and skills that create it are provided, as well as legal regulations and transfer [31].

## VII. INTELLECTUAL PROPERTY OF CULTURAL HERITAGE

Intellectual property is a very important issue related to cultural heritage and intangible heritage. Addressing this issue should benefit both rights holders and society as a whole. However, it is very difficult to harmonize national and international legal frameworks governing different forms of cultural creation and traditional knowledge, moreover, an ideal combination of these frameworks cannot be made. International institutions dealing with this issue are the United Nations, UNESCO and WIPO (World Intellectual Property Organization). Intellectual property is a general term used to denote various legal mechanisms that protect the property rights of intangible cultural heritage.

Property rights of intangible cultural heritage can be protected by patents, trademarks and copyright. Patents protect innovation. They give their holders certain rights. Patents can prevent others from making, using, selling or importing these innovations for the duration of the patent. However, traditional knowledge cannot be protected by a patent. They are always the product of some previously published, publicly used or orally established knowledge. Only in a few cases did the patents belong to the autonomous population or local communities for innovations achieved through the use of traditional knowledge, but not for knowledge per se. Innovations were created in these cases in cooperation with patent holders and research institutions, and they relate to the further development of a particular technology or know-how. However, patents are an excellent instrument for the protection of traditional knowledge because they make it impossible to apply for this knowledge as patents and use it as an innovation, and thus abuse it in terms of owning an exclusive right.

A trademark is a suitable way to protect cultural creativity and traditional knowledge because protection does not have to be term-limited, ie it can last forever. On the other hand it is possible to collectively possess this right. Indigenous and local communities can use trademark as a tool for differentiation and branding. With an adequate marketing strategy, this can increase the recognition of traditional cultural creation as well as bring certain benefits to the holders of those rights.

Copyright is a very important tool for the protection of traditional cultural creation. They cover a wide range of literature, artistic and scientific creations, such as novels, poems, plays, films, musical compositions, choreographies, paintings, photographs, sculptures. Furthermore, they protect the expression of ideas, but not the idea itself. In any case, the work does not have to be completely new, but it must pass precisely defined criteria of originality [32].

When it comes to property rights and cultural heritage, a special potential for the development of the Serbian economy is the production of products with protected geographical origin. According to the Law on Geographical Indications, "geographical indications are used to mark natural, agricultural, food and industrial products, handicrafts and services. Designation of origin (IP) is the geographical name of a country, region or locality designating a product originating there, whose quality and special properties are exclusively or essentially conditioned by the geographical environment, including natural and human factors, and whose production, processing and preparation take place as a whole in a certain limited area. A geographical indication (GI) is a designation that identifies a product as originating in the territory of a country, region or locality in that territory, where a particular quality, reputation or other characteristics of the product can be essentially attributed to its geographical origin and whose production and / or processing and / or preparation takes place in a specific limited area" [33].

At the national level, the registration and protection of geographical indications is performed by the "Intellectual Property Office of the Republic of Serbia" and at the international level by the "International Intellectual Property Office", which includes our "Intellectual Property Office", because Serbia is a signatory to the Lisbon Treaty but the registration of the mark itself is done at the request of the Intellectual Property Office of the Republic of Serbia. At EU level, the protection of products of geographical origin is carried out by the European Commission through various regulations.

There is a set of benefits and costs of registering geographical indications and traditional products. Economically, the protection of designations of origin,

geographical indications and traditional products differs from other types of intellectual property protection. This is primarily because in the case of a quality scheme, it is not the innovation that is protected, but the geographical area, which contributes to the specificity of the product [34].

The geographical indication is also a very important instrument for the protection of traditional knowledge. It allows traditional knowledge to remain in the public domain, which means that no firm or individual can have a monopoly over this knowledge.

To date, the Institute for the Protection of Intellectual Property has protected more than 60 products with geographical indications, among which the largest number of food products, such as Leskovac homemade ajvar, Leskovac barbecue meat, Rtanj tea, Vrnjci water, but also home-made products such as: Pirot carpet, Bezdan damast and Sirogojno - hand-knitted clothes. In addition, Chigota can be found on this list, as a geographical indication for the provision of health and tourist services in part of the territory of the municipality of Čajetina. Only three products from Serbia have been registered at the international level: Leskovac homemade ajvar, Homolje honey and Bermet.

