AGRICULTURAL UNIVERSITY-PLOVDIV

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MANAGEMENT OF INNOVATIONS IN THE AGRICULTURAL HOLDINGS IN THE REPUBLIC OF SERBIA

AUTOREFERAT

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I. ABSTRACT

The Serbian agriculture is characterized by small holdings that are mostly owned by individuals. In order for a family farm business or holding to be successful, the following factors can be distinguished: the yield and quality of the products achieved, the prices generated for the products, and, of course, the decisions that are made in order to make the management of the farm more efficient.

Nowadays, consumers of agro-food products around the world are demanding higher quality products, which challenge farmers and processors. As worldwide demand goes higher and moves towards greater quality food products, agricultural holdings need to develop competitiveness strategies, based on innovations and technologies.

The subject of the dissertation research is the analysis of the impact of innovations and product quality on the sustainable success of family farms or holdings in the Republic of Serbia. The main goal of the dissertation is to provide new knowledge in the field of innovations and quality of the agricultural products with the aim of achieving sustainable success of family farms.

The dissertation is composed of the following units: introduction, theoretical research, methodological settings, empirical research, discussion, conclusions, references and appendices.

In the introductory part some are presented some considerations as well as an overview of the situation in the field innovations and sustainable success of family farms. The subject, the objectives and the tasks of this research are defined, as well as the starting hypotheses, methods and techniques of analyses and the expected results of the study.

The second part of the dissertation refers to the theoretical basis of the research. It includes a review of the literature about the role and importance of innovations, quality, and sustainability of agricultural holdings in the Republic of Serbia.

The third part refers to the methodology in use. Preliminary theoretical and empirical research is provided. A questionnaire was made based on the experience of experts from the above mentioned fields to determine which issues are important for further research.

The fourth part of the dissertation refers to the empirical research. This section presents the way the empirical research was done and the results obtained. Analysis of the profile of respondents was carried out. The reliability of elements of the set system model was established, and the benefits and justification of the research, the factor analysis of the model, and the correlation and regression analysis of the model were calculated.

The fifth part of the dissertation shows the discussion about the research results.

The sixth part of the dissertation shows the conclusions and the possible directions of future research.

The references include a list of literature used in the research.

The appendices present the databases used from statistical software.

II. MAIN CONTENTS OF THE DISSERTATION

PART 1 : INTRODUCTION

The agricultural sector in the Republic of Serbia has a very high economic and social significance, since it has a substantial share in creating the gross domestic product and employing a large number of people. In 2016, agriculture accounted for 11.9% of the GDP, which is largely the result of a fertile soil and quality natural conditions for agricultural production. According to the Statistical Office of the Republic of Serbia, 680,000 people are employed in agriculture, or 21% of the total workforce in the country. In 2016, agriculture and food production accounted for 19.4% of Serbia's total exports and generated a surplus of $1.4 billion, $130 million more than in 2015 (mainly due to increased exports of processed fruit and vegetables). According to the results of the agricultural census in the Republic of Serbia in 2012 (the new census was in October 2018) 631,552 agricultural holdings were registered in Serbia, while the agricultural land used amounted to an area of 3.44 mil. ha. Family farms are dominant in the agricultural sector, accounting for 99.5% of the total number of agricultural holdings and 82.2% of the agricultural land used (SORS, 2013).

According to the data of the Ministry of Agriculture (Forestry and Water Management of the Republic of Serbia), agricultural and food products have a stable share in the foreign trade exchange of Serbia, which they have maintained during 2017, with the participation of this category of products in imports increasing by 1.7 percentage points, while their participation in export decreased by 2.4 percentage points (the Republic of Serbia, the Ministry of Agriculture, Forestry and Water Management) (2018).

The data show that agriculture is one of the key economic activities of the Republic of Serbia. Livestock farming, together with crop farming, is an essential branch of agriculture in RS (Madžar, 2017).

The Strategy for Agriculture and Rural Development of the Republic of Serbia for the 2014-2024 period (Off. Gazette of the Republic of Serbia, 2014) defines the strategic framework for the development of agriculture and rural development in the Republic of Serbia. This strategy defines a new approach to the development of agriculture with a defined vision, goals and directions of the development of agriculture and rural development of the Republic of Serbia. The Strategy was the basis for the adoption of the National Program for Agriculture for the 2018-2020 period (Off. Gazette of the RS, 2017), which represents a further development of the Strategy at the medium-term level and suggests specific solutions in the area of defining and implementing agricultural policy in the 2018-2020 period.

According to the Law on Agriculture and Rural Development of the Republic of Serbia (Law on Agriculture and Rural Development of the Republic of Serbia, Art. 16), a family farm or agricultural holding is the basic form of organization of agricultural production. In the said Law, an agricultural holding is defined as a production unit where an agricultural enterprise, an agricultural cooperative, an institution or another juristic person, entrepreneur or farmer carries out agricultural production, while a family farm or holding is considered to be an agricultural holding where an individual/farmer carries out agricultural production, together with the members of his household.The Ministry of Agriculture (Forestry and Water Management of the Republic of Serbia) on the basis of the Decree on the Register of Agricultural Holdings (Off. Gazette of the Republic of Serbia, no. 45/04) from May 2004, administers the registration procedure for agricultural holdings. This register is managed by

the Ministry of Finance (the Treasury Department) with the aim of improving agricultural production, increasing productivity and competitiveness.

The successful business of family farms depends on a large number of factors, but the following are the most significant: the yield and quality of their products, the prices of their products, and, of course, the decisions made in order to manage the farm more efficiently (Ćeranic, Paunović, Novaković, 2013).

Nowadays, consumers of agro-food products around the world are demanding a better quality of products, which represents a major market challenge. Achieving quality in today's conditions requires the development of a competitiveness strategy that is based on innovation and quality.

1.1. The subject of research

Starting from the place and importance of family farms or agricultural holdings in the Republic of Serbia in increasing the number of employees and impacting the GDP and the fact that today, innovation and quality of products are an important factor of sustainability, the subject of scientific research is the analysis of the impact of innovation and product quality on the sustainable success of agricultural holdings in the Republic of Serbia.

1.2. The objective and the research tasks

The main goal of the doctoral dissertation is the need to provide new knowledge in the field of innovations and quality of agricultural products of family farms with the aim of achieving sustainable success. Namely, today's organizations are required to do the best they can, and achieving sustainable success requires doing even better. In order to achieve product quality and sustainability, organizations must constantly work to improve their processes.

The research tasks of this doctoral dissertation are as follow:

1. To determine whether the level of innovations of agricultural products significantly affects the level of quality of agricultural products.
2. To determine whether the level of innovations of agricultural products significantly affects the level of sustainable success of individual family holdings.
3. To determine whether the level of quality of agricultural products significantly affects the level of innovations of agricultural products.
4. To determine whether the level of quality of agricultural products significantly affects the level of sustainable success of individual family holdings.
5. To determine whether the level of innovations and quality of agricultural products significantly affects the sustainable success of individual family holdings.

1.3. Hypothetical framework

In accordance to the theoretical research, and defined by the problem, objective, purpose and tasks of the research, the following general or zero hypothesis is formulated:

H_{00} – The level of innovations and quality of agricultural products significantly affects the level of sustainable success of individual family holdings.

General - the zero hypotheses will be proved by analyzing the auxiliary hypotheses, as follows:

- *H_{11} - The level of innovations of agricultural products significantly affects the level of the quality of agricultural products.*

- H_{12} - *The level of innovations of agricultural products significantly affects the level of sustainable success of individual family holdings.*

- H_{21} – *The quality level of agricultural products significantly affects the level of innovations of agricultural products.*

- H_{22} - *The quality level of agricultural products significantly affects the level of sustainable success of individual family holdings.*

1.4. Research methods

A number of research methods and techniques for the tertiary and empirical part of the work were applied in the aim of realizing the objects and goals of the research – economical, statistical, mathematical, descriptive, comparative, monographic, graphical, questionnaire survey, etc.

PART 2: THEORETICAL BASIS OF THE RESEARCH

The second part of the dissertation refers to the theoretical basis of the research. This part of the dissertation includes a review of the literature on the role and importance of innovation, quality, sustainable success and the importance of agricultural holdings in the Republic of Serbia**.**

2.1. Innovations

Today, innovations are widely accepted as one of the key sources of enterprise survival and of building a sustainable competitive advantage. They can be understood as a specific type of positive change based on the process of applying new ideas in order to achieve better results either at the enterprise level or at the level of the economy as a whole (Dragić, 2017).

In highly developed countries, innovations have a smaller impact on economic development than in less developed countries (Intelligence Unit, 2007). Developing innovations is a necessary condition for the country's economic advancement, and therefore, countries need to develop innovation policies as the most important instrument of long-term strategies. An organization's innovations can be defined as its ability to produce and commercially valorize goods and services based on the use of new knowledge and skills (Porter, Stern, 2002). The work of the company in the realization of innovative activities leads to improvement of the overall performance of this company, as it can be said that innovations (Vujičić, Djuričić, Vukadinović, 2013) are the heart of the success of any organization, due to the fact that, in addition to improving product quality and reducing costs, they also enable an increase in efficiency and sales for the organization.