## VIII. CONCLUSION

Serbia has huge potentials when it comes to the intellectual capital of cultural heritage and its participation in creating value at the national level. Tangible and intangible heritage provides space for the operation of service activities in both the private and public sectors, but under the condition of their mutual cooperation.

Tourism is the main activity that has as its subject the promotion of cultural heritage. In order for the business of this activity to come to the fore and take on a serious and sustainable character, it is necessary to meet certain conditions. It is extremely important to preserve and maintain cultural heritage sites in order to create conditions for the arrival of tourists in a particular area. Income from tourism could later be used in further maintenance and development of the tourist site, ie cultural heritage site. However, in order to ensure the interest and arrival of tourists, it is necessary to develop adequate programs that would be particularly attractive and appropriate, and which would entail members of the local community to take an active part in them.

In addition to all the above, it is necessary to have professional staff who could meet and respond to the demands of tourists in terms of providing information. It is also necessary to create interest in language, art, music, gastronomy and other forms of culture of our country, which is achieved by adequate marketing programs.

Products with geographical indications are also an extremely important potential of Serbia. The first steps have been taken when it comes to the protection of original Serbian products, but that is still not enough. It is necessary, first of all, to complete projects of comprehensive mapping of original Serbian products, to identify and protect them. In that way, these products would have a guaranteed quality, gain significant value, attract foreign consumers, and thus encourage the local population to engage in agricultural activities, but it would also activate old crafts that have slowly begun to die out.

In the era of information technologies, it is necessary to use them for the preservation and then promotion of our cultural heritage. It is very important to build an open data infrastructure in Serbia that allows free access to information about various libraries, galleries, museums. This results in increased influence, visibility, new customers, brand value, as well as increasing the number of distribution channels.

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# Cost-Benefit Analysis of Hens and Broiler Chicken Farms in the Canton of Sarajevo

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**Abstract-Aim:** Aim of this study was to determine the profitability of intensive breeding of broiler chickens and hens using the cost-benefit analysis, on two poultry farms of small capacity in the area of the Sarajevo Canton in Bosnia and Herzegovina.

**Material and methods:** A farm of broiler chickens was analyzed within six cycles during one year, and it had a capacity of 8500 chickens. A hens farm of capacity of 2.000 was analyzed as well. Analysis of hens farm was done, because of the didactic reasoning, in two different segments, within breed of broilers up to 4 months of age and the exploitation of hens during the first year. Methods included cost-benefit analysis where the method used was the one of goal-free evaluation. Data which represent input parameters for the analysis were obtained from conversing with the owners of the farms, after what certain numerical values were obtained which were necessary for the further processing of analytical procedures.

**Results:** In intensive breeding of broiler chickens and hens, using cost-benefit analysis, a number of costs were determined which eventually lower the expected profit. Food, amortization, sawdust, as well as overhead and veterinary expenses make up up to approximately 80% of total expenses, during the one year of breeding. The broiler chicken farm of capacity of 8.500 broilers, during the six cycles produces 122.400 kg of chicken meat a year, which equals to 318.240 BAM<sup>1</sup>, while a year long hens exploitation, in terms of placement of consumed eggs on the market, resulted in a profit of 107.320 BAM.

**Conclusion:** Continental climate, which dominates the region of the Sarajevo Canton, favors the breeding of broiler chickens, as well as the breeding of hens for the production of consumed

hen eggs. Obtained results show that an economic profitability exists, if a capital is invested in this segment of poultry production. Quick turnover of capital; a possibility of 6 cycles in a year, a good price of chicken meat and consumed eggs, purchasing habits of the Sarajevo Canton population, as well as the constant increase in the poultry production in bosnia and Herzegovina (B&H). Bare strong economic indicators for the profitability that comes from the investment in the poultry production.

**Keywords** - cost-benefit analysis, breeding of broiler chickens, breeding of hens, chicken meat, chicken eggs

## I. INTRODUCTION

Poultry production in the world in the last two decades has shown a great development. It has a lot of advantages which is why it is now in the first place when it comes to cultivation of animals [1]. Basal metabolism of poultry allows and favors decreased conversion of food, while genetic predispositions enable great reproduction and fast growth. It is possible to apply „industrialization of production“ when it comes to poultry in all of the phases of production. Broiler, a young fattened chicken of fast-growing species and hybrids in an enclosed building on the principle of industrial production is the poultry of choice. Meat, as their most representative product, is easily metabolised with amino acid composition of good quality, which does not burden the human organism in the cholesterol diet as well as with other harmful ingredients as some other types of meat. Chicken egg is biologically highly valuable

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<sup>1</sup> Bosnia and Herzegovina convertible mark

food. It is rich with proteins of high quality, mono- and poli- unsaturated fatty acids, vitamins and minerals [2,3]. As it is an important food, chicken egg is far more prevalent when compared to other domestic poultry's eggs [4].