Innovations are defined from the angle of management as "the process of applying new ideas for the improvement of processes, products or services" (Certo, Certo, 2006). Schumpeter (1942) argued that innovations include product innovation, process innovation, organizational innovation and innovations that lead to the opening up of new markets as well as providing for the development of new sources of raw materials supply.Drucker (1996) thinks that "innovation is a specific tool for entrepreneurs, a means by which they use changes as an opportunity to perform various production or service activities. Innovation is an action that gives resources to new capacities to create wealth. Innovation, in fact, creates a resource. There is no such thing in the world such as a resource until a man finds the useless value of something in nature and does not endorse it with economic value. Innovation represents all that brings about changes in the potential of generating wealth in already existing resources."

Innovation is, by itself, the function of three main factors: the first being to create new knowlege in science, technology and management (basic inovation); second, the availability of of highly educated, self programmed workforce capable of utilizing new knowledge to improve productivity (which could be the result of the quality and quantity of the educational system); third, the existence of entrepreneurs capable and willing to take the risk of transforming innovation into business (Zjalic, 2007).

Innovation is the use of new technological and market knowledge to offer a new product or service that consumers will want. The new product has a lower price, improved characteristics, features that it never had before or had never even existed on the market (Afuah, 2003).

Tidd and Bessant (2009) highlighted two key characteristics of innovation that all businesses must be aware of:

- An innovation is not a single event; innovation is a process that needs to be managed.
- Impacts on the process must be managed in order to influence the outcome, which means that, in addition to the process, they must and can be managed.

2.2. Types of innovation

The Oslo Manual distinguishes four basic types of innovations: product innovation, process innovation, innovation in marketing and innovation in the organization (Table 1).

Table 1: Basic forms of innovations according to OECD methodology

Types of innovations	Area of application	Basic features
Product innovation	Innovation of products and processes	Significant improvements to the technical characteristics of parts and materials, embedded software, user manuals or other functional features
Innovation of the process	Introduction of new or significantly improved production, delivery or support methods for product use	Significant changes in the technology of production equipment and / or software
Marketing innovation	Application of new marketing methods, including significant changes in the design or packaging of products during its storage, placement and promotion of products and the correction of the market price	Better satisfaction of consumer needs, creation or entry into new markets or new positioning of company products on the market to increase sales volume
Organizational innovation	Introduction of new forms and methods of organizing business, new work organization (jobs) and change in relation to the environment	The introduction of a new way of doing business, work organization and environmental relations in order to improve company performance, reduce administrative or transaction costs, improve conditions and productivity, reduce inventory costs, and so on.

Source: OECD and Eurostat (2005)

Product innovation enables continuous progress, rapid growth and high profitability for every organization. Innovation of products can be used with new knowledge and technologies as well as their combination. Product innovation also involves design innovation, but this must involve a significant change in the functional features of a product or the way it is used. The development of a new product can give the company more strategic advantages as the new product can do the following (Narayanan, 2000):

- be a source of competitive advantage;
- provide opportunities for reinforcement or change of strategic direction;

- improve the corporate image;
- ensure a return on investment and capitalize research and development results;
- strengthen marketing / branding;
- provide affordable human resources.

New products could be developed by combining the existing technology and a different approach to utilizing it, or by using radical technologies. In this case it is very important to recognize the needs and expectations of the customer and offer them the products and services capable of satisfying their needs. We could say that there is a connection between the innovation of products and technologies, while some authors consider the technology to contribute to an increase of production levels, quality of the characteristics of the product, increase in value and decrease the manufacturing costs of the product (Gunai, 2007, pg. 11-12).

We could argue that the purpose of innovation of a product is to attract new customers, but also achieving a sustainable success of the organization due to an increased market share. Product innovation, according to Freeman (1982), is a process which includes the technical design, research and development, production, management and commercial activities included into marketing of the new or improved product. Product innovation is key to the improvement of the competitive position in the industry. Organizations today do business in a fast changing world, with more demanding and expecting customers, and deal with increased competition due to the open market and globalization. Companies who are efficient in the implementation of innovation and product development could gain a significant competitive advantage (Nikitovic, Vujicic, 2019).

Product innovation = product development + realization

Process innovation is an important asset in the modern world, because the process is the heart of managing innovation, and it is imperative that the process is harmonized with the end goals. A decision about certain end goals of utilizing innovation marks the starting point of the innovation process and defines the steps of the process which would be used (creating ideas, concepts, development etc).

Even though new products are considered as "top" market innovations, process innovations have proved to have a significant strategic effect on staying competitive. Process innovation includes the introduction of quality function and doing business re-engineering process (Cumming, 1998).

Process innovation includes numerous activities such as the introduction of new equipment, new management practice as well as changes in the production process. Process innovation refers to the introduction of new elements (entry material, work and information flow, equipment) into the production process or service provided by the organization, which is then used for the manufacturing of a product or said service).

The reasons for the introduction of the process innovation are numerous, the main and most often cited being to stay competitive in the same product market. Product innovation leads to an improvement of the work process and the growth of efficiency.

Marketing innovation, along with the process innovation and the product innovation, represents the means of competitiveness and success of modern organizations. Clemmer

(1998) claims that marketing innovation should be taken as a key factor to success in doing business, especially in the strategic planning of future growth and development of new products and services.

Kotler (2005) claims that marketing innovation is based on the understanding that the existing rules of marketing are not enough to ensure success and competitiveness in a crowded market. Marketing innovation includes the use of brand new marketing strategies, marketing concepts or marketing methods which were never deployed by an organization before. According to Stosic (2007) marketing innovations are based on a combination of the following elements:

- Significant improvement in the product design (shape or packaging change),
- Applying the new price strategy,
- Implementing a new concept of retail (the introduction of new channels of distribution),
- Implementing a new concept of promotion (social network marketing).

In order to draw attention to marketing innovation, Levitt (1960) has pointed out that when an organization becomes more successful in the production of new and more efficient products, it is imperative to think with more creativity and imagination about new marketing methods, because "if marketing falls behind, profit attained by new products could disperse due to the lack of efficiency of obsolete marketing methods".

Organization innovation is defined by Tigre (2006), in accordance with the Oslo guidebook, as "changes in the managing structure of the organization, in the relationship between different areas, in the professionalism of the employees, in the relationship maintained with the suppliers and buyers, as well as multiple new techniques on how to organize the business process…". Organization innovation, or the so called work place innovation, is one of the most important factors which leads to an improved organization effect, when the competition among organizations in an economy is based on the knowledge and the competence of the employees (Nikitovic, Vujicic, 2019).

Tidd and Bessant (2009) point out two key characteristics of innovation, of which every business should be made aware:

- Innovation is not a single process, innovation is a process which needs to be managed and developed.
- Effects on the process must be managed in order to have an effective outcome, which means that it is imperative to manage the process.

Damanpour et al. (2009, p. 655) define the organization innovation as "changes in the structure and process of an organization, administrative systems, knowledge used in the business process, management skills which allow the organization to function successfully by the efficient usage of its resources…".

It is very important for the process of innovation that organizations recognize the expectations of their customers in order to design new or improve old products. At the same time, the competitiveness of the organization is improved in this way. Baumol (2006) points out that innovative activity must become a routine process in a company business to reduce the uncertainty of investing in innovations to a minimum (Baumol, 2006).

A greater degree of innovations implies a greater investment and risk, which is why research into the aspects of innovation risk results in analytical approach proposals, which should be based on the following (Liberatore, 1990):

- identifying current and prospective ‘challenges’ for at least 3-5 years in the future, in order to take account of the fact that competitors are likely to develop their programs;
- assessment of the relative advantages and disadvantages of the company in relation to the competition for each product line and each market, as a basis for assessing the appropriate benefits that would result in increased investments in these areas;
- assessment of risks, costs and problems for different combinations of investments, including adoption (acceptance) of already developed technologies and initialization of own research, again in relation to analogous activities of the competition;
- research of changes that should be made in the area of finance, marketing, human resources and organizational elements that are deemed necessary for the proper use of innovation potentials.

A well formulated strategy and business environment is very important for the success of any innovation. Stoneman (2011) pointed out that in addition to innovations that are commonplace and which he calls hard, there are also soft innovations that can be found in processes related to an esthetic and intellectual nature. These innovations can be found in the creative industry.

Managing an innovation process depends on ones point of view about innovation. Innovation helps an organization in five main ways:

- It allows for the offering of goods and services which a consumer may consider superior compared to the rival ones. It is known as the difference strategy.
- Activities done by the organization could be done much cheaper, which would lower the cost structure in an organization. It is known as the cost leadership strategy.
- Processes in the organization and inside the supply chain could become more reliable and faster, allowing an organization to be flexible and gain opportunities. It is known as the agility strategy.
- New ways of product sales, brand and organization could be attained. This increases or changes the market awareness and product placement so as to appear more valuable. It is also known as the market positioning strategy.
- Sometimes a new business formula could be found. For an example, internet offers a chance for banks to work outside of their branch offices. In this case the innovation was in the fundamental business model. New ways of forming an organization could open many opportunities. It is known as the paradigm shift strategy.

According to the Global Innovation Index (GII), Serbia took 55th place in 2018, which is an improvement of 7 places compared to 2017. Switzerland, followed by the Netherlands, Sweden, Great Britain and Singapore, ranked first in this index.

In the Republic of Serbia, according to the Statistical Yearbook for 2018 (SORS, 2018), the greatest share are product and service innovations, some 26.9% of the innovations introduced, while the share of income from product/service innovations which were new on the market were 5.8%, and those who were new on the companies were 9.3%, compared to the total income of the innovators.