A trend of increased poultry production is evident in B&H as well, and it represents its important part of animal cultivation in terms of agriculture. Poultry in B&H is being bred in multiple ways. The highest number of poultry is still placed in an unspecialized farms where their breeding is extensive. At the same time, there are also some big and highly specialized farms which, for example, have over 20.000 hens or broiler chickens. Technology is used at such intensive breeding, which often works according to pre-established programs, that is, it is almost entirely automated. Finally, between these two very different ways of breeding poultry, there are different possibilities of transitional arrangements, depending on whether their use is justified in each case alone.

According to [5] poultry production includes breeding and keeping of hybrid hens of light breeds that are able to reproduce, as well as the breeding of chickens for the production of consumed eggs, breeding and keeping of hybrid hens of heavy breeds and the production of a one-day offspring.

## II. STATISTICAL PARAMETERS FOR THE NUMBER OF POULTRY IN B&H IN THE PERIOD OF 2010 – 2014

According to data of Agency for Statistics of B&H the number of poultry in B&H in the period 2010. - 2014. varied from 18.7 to 24.73 millions of pieces, while the number of hens since 2010. increased from 3.77 to 5.60 millions. In 2014. the number was somewhat lower when compared to the last year (2013), lower by 16.1%.

A total number of poultry in B&H in 2014. was 20.664 millions pieces, while the number of hens in the same year amounted to 5.602 millions [6]. A share of poultry meat production in the structure of a total fresh meat production in B&H is 59%. On average, around 31.396 pieces of poultry are slaughtered in slaughterhouses a year, and 99% of that are fattened chickens, while the remaining 1% is made up of other poultry, mostly hens [7].

## III. FACTORS AFFECTING TREND OF GROWTH OF POULTRY PRODUCTION

Poultry production is specific because of the possibility of quick turnover in business, which in the end results in the lowest meat prices. If we look at the broadest layers of the population, then the meat of poultry, as it is cheaper, becomes the main interest of consumers. With the help of technical and technological achievements in the production of broiler meat, as well as the biological characteristics of poultry, the continuing trend of growth of this production exists, in the world, and in B&H.

By applying the latest knowledge in the field of genetics and selection in a relatively short time, a new hybrid hens were created, whose offsprings - chickens for fattening, today, in only 40 days of fattening can gain the weight of over 2 kg, with food consumption below 2 kg per kg of growth [8].

Many also predict an increase of the production at the world level in the future. Many reasons are in favor of increasing the production of chicken meat:

- The price of chicken meat (is what nowadays determines purchasing habits of consumers more than quality and nutritional value of the food)
- Nutritional composition/value of chicken meat (meat rich with proteins and low on fat)
- Reduced food conversion (lower food consumption per kilogram of growth)
- Maximum utilization of genetic resources (rapid growth and weight gain)
- Usage of space for fattening (production is not closely related to the large rooms / areas)
- The rapid turnover of capital (possibility of up to 6 cycles in a year)
- Lower investments (starting investments in equipment and animals)

Breeding of chicken broilers is enabled to almost all those who wish to engage in this activity, whether for profit or own needs for chicken meat.

## IV. OVERVIEW OF THE RESULTS OF PREVIOUS RESEARCH

Cost benefit analysis is a method of economic analysis, used to compare and

evaluate all advantages and disadvantages of some economic venture or project by analyzing costs and benefits. Such analysis is important for making the right decisions, and for the correction of projects for which it is done [9-11].

After consulting the reference data that prejudice issue of cost-benefit analysis, for example, we have chosen an investment model with the basic parameters of the calculation of costs and expenses on the one hand, and the annual income, or profit, on the other hand, (Table I).

Based on the collected relevant data, for the upbuilding of farm and technical and technological process for the fattening of broilers, with prices characteristic for the region

TABLE I. DESCRIPTION OF COSTS AND MARKET VALUE OF PRODUCTION [13].