Table 2 shows the structure of the type of innovation in the overall innovations activities of innovators, 2014-2016 within the Republic of Serbia.

	Product/Service Innovations	Process innovations	On-going or abandoned innovationsn	Organisational innovations	Marketing innovations
Republic of Serbia	26.9	21.0	14.3	24.2	22.3
Small	25.3	19.0	13.3	22.1	20.3
Medium	33.0	26.9	17.7	31.8	30.3
Large	45.4	41.7	27.7	47.3	40.9
North Serbian region	26.4	19.7	14.9	24.9	21.7
Small	24.6	17.5	14.0	23.0	19.7
Medium	34.5	26.6	17.7	33.2	30.5
Large	46.9	44.4	29.2	48.2	43.4
Belgrade region	**27.2**	**21.0**	**16.1**	**25.0**	**22.0**
Small	25.1	18.7	15.4	23.3	20.1
Medium	38.3	32.1	17.2	31.8	30.6
Large	47.9	47.2	31.7	49.9	46.6
Vojvodina region	**25.1**	**17.4**	**12.8**	**24.9**	**21.3**
Small	23.6	15.3	11.4	22.4	19.1
Medium	29.6	24.1	18.4	35.0	30.5
Large	45.3	40.0	25.4	45.5	38.4
South Serbian region	**28.0**	**24.2**	**13.1**	**22.6**	**23.4**
Small	26.9	22.7	11.7	20.1	21.6
Medium	30.8	29.3	17.6	29.7	30.0
Large	41.6	35.1	24.2	45.4	34.8
Sumadija and Western Serbia Region	**28.4**	**25.0**	**13.6**	**22.7**	**25.0**
Small	27.6	24.2	12.6	20.7	22.9
Medium	29.9	27.3	16.2	28.5	32.6
Large	42.9	34.2	4.6	43.2	35.8
Region of Southern and Eastern Serbia	**27.4**	**22.8**	**12.3**	**22.3**	**20.9**
Small	25.8	20.2	10.2	19.2	19.4
Medium	32.2	32.6	19.9	31.7	25.7
Large	39.8	36.6	23.5	48.6	33.4
Region of Kosovo and Metohija	—	—	—	—	—

Table 2: The structure of the innovation type in the overall innovations activities of innovators, 2014-2016 in the Republic of Serbia.
Source: SORS, 2018

Table 3. shows companies by type of innovations and business sectors during 2014-2016.

Innovators					
	Total	**Technological innovators**	**Non-technological innovators**	**All innovators**	**Non-innovators**
Total	41,2	33,4	30,2	22,4	58,8
A-*Agriculture, forestry* and *fishing*	41,9	32,2	32,7	23,0	58,1
B – Minning	27,1	18,6	20,3	11,9	72,9
C – *Manufacturing*	47,9	40,7	36,6	29,3	52,1
D *Electricity*, *Gas* & *Steam* Supply	53,7	40,3	34,3	20,9	46,3
E – Water Supply and remediation	31,1	24,2	28,5	21,2	68,9
F – Construction	36,7	31,7	20,9	15,9	63,3
G – Wholesale and retail trade	31,0	21,5	22,4	12,9	69,0

H – Transportation and storage	37,3	25,2	22,9	10,9	62,7
I – Accommodation and food service activities	30,8	26,9	28,7	24,7	69,2
J –Information and communication	40,2	32,1	31,4	23,3	59,8
K – Financial and insurance activities	38,1	25,4	35,8	23,1	61,9
L – Real estate activities	8,5	5,1	5,1	1,7	91,5
M – Professional, scientific and technical activities	47,3	41,0	32,1	25,7	52,7
N – Administrative and support service activities	53,1	43,8	41,2	32,2	46,9

Table 3: Legal entities by type of innovation and business sectors 2014-2016. Source: SORS, 2018

According to authors Wilkinson and Kannan (2013), innovative products are those products that have specific features, making them difficult to copy or imitate.

According to Von Stamm (2009), product innovations are reflected in the change in the way of production, the extension of production lines, the improvement of production, the new product, the start-up business and significant innovativeness (Table 4).

Table 4: Types of product innovation

Types of production innovations	Is there a market?	Does the organization serve the market?	Do the consumers know the product features and functions?	Efforts in the designing process	
				Product	Process
Changes in production	Yes	Yes	Yes	Minor	-
Extension of production	Yes	Yes	Yes	Minor	Minor
Product improvement	Yes	Yes	Yes	Significant	Minor
New product	Yes	Yes	Yes	Significant	Significant
Start-up business	Yes	No	Yes	Significant	Significant
Significant innovations	N	No	No	Significant	Significant

2.3. Innovations in agriculture

There are many ways to define "innovations in agriculture." In fact, the term represents an implementation in the form of new plant varieties, plant and animal breeds, new and improved food products, materials, new equipment, new technologies in plant production, livestock, new organizational and management forms in different economic spheres, and new approaches to social services which can improve production efficiency (Ivanov, 2008). Rodionova (2010) considers that innovations in agriculture represent the ultimate result of implementing upgrades in the field of agriculture (plant varieties, animal breeds, plant

protection or animal production technology, etc.) leading to economic, social, environmental and other effects.

According to Madureira et al. (2013), innovation in the field of agriculture represents the introduction of new or significantly better product (goods or services), process, organization structure or marketing method. Innovation of a product in agriculture is defined by the changes in its technical characteristics, in addition to new functions: the focus is on the quality of the product or new ways of use or application.

- Process innovation in agriculture is the introduction of a new or significantly improved way of production or delivery, including significant improvements in technology and equipment.
- Marketing innovation in agriculture is obtained by introducing new marketing methods which includes significant changes in the design of the product or its packaging, as well as new ways of marketing, promotion and price.
- Organization innovation in agriculture implies the introduction of new structure or the way a business is organized.

Innovation in agriculture helps the farmers to increase their income, produce better food, better raw materials without an adverse effect on the environment and through the adjustment to the ongoing climate change. Sonnino and Ruanne (2013, p. 34-35), in regards to the innovation in agriculture, claim that it is more of a "successful combination of technology and practice, new knowledge and mental structures, new institutions and ways of social organization…". Pioneers in the field of innovation are shown on the table 5:

Table 5: Pioneers in the field of innovation

SECTORS	FACTORS THAT STIMULATE INNOVATION
Market	♦ Changes in food consumption patterns as a result of the growth of the middle class ♦ Dominating position of food distribution chains ♦ International trade and changes in global demand ♦ Changes in consumer's awareness on issues such as sustalnability,food safety,etc. ♦ Price of inputs and labor costs.
Environment	♦ Climate change ♦ Natural disasters ♦ Availability of natural resources
Polices and regulatory frameworks	♦ Rules,standards and norms ♦ Taxes and fees ♦ Incentives and subsidies
Science and technology	♦ Advances in basic knowledge on life sciences ♦ ITC-based technologies ♦ Information on market opportunities and prices ♦ Availability of new inputs ♦ Availability of new agricultural pactices ♦ New storage and conservation technologies and infrastructure

Source: Sonnino, Ruane (2013:35)

In the agriculture sector the rural, ecological and agricultural politics are especially important for the innovation sector because they affect the structural adjustment, quality of natural resources and availability, investment capacity and the choice of production systems. The following figure (1.) shows the dynamic of innovation in agriculture.

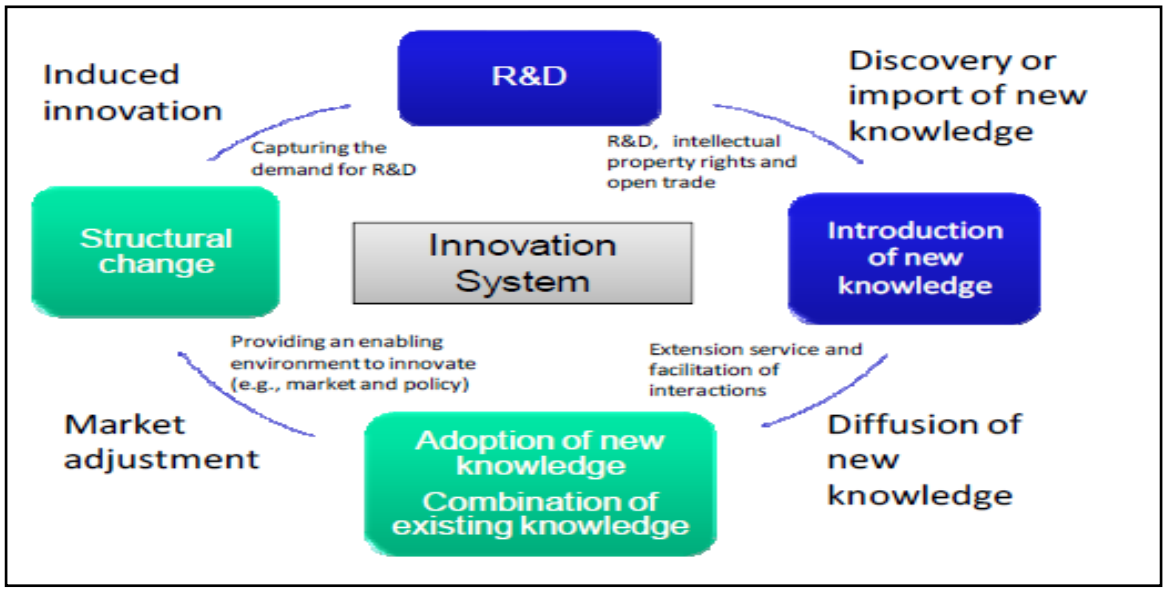

Figure 1:Dynamic of innovation in agriculture

Source:http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/CA/APM/WP(2012)19/FINAL&docLanguage=En

Innovations in agriculture can also be defined as the changes that a company or legal entity carries out in its activities in order to increase the market competitiveness of products and which in turn contribute to the achievement of competitiveness and the growth, development and profitability of agricultural enterprises.

2.4. Quality

The conditions for the survival of today's organizations on markets that demand high-quality products are business activities that are focused on product quality. Quality has now been given a prime place among the indicators of the market performance of an organization before a number of calculable parameters such as productivity, profitability, liquidity, capacity utilization, etc. Figure 2. shows a symbolic view of the evolution of the approach from controlling and managing to improving quality and innovations in relation to product performance, process, and organization results.

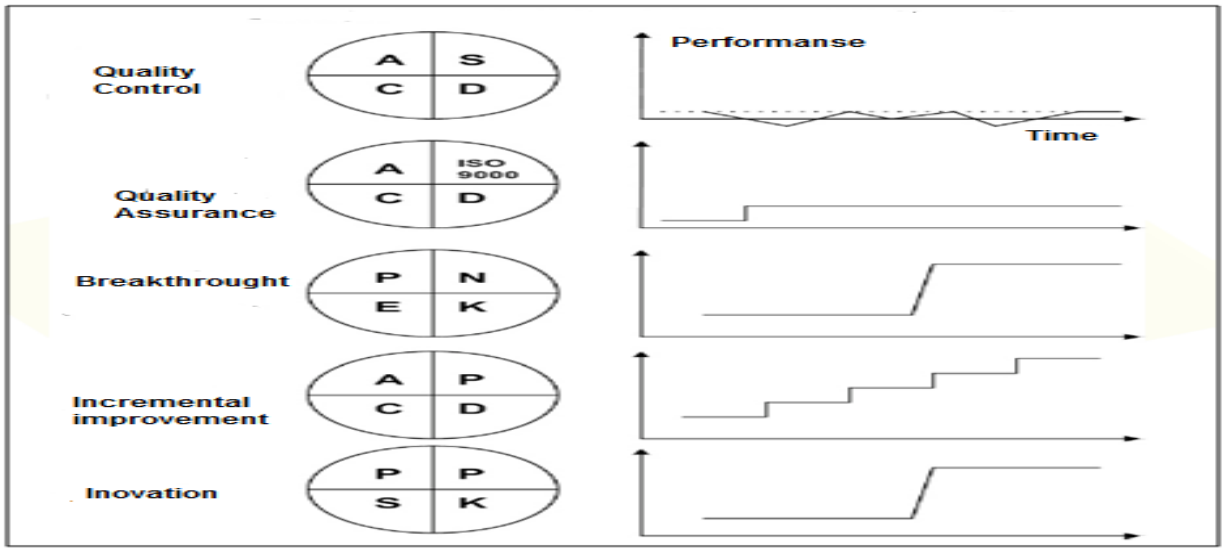

Figure 2: Evolution from management to quality improvement and innovation.
Source: Heleta, 2008

Today quality is the basis for achieving competitiveness on the market. It has a very important role in the overall organizational strategy and therefore must be the priority of any organization. Ensuring maximum product quality at minimal cost has become the goal of all today's organizations as quick and constant changes in today's markets alter the relationship with quality and require companies to satisfy customers in the best possible way. If we start from the definition of a product as a result of business activities, we could say that a product is the method by which each company adjusts its capabilities and available resources with the needs and requirements of the customers in a bid to satisfy them (Vujičić, Vukadinović, Nikolić, 2011). As a term, quality is used often in everyday life, and everyone has a good idea of what is good and what is poor quality (Marinković, Senić, 2012).

Although quality is widespread, researchers have still not been able to find a unique quality definition, primarily because quality, as a concept, is related to a large number of interpretations (Garvin, 1984). Today, there are many definitions of quality that differ because they were created in different contexts and time periods. Juran believes that quality is primarily a matter of business and not technicality, and the survival of organizations depends on its ability to satisfy the social needs for quality (Kilibarda, Zečević, 2016). Zairi (1991) lists some of the most famous and most recognizable definitions of quality:

-Quality should focus its attention on current and future user needs.
-Quality is a set of activities based on which the product's suitability for use is achieved.
-Quality is a set of complex characteristics of products or services in marketing, development, production and maintenance through which the product or service in use will satisfy the expectations of users.
- Quality is in compliance with requirements.
- Quality is a set of usable, technical, economic and esthetic features of product satisfaction in observation.

Perović (2003) defines quality as:

- The measure or indicator indicating the extent or amount of the usable value of a product or service to meet a specific need at a particular place and a particular time, when that product and service is confirmed as a commodity through the exchange process.
- Gatherings of all factors that give satisfaction of possession and force both the customer and the user to continuously buy a product or service.

Today, it can be freely stated that there is a strong tendency for quality to be the main element of competitiveness and the basis for gaining a better strategic position on the market. Components have been identified for the improvement of quality that has a very big impact on this process. Figure 3. presents key components of quality improvement in the organization and we can notice that education and training are important for achieving the quality of products, processes, communications, and all phases of the life cycle of a product.

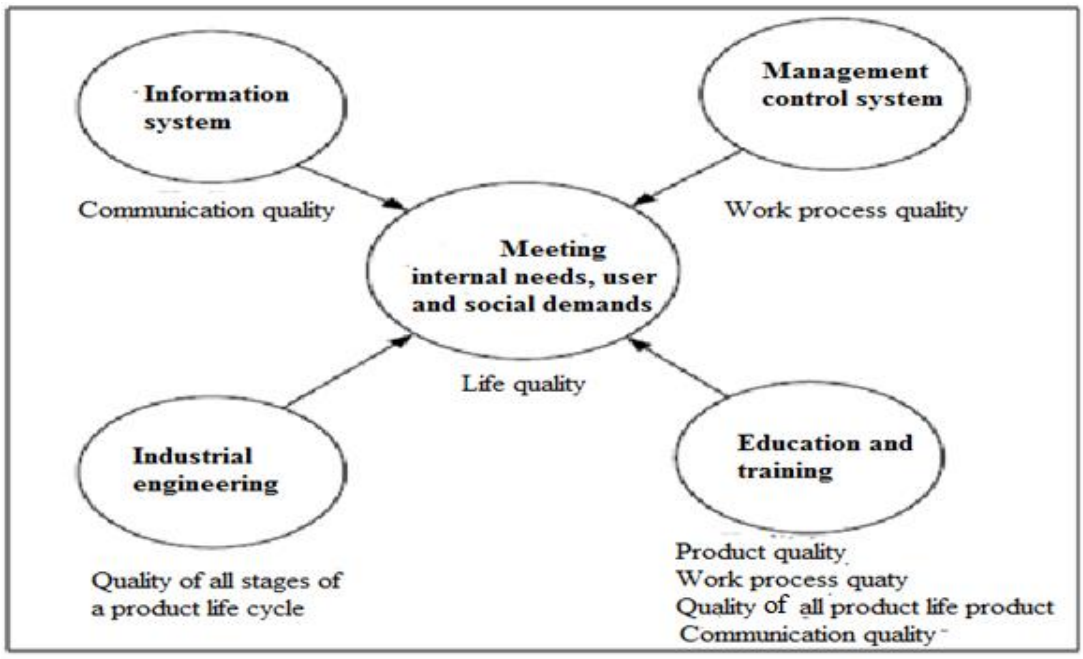

Figure 3: Key components of the general approach to improvement of quality in an organization.
Source: Papić, 2011

Product quality is a multi-dimensional concept that includes the following:

- functionality,
- reliability,
- sustainability,
- accuracy,
- easy handling,
- fixability and other properties that determine the ability of the product to satisfy a particular consumer need (Stikić, Nestić, Marković, 2011).

In the development of agriculture, family farms or holdings represent the main organizational form of agriculture as a socially attractive way of agricultural production, especially the reconciliation of the increase in agricultural production with concern for the natural and sociocultural environment (Vos, Zegar, 2002; Ploeg, 2009).

The agricultural sector of the Republic of Serbia has not yet reached its full capacity on the world market, as the results we can see are still below those that are realistically possible based on Serbia's agricultural resources.Table 6. shows the agricultural production - 2015-2017 indices.

Table 6: Agricultural production - 2015-2017 indices.

Crop production					**Livestock breeding**				
Agriculture total	All	Crop farming	Fruit growing	Viticulture	All	Cattle breeding[1]	Pig breeding	Sheep breeding[2]	Poutry breeding[3]
Chain indexes –previous year=100									
92,0	87,3	83,4	105,0	139,3	103,5	100,5	103,8	102,8	102,6
109,0	119,5	124,7	102,2	85,5	98,3	99,3	104,5	89,1	95,1
88,1	76,5	71,9	94,7	113,5	101,5	100,3	100,7	107,4	102,1
Base indexes-2015=100									
100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
109,0	119,5	124,7	102,2	85,5	98,3	99,3	104,5	89,1	95,1
96,0	91,5	89,7	96,8	97,0	99,7	99,5	105,2	95,6	97,1

[1]-Increase of cattle and cow's milk production
[2]-Increase of sheep, wool and ewe's milk production
[3]-Increase of poutry and eggs production

It could be said that improving quality in agriculture is the key to Serbia's successful cooperation with the world, primarily with the countries of the European Union. In the last decade, one of the central market trends is an increase in quality requirements, with focus on appearance, taste, nutrition, manufacturing process, fair trade, etc. Customers want products that are healthier, fresher, unique and fit for their value systems (SEEDEV, 2017). This customer attitude demands competitiveness or a competitive quality from producers who want to survive on the market price.