Description of costs and expenses	BAM cycle	BAM year
Day-old chicks (5.000 x 0.9 BAM)	4.500	24.750
Food for fattening (4.850x4.5 kg x 0.8 BAM)	18.500	99.000
Electricity, water, bedding, medicines	800	4.400
Salaries for 2 months /1 employee x 750 BAM	1.500	9.000
<b>In total</b>	<b>24.800</b>	<b>137.150</b>
<b>Market value of production</b>		
Chickens (4.850 x 1.90 BAM x 6 BAM/kg)	55.290	304.095
<b>In total</b>	<b>55.290</b>	<b>304.095</b>
<b>Annual revenues of the production in the system of cooperation</b>		
Gross profits (4.850 chickens x 0.57 BAM/piece)	2.765	15.207
Costs of salaries, electricity, medicine, water, sawdust	2.350	12.925
<b>Profit</b>	<b>415</b>	<b>2.828</b>

of B&H, systematic investment plan updated in the late 2014 on the proposed models from 55 farm looks like this [12].

An example of investment model for the upbuilding of installation/farm of capacity 5.000 broilers.

Parameters: upbuilding of the installation of dimensions cca 330 m<sup>2</sup>: cca 80.000 BAM, equipment for chicken fattening: cca 20.000 BAM, in total: 100.000 BAM

Hypothetically speaking, it is believed that the intensive rearing of broilers and hens of small capacity is a profitable business.

Aim of this study is to examine two poultry farms using cost-benefit analysis: a farm of fattening broilers and a farm of hens of small capacity on private farms, in order to obtain exact economic data on potential profitability in this specific part of the livestock production.

## V. MATERIAL AND METHODS

To make the cost-benefit analysis of the two poultry farms, farms of broiler chickens and laying hens farms of small capacity on private farms on the outskirts of Sarajevo, a method of goal-free evaluation was used. Data included in the analysis were obtained from the interviews with the owners, and we jointly came up with certain numbers that are necessary for the analysis. Two poultry farms were analyzed; broiler chicken and hens ones. Farm of broiler chickens of small capacity is located in the south-western outskirts of Sarajevo, S.P.D. "Chicken". The farm's capacity is 8500 broiler chickens, hybrid COOP 500.

The farm of hens is located in the peripheral northern slopes of Sarajevo, the one of small capacity as well, i.e. Independent Turnover Agricultural Activity SOPD2 "Jaja Prom". Capacity of farm is 2000 pieces of hens - hybrid Issa Brown. Cost benefit analysis of hens farm was analyzed in two segments. First was the breeding of chickens from the first day of their life until the 18th week (cca 4 months old) and the other period was from the moment chickens carry through eggs and the following 12 months.

For easier monitoring and better visibility of revenues and expenses of the poultry farms, the appropriate tables were made. Income and

<sup>2</sup> Independent Turnover Agricultural Activity – Bos. Samostalna obrtnička poljoprivredna djelatnost (SOPD)



expenses are expressed in the B&H currency, i.e. Bosnian convertible mark (BAM/KM)

By the decision of currency board of Central Bank of B&H, every bill is pegged to Euro. Fixed exchange rate of BAM/KM is: 1BAM/KM = 0.51129 € or 1€ = 1.95583 BAM/KM [14].

## VI. RESULTS

TABLE II. THE ANNUAL COSTS OF A BROILER CHICKEN FARM.

Description	Amount (BAM)	Percentage (%)
Costs of chickens (8.500sth. x 6 x 0.83 BAM)	42330	14.6
Costs of diet	200000	69.4
Costs of materials, amortization, maintenance	4000	1.4
Overhead expenses (electricity, water, coal, wood)	12000	4.1
Veterinary expenses and medicine	2500	0.8
Costs of disinfection	600	0.2
Salary of one employee	18000	6.2
Sawdust	6000	2.0
Compost	2100	0.7
Accounting services	700	0.2
<b>Total expenses</b>	<b>288230</b>	<b>100.0</b>

TABLE III. THE ANNUAL BUDGET OF INCOME OF BROILER CHICKENS' FARM IN THE SYSTEM OF COOPERATION.

Description	Quantity	Unit	Amount (Bam)+Vat	Percentage (%)
Productin of meat	122400	kg	318240	100
Production of innards	-	-	-	-
Compost	-	-	-	-
<b>In total</b>	<b>122400</b>	<b>kg</b>	<b>318240</b>	<b>100</b>

TABLE IV. THE ANNUAL BUDGET LOSSES: MORTALITY AND WASTE ON THE BROILER CHICKEN FARMS

Description	Quantity	Unit	Amount (Bam)+Vat	Percentage (%)
Mortality	4896	kg	12730	4.0
Waste	750	kg	1250	0.4

TABLE V. BUDGET EXPENDITURES OF BREEDING CHICKENS UP TO 4 MONTHS IN THE HENS FARM.

Description	Amount (Bam)	Percentage (%)
Costs of chickens (2000 x 1,5 BAM)	3000	17.8
Costs of diet	9800	58.4
Costs of materials, amortization, maintenance	960	5.7
Overhead expenses (electricity, water)	520	3.1
Veterinary expenses and medicine	200	1.1
Costs of disinfection	80	0.4
Accounting services	120	0.7
Sawdust	100	0.6
Salaries of employees	2000	11.9
<b>In total</b>	<b>16780</b>	<b>100</b>

TABLE VI. REVENUES DURING THE BREEDING OF CHICKENS UP TO 4 MONTHS OF AGE IN THE HENS FARM.

Description	Quantity	Unit	Amount (Bam)+ Vat	Percentage (%)
Compost	2000	kg	200	100
<b>In total</b>	<b>2000</b>	<b>kg</b>	<b>200</b>	<b>100</b>

TABLE VII. THE ANNUAL BUDGET COSTS OF HENS FARM.

Description	Amount (Bam)	Percentage (%)
Accounting services	360	0.4
Costs of diet	56940	71.9
Costs of materials, amortization, maintenance	6830	8.6
Overhead expenses (electricity, water)	1680	2.1
Veterinary expenses, medicine and disinfection	1300	1.6
VS form / veterinary certificate /	3650	4.6
Salary of one employee	8400	10.6
Sawdust	-	-
Compost	-	-
<b>In total</b>	<b>79160</b>	<b>100</b>

TABLE VIII. THE ANNUAL BUDGET OF INCOME OF HENS FARM.

Description	Quantity	Unit	Amount (Bam)+Vat	Percentage (%)
Production of eggs	657000	sth	105120	97.9
Sellings of used chickens	2000	sth	2000	1.8
Compost (during the breed of chickens that are up to 4 months old)	2000	kg	200	0.1
In total	--	--	107320	100

## VII. DISCUSSION

Farm S.P.D. "Chicken" is located on the outskirts of Sarajevo and offers space for fattening of 580 m<sup>2</sup>, which is physically separated into three equal parts. The approximate value of the farm and associated buildings is approximately 300.000 BAM, along with the cost price of complete construction work. Estimated value of the wages is 60.000 BAM, then zoning, building permits, and veterinary control number (VKB), which amount to 30.000 BAM. In the space for fattening there is an equipment for the power supply, as well as for the feeding and ventilation of chickens, which have an estimated value of 60.000 BAM. The farm is registered, and has a cash register worth 580 BAM.

Farm S.P.D. "Pile" grows fattening poultry of provenance "COBB 500" [15]. Period of intensive farming of fattening chickens (broilers) COBB 500 (5-6 weeks) is up to 42 days (Cobb 500 Broiler Performance & Nutrition Supplement). It is possible to organize six such cycles (8500 X 6) and annually grow 51000 broilers. The purchasing price of a day-old fattening chicken is 0.83 BAM. Table II shows the cost of day-old broiler chicks per year, which amounts to 42.330 BAM, that is 14.6% of the total cost.

Food costs are definitely the biggest costs of broiler chickens farms and they amount to 69.4%. Out of overhead costs on the farm the ones that have to be payed are electricity, water, wood and coal, an annual total of 12.000 BAM or 4.1% of the total cost of the farm. Out of

these, the cost of electricity amounted to 4.000 BAM, water costed 3.000 BAM, costs for coal were equal to 4.000 BAM, and the cost of wood was 1000 BAM. The costs associated with maintaining inventory and equipment within the farm were evident, as well as the expenses for the amortization of the cars and the costs of oil. The approximate average cost price of 4.000 BAM was taken, although the amount of that cost is unpredictable, since in some cycles of growing broilers it can be minimal or it often can be much higher than listed.