The Strategy for Agriculture and Rural Development of the Republic of Serbia for the 2014-2024 period (Off. Gazette of the Republic of Serbia, no. 85/2014) points to the fact that "the market for agricultural and food products is one of the most competitive markets, where very often, in front of producers, especially those who export food to the market of EU member states, there are additional requirements for the application of certain standards, initiated primarily by large retail chains, but also by consumers." For the above reasons, there is a need to harmonize the production and marketing of food products with the requirements defined by the standards of food safety and quality (GLOBALG.AP, BRC, IFS, ISO series,

Halal, Kosher, etc.) (the Agricultural and Rural Development Strategy of the Republic of Serbia for the 2014-2024 period).

The application of standards in agricultural production will enable the strengthening of competitiveness both on the domestic and foreign markets as well as an increase in the efficiency of the management and development system.

As today's customers demand products that guarantee better taste and higher quality, there has been a "turn towards quality" trend in the agri-food sector in Europe, where there is also increasing movement from the industrial world (with a large number of standardized quality conventions and the logic of mass production) to "domestic production" where quality rules are embedded in trust and tradition, and products and forms of economic organization are diverse, localized and ecological (Gudman, 2013).

In 2016, the Government of the Republic of Serbia adopted the Decree on the designation of agricultural and food products with the national quality label "Serbian quality," which stipulates the manner and procedure for marking agricultural and food products with the "Serbian quality" label, the control of quality compliance and specific product characteristics in the process of marking the "Serbian quality" label, the appearance of the label, as well as the manner of keeping a record of the labeling of the product with the words "Serbian quality" and the right to use that label (Off. Gazette of the RS, no. 90/16 - Regulation on the labeling of agricultural and food products with the national quality "Serbian quality" label).

2.5. Sustainable success

To achieve sustainable success in a highly volatile environment, it is essential that organizations regularly monitor, measure, analyze and review their performances (Babić, 2011). The ISO 9004: 2009[1] international quality standard indicates that the sustainable success of an organization can be achieved through the effective management of the organization through its environment, by learning, and through the appropriate application of any improvements to either innovations or both (ISO 9004: 2009). By applying a combined approach to continual improvement and innovation, the organization achieves a sustainable performance in the conditions of a classically unpredictable environment (Heleta, 2010).

[1]The new ISO 9004: 2018 standard gives guidelines for improving the ability of the organization to achieve sustainable success. These guidelines are in accordance with the principles of quality management outlined in ISO 9000: 2015.

Attention to the long-term sustainability of agricultural holdings is often secondary to the need to support life in the short term and to encourage people to remain in rural areas (Christoplos, 2007).

"Sustainable development of agricultural production, processing and trade, as an integrated sector, ensures the process of industrialization and overall economic development and contributes to the reduction of existing differences in regional and rural areas" (Bugar, 2011).Table 7. shows the steps toward the sustainable success of every organization that at the same time also show the level of the organization's maturity.

Table 7: Description of the steps towards sustainable success-the level of maturity of an organization

Features and level of maturity: Elements of maturity	**Start/up Organization**	**Productive organization**	**Flexible organization**	**Innovative organization**	**Sustainable organization**
	Level 1	Level 2 (level 1+)	Level 3 (level 2+...)	Level 4 (level 3+...)	Level 5 (level 4+...)
Focus on	Products	Customers, demands from laws and acts	Some additional stakeholders	Balanced focus on the existing stakeholders	Balanced focus on future stakeholders
Access	Reactive	Process management based	Process management enables flexibility	Access to effective interconnected innovation-based processes	Access to effective interconnected processes involving connections with many stakeholders
Triggers used for improvement	Complaints & financial indicators	Data on customer satisfaction	Entries from supplies, partners and staff	Entries from other stakeholders	Entries from remaining stakeholders
Activities and system	Basic work procedures	Applied QMS	Effective and integrated system management	Agility (speed, flexibility, innovations) supported by the system management	System management supported by benchmarking
Results	Negligible (chance) record of results	Some presentable results	Presentable results	Consistent, positive results and sustainable trends	Performances developed and sustained long-term
Learning	Individual and negligible	Systematic learning from errors	Expansion of learning within the organization	Continual improvement based on learning and culture of spreading knowledge	Learning shared with relevant stakeholders
Application of PDCA	Chance use of certain PDCA quadrants	Initial use of PDCA cycle in some processes	PDCA cycle is applied and totally contained in	Self-run PDCA cycle is applied within the organization,	PDCA cycle is run by stakeholders

			key processes	supported by innovation	

Source: ISO/CD 9004 – ISO/TC 176/SC 2/WG 18 - ISO 2007, Milenko Heleta (2008) Quality Management, Singidunum University, Beograd, p. 295.

In order to achieve the sustainable success of agricultural farms, investments in innovations are increasingly needed but with a timely response to changes which are more extensive and more complex. Continued learning and knowledge dissemination allows for the innovation of agricultural farms, which influences the improvement of the processes, products and performance of the organization, all directed towards sustainable success (Figure 4).

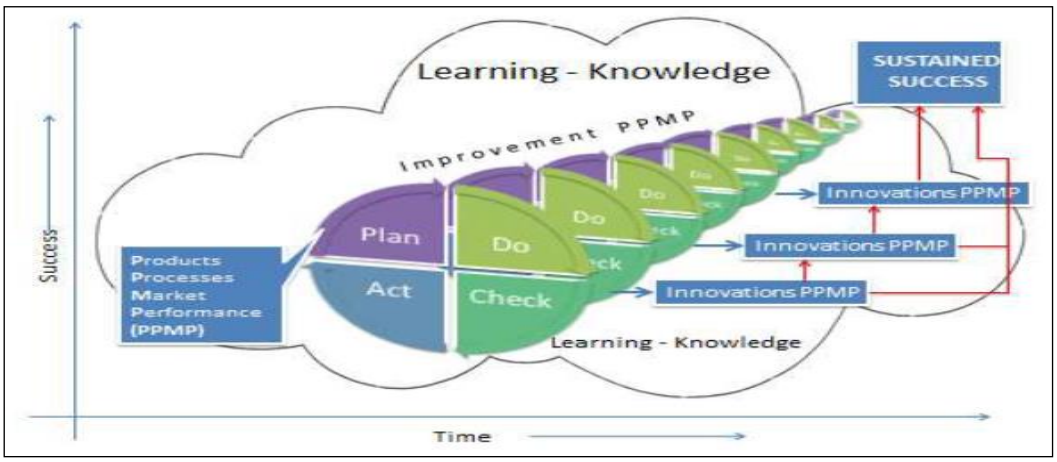

Figure 4: Learning, knowledge and innovations lead to sustainable success. Source: Adapted – Luburić, 2016

The foundation for sustainable success in any organization is good governance and continuous improvement and learning.

The sustainable success of agricultural holdings should not only rely on effective management, but also on the understanding of the farm's environment, as well as the appropriate approach to agricultural land reform - in order for it to be innovative.

Agricultural holdings must employ the best tactics possible, with a constant focus on meeting the needs and expectations of users and all stakeholders to achieve sustainable success. Also, owners of agricultural holdings should plan for the long term in order to improve the performance of an agricultural holding. It is therefore necessary to take on permanent learning and constant innovation.

The combination of sustainability and innovation is necessary for the realization of new combinations, which can lead to an innovative process that addresses the current sustainability challenges. Nidumolu et al. described sustainability as a key driver of innovation in the 21st century (Nidumolu, Prahalad, Rangaswami, 2009).

Owners of agricultural holdings, in order to achieve the sustainability of their agricultural holdings, must have a perspective based on long-term planning, to analyze the

environment of the organization, to identify all stakeholders, and to work to meet the needs and expectations of customers.

2. 4. Agricultural holdings in the Republic of Serbia

The sector of agriculture plays an important role in the economy of the Republic of Serbia, with a significant share in the gross domestic product. The Republic of Serbia has agricultural resources that are not used sufficiently but could contribute to the further development of the entire economy. With the aim of defining measures and activities for the reconstruction and activation of the development potentials of the rural areas and future reforms of the agricultural sector within the external and internal challenges that it faces, the Ministry of Agriculture and Environmental Protection has adopted the Strategy for Agriculture and Rural Development of the Republic of Serbia for the 2014-2024 period. This strategy is a basic and long-term strategic document that defines the goals, priorities and frameworks of political and institutional reforms in the field of agriculture and rural development.In the Strategy for Agriculture and Rural Development of the Republic of Serbia for the 2014-2024 period, small family farms or holdings represent an indispensable part of the rural economy and require special attention (the Strategy for Agriculture and Rural Development of the Republic of Serbia, 2014-2024).

It could be said that Serbia's agriculture is characterized by small agricultural holdings with fragmented plots of land mostly owned by individuals. According to the Law on Agriculture and Rural Development of the Republic of Serbia (Agricultural and Rural Development Act of the Republic of Serbia), an *agricultural holding* is a production unit where an agricultural enterprise, agricultural cooperative, institution or other legal entity carries out agricultural production, while a *family farm* is an agricultural holding where a farmer, together with members of his household, carries out agricultural production.

Private farms dominate in agriculture in Serbia and use more than 90% of agricultural land, while the remaining 10% of agricultural land is used by state/public enterprises and cooperatives (Hopić, 2008). Also, it has been estimated that there are about 871,000 private farms in Serbia, with most private households owning small land holdings consisting of several separate plots. The largest number of registered farms hold land to the size of 2-5 ha, and the smallest are estates of 15-20 ha and over 20 ha. Large farms (over 10 hectares) are mostly registered in South Banat and the South Bačka District, and to a lesser extent in the Nišava and Pčinja Districts, with the largest number of holdings of medium size (5-15 ha) located in Mačva and the South Banat District, and the smallest in Pirot and the Pčinja District (Hopić, 2008).

Based on the 2012 Agricultural Census,[2] it was established that there are 631,552 agricultural holdings on the territory of Serbia. Serbia is showing dominance in relation to some EU countries with this number of agricultural holdings (Table 8).

Table 8: Number of agricultural holdings in Serbia and selected countries

[2] The 2012 agricultural census was carried out in accordance with the valid EC regulations (no. 1166/2008), which envisage that a census is carried out every ten years, and a survey on the structure of agricultural holdings on a sample (FSS) is carried out in the interim period, which provides the basis for the functioning of the agricultural statistics system.

Country	No. of agricultural holdings
Hungary	576,810
France	516,100
Germany	299,130
Bulgaria	370,490
Serbia	631,552
Holland	72,320
The Czech Republic	22,860
Slovakia	24,460
Austria	150,170
Slovenia	74,650

Source: SORS Serbia, 2012 agricultural census, SORS Serbia, www.webrzs.stat.gov.rs

Eurostat, http://ec.europa.eu/eurostat

The number and economic size of agricultural holdings in the Republic of Serbia and by region according to the 2012 census is shown in table 9.

Table 9: Number and economic size of agricultural holdings in the Republic of Serbia and by region.

	Serbia	Beograde region	Vojvodina region	Sumadija and Western Serbia region	South and Eastern Serbia region	Kosovo and Metohija region
Agricultural holdings,total						
AH total	631552	33244	147 624	262 940	187 744	—
Economic size in EUR	3 750 790 895	200 719 138	1 776 258 757	1 132 910 083	640 902 918	—
Average economic size in EUR	5 939	6038	12 032	4309	3 414	—
Family agicultural holdings						
Number of FAH	628 552	33 117	142 269	261 935	187 231	—
Economic size in EUR	3 136 526 046	145 344 061	1 309 594 621	1 079 712 999	601 874 365	—
Average economic size in EUR	4 990	4 389	8 953	4 122	3 215	—
Legal entities and entrepreneurs						
Number	3000	127	1 355	1 005	513	—
Economic size in EUR	614 264 849	55 375 077	466 664 35	53 297 084	39 028 553	—
Average economic size in EUR	204 755	436 024	344 402	52 932	76 079	—

Source: SORS, 2013

Of the total number of agricultural holdings, 99.5% are family farms (628,552). The average economic size of agricultural holdings in the Republic of Serbia in 2012 amounts to EUR 5,939, and according to the organizational-legal form per family farm, it amounts to EUR 4,990 and EUR 204,755 by sector of legal entities and entrepreneurs.

The application of the FADN system[3] (whereupon the National Board for the FADN system of the Republic of Serbia has established the criteria for determining the field of FADN research - two FADN regions: Serbia North and Serbia South, threshold of economic size of EUR 4,000, 10 basic types of agricultural holdings, 14 basic groups of economic size, a representative number of farms for the FADN sample of about 2,000 farms) (Ministry of Agriculture, Forestry and Water Management, Republic of Serbia, 2018), resulted in data on the average size of farmland used by households in 2016 in Serbia (13.4 ha). The results confirm significant differences in the average size of the land used between the regions of Serbia North and Serbia South, given that the average land used in the region of Serbia North is 21.5 ha, while in the South Serbia region it is 9.4 ha.

In order to improve the physical and economic performance of small and medium-sized agricultural holdings in Serbia (which dominate in the structure of total farms by providing stable and high sources of income of the holding and becoming more competitive on the domestic and foreign markets), it is necessary for farmers to engage more actively on removing the internal constraints, or the development of the internal capacities of the holdings in the following areas: (a) education, acquisition of new knowledge and skills, greater awareness; (b) fostering an entrepreneurial and competitive spirit; (c) greater application of innovations in production and operations, which are not significantly related to financial resources; (d) changes in mindset and mentality in the direction of a real insight into the mistakes, problems, opportunities, needs for association, importance of investments in products with higher stages of processing, introduction of quality standards, improvement of product quality, and similar (Paraušić, Cvijanović, 2014).

From October 1 to November 30, 2018, the Statistical Office of the Republic of Serbia conducted a survey on the structure of agricultural holdings in the Republic of Serbia. A total of 120,000 agricultural holdings were surveyed, thus gathering data on the agricultural land, livestock, mechanization, the labor force on the farms and the applied agro-technical

[3] The FADN system (system of accounting data of agricultural holdings in the Republic of Serbia) is applied every year in all EU countries for the collection of technical, financial and economic data for over 82,000 agricultural holdings, representing about 5 million agricultural holdings in the European Union. In Serbia, the FADN system was established in 2014.

measures. Figure 5. shows the number of agricultural holdings in Serbia and the average area of agricultural land by farm. There is a noticeable decline in agricultural holdings in the Republic of Serbia in relation to 2012 - by 9.9%.

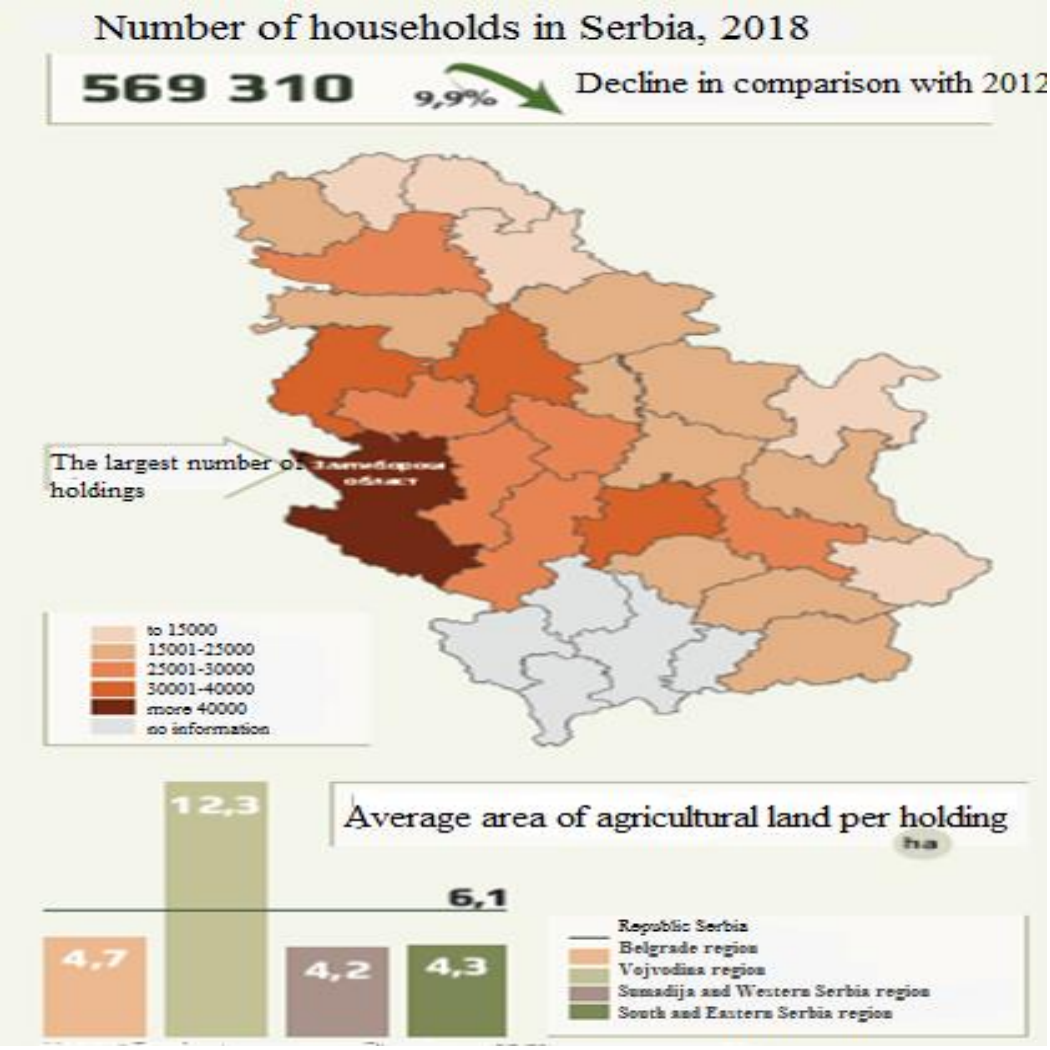

Figure 5: Number of households in Serbia
Source: Survey on the Structure of Agricultural Holdings, 2018. First Results - Assessment, SORS, 2019

Table 10 shows the land area, livestock, labor and standard value of farm production according to the legal status and size of the used agricultural land. It is noticeable that the use of agricultural land on family farms is much higher compared to companies and entrepreneurs.