Arrival of the official veterinarian, as well as the costs of medicines (vaccines) that are preventively put in drinking water per year is 4.000 BAM (Table II).

The cost of disinfecting farms in the periods in between the cycles, during which the rooms of the fattening farm "rest" are the smallest, and they amount to 0.2% of the total cost of the farm, 600 BAM. This cost is actually a retail price of disinfectants, because the owner of the farm always personally disinfects. He owns the associated education, which makes him competent to be able to independently carry out this very important part of the work on the farm.

Farm S.P.D. "Pile" is a registered farm and it is a taxpayer. One full-time employee is reported (the owner of the farm), who pays annual contributions: pension and health care insurance in the amount of 2.400 BAM. On an annual basis this is the cost for the farm in amount of 18.000 BAM. The salary of the registered worker is included within this cost. On an annual basis, these costs amount to 6.2% of the total annual costs of the farm.

Sawdust is a necessary detail in the factory farming of chickens. 3.3 m<sup>3</sup> of sawdust are needed for a cycle of capacity 8.500 broilers. For one year, or six cycles, the owner of the farm has to set aside a minimum of 5.400 BAM. Very often, the distributors must repurchase the sawdust so the costs of the farm on this basis amounted to approximately 6000 BAM (Table II).

Compost (urine and feces) is permanently evacuated from the collection center (collectors). The poultry farms are one of the few farms in the entire spectrum of livestock farms where compost as a specific good can not be, or is very rarely placed on the market. Farm S.P.D. "Pile", only has costs regarding fertilizers, and the costs of evacuation, transport

and disposal in the city dump. Costs of engaging the workforce (seasonal workers) are equal to 250 BAM, while the transportation costs amount to 300 BAM and the costs of depositing in the city dump amount to 150 BAM. The total costs of the farm in terms of fertilizers is 2.100 BAM, because the evacuation of fertilizers IS performed three times a year, or after two consecutive cycles (Table II). Finally, there are the accounting services costs, the services of independent accountants, and they amount for the whole year to 700 BAM.

In Table III. it can be seen that the annual production of the farm SDP "Pile" is 124 tons and 400 kg of chicken meat, so about 51.000 fattened chickens in a year, within six cycles. The average weight of a farmed chicken is between 2.3 to 2.6 kg. It was hypothetically assumed that every chick was weighing 2.4 kg, after completion of breeding cycles, where the mean value was used. The purchasing price including VAT for 1 kg of live weight was 2.6 BAM. So the annual farm income amounted to 318.240 BAM.

These financial indicators of profit are not diminished, what is essential to certain losses due to mortality of animals. According to Kustura and Goletić 2004, the percentage of mortality is tolerated to a maximum of 5%. Brovis Ltd. company, which redeems the entire production the S.P.D. "Pile", and in accordance with the contract, obliged to financially compensate a percentage of mortality to a maximum of 4%. Therefore, a farmer of S.P.D. "Pile" can have a higher or lower income, when compared to the profit shown in Table III. If, hypothetically, a farmer has a mortality rate of 4%, the losses that arise from it imply a loss of 4 tons and 896 kg of meat, that is a loss of 12.730 BAM annually, within six cycles.

Other financial loss for farmer is so called slaughterhouse confiscates (feathers, intestines, heads, feet) and it ranges from 100 to 150 kg per cycle, by the company Brovis Ltd. In Table IV, hypothetical mean was taken, and it is 125 kg of slaughterhouse confiscates per round. The annual income of a farmer is reduced by 1.250 BAM, which is 0.4% of the total earnings. Since Brovis Ltd. fully redeems all fattened chickens, the farmer does not have the opportunity to earn on the chicken innards: liver, lungs, heart (Table III). Also, the farmer does not gain any income from the compost (Table III). On the contrary, there is an annual loss of 2.100 BAM (Table II).

Analyzing Table II and Table III, i.e. comparing the annual profit with the annual expenditures, a total annual profit of 30.010 BAM is obtained, and so the monthly net income amounts to 2.500 BAM. It is important to note that this gain is independent of the monthly salary of a notified worker in the amount of 1.300 BAM, together with paid contributions, a total of 18.000 BAM (Table II), as well as of the cost of salary of engaged seasonal worker (Table II).