Table 10: Land, livestock, labor and standard value of farm production according to legal status and size of agricultural land used

	Time	Indicator							
Teritory				Time	2018				
Size				Indicator	Agricultural land used (ha)	Holding (number)	Condicional cattle (number)	Annual work unit (number)	Economic size of the holding (mil €)
Legal	**Teritory**	**Size**	**Legal**						

status			status					
	REPUBLIC SERBIA	Total	**Total**	**3475894**	**564541**	**1933840**	**645733.12**	**4861**
			Family holding	2916125	562895	1651568	627406.28	4205
			Legal entity	557866	1373	276370	17576.92	644
			entrepreneur	1903	272	5902	749.92	12
	SERBIA NORTH	Total	**Total**	**1719899**	**157103**	**784606**	**163381.75**	**2312**
			Family holding	1287300	156138	562421	148957.4	1753
			Legal entity	431356	853	221200	14118.23	556
			entrepreneur	1242	112	985	306.12	4
	SERBIA SOUTH	Total	**Total**	**1755995**	**407438**	**1149234**	**482351.37**	**2549**
			Family holding	1628826	406758	1089147	478448.88	2452
			Legal entity	126509	520	55170	3458.69	89
			entrepreneur	660	161	4917	443.8	8

Source: http: //data.stat.gov.rs/Home/Result/1300020101? LanguageCode = en-Latn

PART 3: THE METHODOLOGICAL POSTULATES OF THE RESEARCH

The third part of the dissertation refers to the methodology of the research. In this part of the dissertation, preliminary theoretical and empirical research is provided. A questionnaire was made based on the experience of the experts from the above fields to determine which issues are important for further research.

3. 1. The theoretical model of the impact of innovation and quality of agricultural products on the sustainable success of individual family holdings in the Republic of Serbia

In the time of a global crisis, it is important to encourage the development of agriculture through the development of its own competitiveness in order for it to be built on innovation and the development of new ideas.

Consumers of agricultural products around the world demand an increasing quality of products, which presents an increasing market challenge. Creating a quality product in today's market conditions demands developing a competitive strategy based on innovation and quality. Innovations in agriculture, just like in every other sector, are the main motor behind the growth of productivity[4]

Based on the findings presented in the literature review, based on the available literature (domestic and foreign), and based on specialized works in this field (Vilallobos, Garcia,Avila, 2017; Faure et al., 2018, Vogl, Kummer, Schunko, 2016; Alston, 2010; Alston et al., 2010; OECD, 2009; OECD, 2010c; OECD, 2010d; Stads, Beintema, 2012; Fuglie, 2012) a selection of questions for the poll have been selected.

The questions were created and in accordance to the ISO 9001:2005 and ISO 9004:2009 standards in cooperation with the mentor. Based on the analysis of the previous theoretical analysis a Basic system model has been created, "Impact of innovation and quality in agriculture on the sustainable success of agriculture" (figure 6).

[4] (http://www.oecd/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/CA/APM/WP(2012)19/FINAL&docLanguage=En).

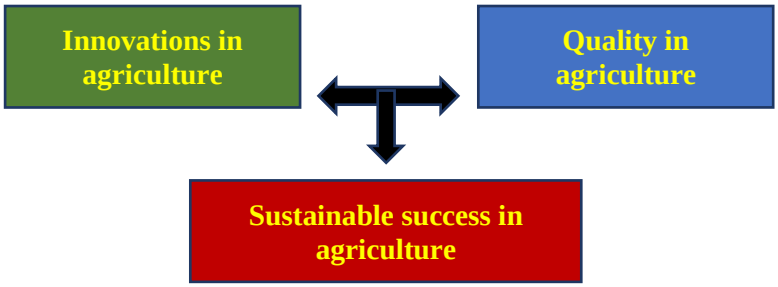

Figure 6. Model 1- The impact of innovations and quality in agriculture on the sustainable success of agriculture

Some hypotheses have been set on the basis of theoretical research (Figure 7). A general or zero research hypothesis has been set, which reads as follows:

H_{00} – The level of innovations and quality of agricultural products significantly affects the level of sustainable success of individual family agricultural holdings.

The general – zero hypothesis will be proven by analyzing the auxiliary hypotheses, as follows:

- *H_{11} - The level of innovations of agricultural products significantly affects the level of quality of agricultural products.*
- *H_{12} - The level of innovations of agricultural products significantly affects the level of sustainable success of individual family agricultural holdings.*
- *H_{21} - The quality level of agricultural products significantly affects the level of innovations of agricultural products.*
- *H_{22} - The quality level of agricultural products significantly affects the level of sustainable success of individual family agricultural holdings.*

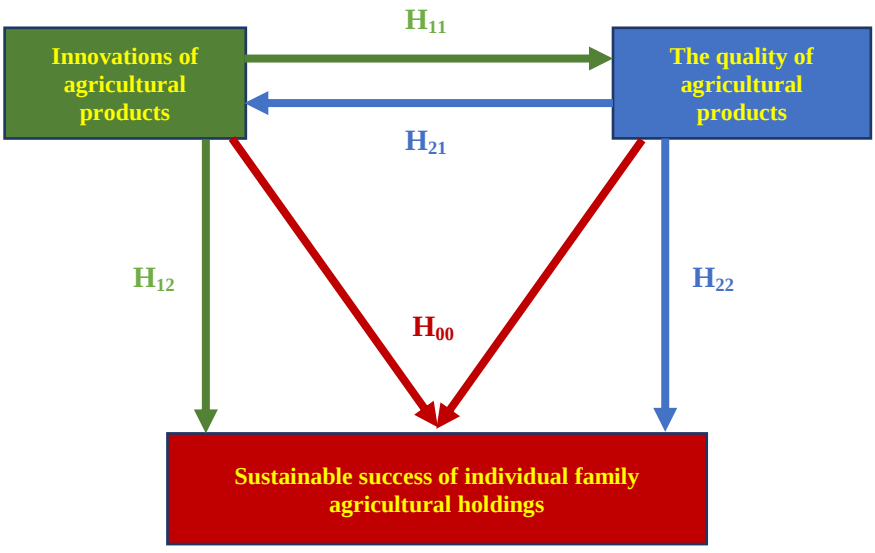

Figure 7: Model 2-The impact of innovations and quality of agricultural products on the sustainable success of individual family agricultural holdings

Expert research was conducted on a sample of 60 experts on the territory of the Republic of Serbia (university professors, colleges, employees in public administrations at the position of agricultural advisers, staff employed at institutes relevant to the field of research) in the period from 1 July to 1 September, 2018.

PART 4.EMPIRICAL RESEARCH

The fourth part of the dissertation refers to empirical research. This section presents the way of the realization of empirical research and the obtained results. The reliability of the set theoretical model and questionnaire was analyzed by 60 experts from the following areas: innovations, quality and the sustainable success of agricultural holdings. The reliability of the set model can be determined or checked in two ways: based on the recommendations for the identification of factor loadings (Nunnally, 1978), and based on the rules and guidelines for internal consistency.

An analysis of the profile of the respondents was carried out, the reliability of the elements of the set system model was established, and the benefits and justification of the research, the factor analysis of the model, and the correlation and regression analysis of the model were calculated.

Following the analysis we can conclude that the level of innovation of agricultural products related to the innovative behavior and innovative business practice of an agricultural holding as well as the quality of customer relations and quality of the agricultural product of an agricultural holding itself affects the development of possibilities of sustainable success of an agricultural holding.

PART 5. DISCUSSION

The fifth part of the dissertation shows the discussion about the research results. Based on the research we can conclude that there exists a big influence of innovation and quality on a sustainable success of agricultural holdings in the Republic of Serbia. In order to achieve a sustainable level of success of agricultural holdings in the Republic of Serbia it is necessary to conduct constant education programs for the farmers about the importance of innovation as well as encourage the aspiration for innovative behavior and business practice and the importance of investing in innovation and improving the process of production. The support of the state and the department ministry has a crucial role, through the support for introducing new technologies in agricultural holdings, subsidizing the necessary materials for agricultural holdings, providing the necessary funding for constant education of agricultural holding owners and exchanging the practices with farmers from the surrounding countries.

Innovative behavior of agricultural holdings could also be achieved through the support for new ideas, collecting ideas from external sources through encouraging business partners to create innovations and through a clearly defined strategy of introducing innovations and innovative management practices.

Analysis of the set research models has shown that sustainable success of an agricultural holding could be achieved through the development of cultural behavior which supports creation and development of new ideas, funding innovative activities, through learning and mastering production practices, with a flexible strategy and encouragement of business partners to participate in creating innovation. Besides the previously stated, by setting the goals and politics of quality, determining and understanding the demands of the customer, fulfilling their demands and establishing communication with them with the goal of achieving feedback about the quality of the product we could, without a doubt, achieve the sustainability of holdings in the R. Serbia. Innovative business of individual agricultural holdings could be achieved by following the modern solutions in agriculture through the improvement of production by using innovation. Innovative behavior and business of individual agricultural holdings through the establishment of a quality customer relationship and the development of quality also affects the achievement of sustainable success of individual agricultural holdings by fulfilling the expectations coming from its surroundings and through the establishment of strategies based on the needs if interested parties.