In the farm S.P.D. "Pile", as mentioned above, one worker is reported (a farm owner). His family home is located next to the farm, and it has four members. Everyone, without exception, is involved in activities of the farm, and, if necessary, participate in certain segments of work on the farm. The utility bills (electricity, water, coal, wood) in Table II. consumed by family members of the owner of the farm S.P.D. "Pile", in his family home, are calculated in the costs of the farm (Table II). In this sense, the family of the farmer benefits further.

Location of the farm and climate condition (continental climate), which dominates the outskirts of Sarajevo, very well enables the growth of broiler chickens. From an interview with the owner of the farm, and on the basis of his long experience with poultry, poultry farms can with a capacity of more than 20.000 broiler chickens can expect great profits. The different structures of government: municipal, cantonal and federal, had so far shown enough understanding in helping poultry farmers with appropriate motivational incentives, which are also regularly enjoyed by farmers from the other branches of livestock-intensive production in B&H.

Business of a poultry farmer is full of risks and unpredictability. A cost-benefit analysis is done in the Tables II, III and IV, where the optimal parameters are presented. However, the percentage of mortality can be intimidatingly high if any technopathy is encountered, i.e. diseases that occur in intensive farms, where a considerable number of animals are placed on one m<sup>2</sup>. Then, there is no therapy, but the animals have to be euthanized.

Hens farm of small capacity is located on the peripheral northern slopes of Sarajevo, SOPD "Jaja Prom". The activity of the farm includes raising and breeding of poultry and egg production. The farm capacity is 2000 pieces of hens hybrids Issa Brown.

The plot where the farm of 460 m<sup>2</sup> is located is worth 36.800 BAM. Price of converting agricultural land into construction land is 3.000 BAM. Dealing with the government's approval amounts to 15.000 BAM. The main building of a farm with the 150 m<sup>2</sup> of space for breeding hens, along with the total cost of construction is worth 100.000 BAM. The constructed object needs feeders, drinkers and ventilation devices that cost 700 BAM. Between 10-15 chickens are placed on one m<sup>2</sup>. Cage system i.e. the equipment for hens for a farm of the capacity of 2000 pieces, within which there are feeders and drinkers, is 16000 BAM. The ventilation system in the area of breeding hens with the installation costs 7.900 BAM. A mill for grinding and mixing of the food is also necessary, the one with the capacity of 500 kg and its cost price is 3.500 BAM. Equipment for classifying eggs is needed as well, and it costs 1.500 BAM, as well as the automatic device for marking the eggs with VKB number (veterinary control number) which costs 450 BAM, while the purchase price of cash registers is about 580 BAM.

Using cost-benefit analysis of hens farm, we analyzed two separate segments. The first was the breeding chickens from the first day of life until 18 weeks (approximately 4 months of age) and the second period was from the time the pullets carried through the eggs up until the next 12 months were over.

Price of a one-day chick is 1.5 BAM, and since the farm purchases 2000 pieces, the first cost of the farm is 3000 BAM. Food that is necessary for a four-month feeding of chickens until they reach the pullets stage where they carried the eggs is 14 tons of food, what is equivalent to 9800 BAM (Table V). The percentage of mortality (mortality) in breeding chickens is low, or satisfactory (on average of 4%). Most often deaths occur shortly after moving day-old chicks to the building. We took the average mortality rate to be 4%. This means negligible losses of about 12 BAM. Hypothetically, if the losses occur in the fourth month of fattening, but it rarely happens on the farm SOPD "Jaja Prom", then the losses amount to approximately 50 BAM. Practice has shown that one chicken during the breeding time of 4 months eats 7 kg of food. The price of 1 kg of food is 0.7 BAM.

The cost of materials, amortization and maintenance within the four month period of breeding chickens is 960 BAM. In this kind of