Based on the information we can conclude that for agricultural holdings to succeed, the responsible Ministry and the government need to increase the subsidies for agricultural holdings dedicated to the investment in innovation. With the establishment of a system of continuous training for the owners of agricultural holdings, where they could be acquainted with the latest achievements in the field of agriculture, new technologies, exchange the experience with the farmers from other countries, they could be helped in establishing a system which would be sustainable in the long term.

It is also necessary to pique the interest in innovative activities of those agricultural holding owners not overly open for innovation. This could be achieved through establishing the agri-business centers whose priority would be to inform the owners of agricultural holdings about the modern production methods, invitations and fund allocation or donation programs, tax stimulations, invitations for cooperation with other participants, educational programs, interregional cooperation and cross-border projects and other actions which would benefit the local farmers.

PART 6. CONCLUSIONS OF THE RESEARCH

The sixth part of the dissertation shows the the conclusions and the possible directions of the future research.

Based on the research conducted on 121 agricultural holdings in the Republic of Serbia, the following conclusions were reached regarding the models set out in the dissertation.

Based on the results of the empirical research, it can be concluded that in relation to Model 1:

- The level of innovations of agricultural products linked with A (innovative behavior) affects the level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers).

- The level of innovations of agricultural products linked with A (innovative behavior) affects the level of quality of agricultural products linked with B (factors of developing the quality of the organization).
- The level of innovations of agricultural products linked with B (innovative business activities) affects the level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers).
- The level of innovations of agricultural products linked with B (innovative business activities) affects the level of quality of agricultural products linked with B (factors of developing the quality of the organization).

Based on the results of the empirical research, it can be concluded that in relation to Model 2:

- The level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers) affects the level of innovations of agricultural products linked with A (innovative behavior).
- The level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers) affects the level of innovations of agricultural products linked with B (innovative business activities).
- The level of quality of agricultural products linked with B (factors of development of quality of the organization) affects the level of innovations of agricultural products linked with A (innovative behavior).
- The level of quality of agricultural products linked with B (factors of development of quality of the organization) affects the level of innovations of agricultural products linked with B (innovative business activities).

Based on the results of the empirical research, it can be concluded that in relation to Model 3:

- The level of innovations of agricultural products linked with A (innovative behavior) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improvement of sustainability).
- The level of innovations of agricultural products linked with A (innovative behavior) *does not affect* the level of sustainable success of individual family agricultural holdings linked with B (factors of development of possibilities).
- The level of innovations of agricultural products linked with B (innovative business activities) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improvement of sustainability).
- The level of innovations of agricultural products linked with B (innovative business activities) affects the level of sustainable success of individual family agricultural holdings linked with B (factors of developing possibilities).

Based on the results of the empirical research, it can be concluded that in relation to Model 4:

- The level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers) affects the level of sustainable success of

individual family agricultural holdings linked with A (factors of improving sustainability).

- The level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers) *does not affect* the level of sustainable success of individual family agricultural holdings linked with B (factors of developing possibilities).
- The level of quality of agricultural products linked with B (factors of developing the quality of the organization) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improving sustainability).
- The level of quality of agricultural products linked with B (factors of developing the quality of the organization) affects the level of sustainable success of individual family agricultural holdings linked with B (factors of developing possibilities).

Based on the results of the empirical research, it can be concluded that in relation to Model 5:

- The level of innovations of agricultural products linked with A (innovative behavior) and B (innovative business activities) affects the level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers).
- The level of innovations of agricultural products linked with A (innovative behavior) and B (innovative business activities) affects the level of quality of agricultural products linked with B (factors of developing the quality of the organization).

Based on the results of the empirical research, it can be concluded that in relation to Model 6:

- The level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers) and B (factors of developing the quality of the organization) affects the level of innovations of agricultural products linked with A (innovative behavior).
- The level of quality of agricultural products linked with A (factors for improving the quality of the relationship with customers) and B (factors of developing the quality of the organization) affects the level of innovations of agricultural products linked with B (innovative business activities).

Based on the results of the empirical research, it can be concluded that in relation to Model 7:

- The level of innovations of agricultural products linked with A (innovative behavior) and B (innovative business activities) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improving sustainability).
- The level of innovations of agricultural products linked with A (innovative behavior) and B (innovative business activities) affects the level of sustainable success of individual family agricultural holdings linked with B (factors of developing possibilities).
- The level of quality of agricultural products linked with A (factors of improving the quality of the relationship with customers) and B (factors of developing the quality of the organization) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improving sustainability).

- The level of quality of agricultural products linked with A (factors of improving the quality of the relationship with customers) and B (factors of developing the quality of the organization) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improving sustainability) and B (factors of developing possibilities).

Based on the results of the empirical research, it can be concluded that in relation to Model 8:

- The level of innovations of agricultural products linked with A (innovative behavior) and B (innovative business activities) and the level of quality of agricultural products linked with A (factors of improving the quality of the relationship with customers) and B (factors of developing the quality of the organization) affects the level of sustainable success of individual family agricultural holdings linked with A (factors of improving sustainability).

Based on the results of the empirical research, it can be concluded that in relation to Model 9:

- The level of innovations of agricultural products linked with A (innovative behavior) and B (innovative business activities) and the level of quality of agricultural products linked with A (factors of improving the quality of the relationship with customers) and B (factors of developing the quality of the organization) affects the level of sustainable success of individual family agricultural holdings linked with B (factors of developing possibilities).

Based on the presented empirical results we can come to the conclusion that the innovative behavior of farms could be achieved through providing support to new ideas, collecting ideas from external sources through incentivizing the business partners for the creation of innovation and through a precisely defined strategy of introducing innovation and innovative ways of management. Innovative business practice of farms could be achieved through the process of following modern achievements in agriculture, using innovation with the goal of improving one's image, collecting ideas from internal and external sources by using one's own resources. Individual farms can improve relations with their customers by considering their demands, determining the end goals in quality, by producing high quality products. Maintaining a high level of quality could be secured through fulfilling the requirements of the customers and keeping track of whether they are satisfied with the product with planned measures related to risks and opportunities.

Everything that was previously specified impacts the factors of improving the sustainability through set strategies, knowledge development, managing the finances in order to have a sustainable success, stimulations for the inclusion of innovation and creative behavior.

Innovative behavior and business of farms through establishing a quality relationship with the buyers and developing one's own quality influences the farm to achieve sustainable success by fulfilling expectations that arise from the environment, and through setting strategies based on the needs of interested parties.

Based on the results of the research conducted and the review of literary sources, the starting hypothesis has been confirmed that the level of innovation and the quality of

agricultural products has a significant impact on the level of sustainable success of individual farms.

In order to improve the sustainability of individual farms a system needs to be set up, in which to run the development of new ideas with clearly defined strategy of innovation implementation and innovative management. It is crucial to develop knowledge and creativity and continuously monitor the events in agriculture, as it is the only way of securing the sustainability of modern individual farms.

CONTRIBUTIONS

Scientific and theoretical contributions:

- Based on тхе in-depth literature analysis, a theoretical conceptualization of innovations in agriculture, their nature, types, and features was proposed.

- Based on the conducted theoretical, methodological and practical research, a model has been adapted, with the help of which a correlation is made between the innovations and the sustainable development of the agricultural production systems.

Practical contributions:

- A methodology for research and analysis of innovations and their impact on the sustainable success of agricultural holdings has been developed, which can be adapted and upgraded for different purposes by other researchers.

- Possibilities for improving the sustainable development of agricultural holdings in the Republic of Serbia based on innovations and improving the quality of their products are justified.

LIST OF PUBLICATIONS

1.**Mirko Milanovic**, Zorana Nikitovic (2020) Značaj kvaliteta poljoprivrednih proizvoda za održivi uspeh poljoprivrednih gazdinstava, Journal "International Review", 3-4/2020, Faculty of Business Economics and Entrepreneurshp, Belgrade, Serbia (waiting for publication)

2.**Mirko Milanović** (2020) Analiza razvijenosti sektora MSPP-a u Republici Srbiji, Journal "Trendovi u poslovanju" ISSN 2334-816X, Faculty of Business Economics and Entrepreneurshp, Belgrade, http://www.trendovi.vspep.edu.rs/index.php/tp/article/view/209

3.Zorana Nikitovic, **Mirko Milanovic** (2019) ,,THE IMPORTANCE OF COMMUNICATION IN LEADERSHIP,, International Scientific Conference "Leadership and Human Resources Management, Sofia, Bulgaria, 29-30. November 2019,

4.Zvonko Brnjas, Aleksandra Golubovic-Stojanovic, **Mirko Milanovic** (2019) Thematic Proceedings, Editors: Z. Nikitovic, S. Vujicic, I. Piljan, International, Scientific Conference ”Employment, Education and Entrepreneurship”, Belgrade, 17-19. October 2019, pp. 63-69, ISBN 978-86-6069-173-8, http://eee-conference.com/_img/arhiva/2019/e2019_sa_naslovnom.pdf#page=64&zoom=100,82,89

5.**Mirko Milanović** (2019) ,,Finansiranje i amortizacija osnovnih sredstava u poljoprivredi,, Zbornik radova sa konferencije "Trendovi u poslovanju", Visoka poslovna škola strukovnih studija "Prof. dr Radomir Bojković", Kruševac, 16. maj 2019. str. 137-144, ISBN 978-86-7566-051-4 print version, ISBN 978-86-7566-052-1 e-version.
http://visokaposlovnaskola.edu.rs/wp-content/uploads/2020/01/Zbornik-radova-TuP-2019.pdf