costs we include the cost of oil, the cash register costs and the accounting services. Utility bills (electricity, water) amount to 520 BAM. Veterinary expenses and medicine, as well as disinfection costs amount to 280 BAM. Sawdust (bedding) for a period of 4 months costs 100 BAM, and it is needed approximately 400 kg of it. Accounting services cost 120 BAM for this period, and salary of the workers is 2000 BAM, for four-month period (Table V). Total expenses for a 4-month period, the expenses of growing day-old chicks until they are pullets which lay eggs amounts to 16.780 BAM. Within this period, dominated by expenditures, a symbolic gain is evident, and it is the one that comes from selling the compost. For a period of four months, 2 tons of fertilizer are deposited which farmers then manage to place on the market and make a profit of 200 BAM (Table VI and VIII). The value of one pullet aged 4 months, which is in the stage of carrying eggs costs 11 BAM. Farmer of SOPD "Jaja Prom" does not sell pullets, but he moves them to another part of the building that is designed to exploit the hens. In this part of the farm this type of poultry is being exploited for 12 months continuously. The biggest cost of the exploitation is the food. Daily 2.000 hens eat 240 kg of food. One kg of food costs 0.65 BAM, and on an annual basis the cost is 56.940 BAM (Table VII). Veterinary expenses, medicines and disinfection of the facility is 1300 BAM. These costs include preventive vitamin and mineral food supplements which annually cost 144 BAM. Disinfection then costs 80 BAM. Laboratory analysis of the quality of the eggs, which is obligatory every month, at the annual level costs 840 BAM. Stool examination of faeces is done four times a year, and it is the cost of the farm in amount of 240 BAM. Utility bills (electricity, water) is 1680 BAM, 480 BAM for water and 1200 BAM for the electricity annually. The cost of materials, amortization, facility maintenance and equipment per year is 6.830 BAM. Of these, the cost of oil, as well as the registration and maintenance of cars and cash registers cost 3850 BAM. Packaging the eggs (cardboard packaging, packets, foil, rubber fasteners, adhesives) annually amounts to 2.980 BAM. The costs of the veterinary certificate (VS form), daily costs 10 BAM, so the annual cost is equal to 3.650 BAM. The salary of a single worker annually costs the farm 8.400 BAM (Table VII). This amount includes a monthly salary, then social and health care contributions. The percentage of mortality in the parts of the farms where the hens are exploited is minimal,

and it is on average 1%. As the costs regarding mortality are minimum, we didn't record them in the tables of expenditures (Table V and Table VII). Sawdust in the cage system of keeping hens is not used, as there is a floor with the appropriate perforations through which feces smoothly circulate through drains. As regards to fertilizers, the farmer decided for the best option and that is to use part of the compost for personal purposes, suppurating his estate, and the rest of fertilizer is donated to agricultural entrepreneurs, provided that they organize the transport and loading of fertilizers. If the farmer deposited fertilizer to the city dump, that would have, on an annual basis, cost him 750 BAM. Accounting services per month cost 30 BAM, what makes it an annual cost of 360 BAM (Table VII).

Experiences of the SOPD "Jaja Prom" in terms of load capacity is 87%. This means that 2.000 hens on average produce 1.800 eggs a day. In one year hens produce 657.000 eggs. At the Sarajevo market one egg has an average price of 0.16 BAM. The annual value produced on the farm SOPD "Jaja Prom" is 105.120 BAM. In addition to this gain, there is a possibility of the sale of "worn out" hens after completion of the 12-month cycle for the price of 1 BAM a piece. Thus, the gain is 2000 BAM. In breeding of pullets of up to 4 months of age, there are profits from the sale of fertilizer in the amount of 200 BAM. The total income is 107.320 BAM. When we subtract the cost from the first part of growing chickens up to 4 months of age in amount of 16.780 BAM and expenses during the one-year exploitation of hens in amount of 79.160 BAM, the total profits obtained result in a surplus of 11.380 BAM.

The farm SOPD "Jaja Prom" has a family of four involved, where the wage of a farm owner, along with the paid contributions is calculated within the costs. The owner of SOPD "Jaja Prom" is not in the system of cooperation, so he himself finds investing opportunities of his own products on the market.

Many years of experience of the owner in this part of livestock production, states that poultry farms with the capacity between 6500-8000 of hens would provide significant financial returns, taking into account a number of problems of an unregulated market economy in B&H, in terms of an unfair competition and the risk of an efficient placement of products on the market.

## VIII. CONCLUSIONS

Cost benefit analysis of the poultry farms of small capacity established the profitability of farmed breeding of broiler chickens and hens in the Sarajevo Canton.

Low purchasing power of B&H citizens, purchasing habits, the continuing trend of increased poultry farming in B&H, as well as favorable climatic conditions in the Sarajevo Canton are solid economic indicators of profitability of investments in the poultry production in B&H.

A more complex economic analysis is required in order to evaluate the type of poultry farming and the scope of intensive farming for achieving a more optimal economic results.

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