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Review

Innovations in Agricultural and Wine Production Sector

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Abstract: The subject of this paper is to consider the issues concerning the importance of innovation in the agricultural and wine sector. In order to remain on the market and remain its competitiveness, it is necessary for the small agricultural enterprises to improve their production process, which can be achieved by monitoring and improving innovative activities. These activities include not only the application of new products, but also the entire way of thinking, acting and managing the creative potential of the organization in order to improve production. Innovation management includes a set of aplicable measures and methods which help the organization to adapt on market conditions and requirements**.** The methods used in this paper are: synthesis, analysis, induction, deduction, gelenarization, content analysis. Through a systematic review of the literature, the aim of this paper is to point out to all interested parts, the importance of respecting innovations in agricultural and wine production.

Keywords: innovation; agricultural production sector; wine production sector.

1. Introduction

The innovation of agricultural systems management is a determinant factor that guarantees adaptation to a new paradigm of global economy, environmental protection, and social requirements. The conventional concepts of innovation, applicable to new products and processes, do not consider many characteristics of the agricultural sector, such as social innovation and innovation resulting from new or renewed processes.

The big problem of small and medium agricultural farms is that they resort to traditional agricultural methods and use cheap imported agricultural means, which they consider a more efficient way than the introduction of information technologies. With the development of software solutions, techniques and methods, the conditions have been created for modern information technologies to find their place in the agricultural sector. The implementation of new technologies and information systems in agriculture is the future and the key to opening great opportunities for the improvement of agricultural production and economical business of producers. The application of new technologies based on computer technology and integrated systems creates conditions for the production of high quality food.

Worldwide wine production has a great cultural and economic importance. A multidisciplinary approach is necessary to improve wine quality. The wine of the future will be produced by applying high advanced technologic resources in different production phases.

The aim of this paper is to present some of the key postulates of innovative activity in agricultural or wine production with an emphasis on a holistic approach to respect when explaining the issue of innovation.

2. Concept and Definition of Innovation

The term "innovation" is present in all activities, as in the economy, politics, education, economy and other areas. One of the most important theorists who dealt with this topic was Jozef Schumpeter. In his works [1,2], he pointed out that innovation is a key element for economic development and prosperity. New technological products initially bring big profits, but are very quickly surpassed by the competition, so a temporary monopoly should encourage entrepreneurs to create new products, as well as to improve existing ones. In his works, Schumpeter divided the basic concepts in this field as follows: 1. invention - an idea that will grow into an innovation after transformation, 2. innovation - practical transfer of new ideas into products, processes, market-proven invention; 3. imitation - imitation of the first and original product, process, technology [1,2].

The theory of the importance of innovation has been developed over the years by various authors, such as Cooper [3], according to whom innovation is the application of knowledge to generate new ideas that bring profit. According to Porter [4], companies gain a competitive advantage through innovation, while Freeman [5] believes that innovation involves technical, design, production, management and commercial activities to bring a new or improved product or process to market. The OECD in its handbook [6] provides a definition of innovation: innovation is the application of a new or significantly improved product, service or process, marketing method or new organizational method in business, work organization or business relations with the environment, which is one of the most common definitions of innovation.

3. Types of Innovation

Innovations can be classified according to various criteria, such as the nature of the innovation, the type of innovation that the innovation brings, whether it is an innovative product or innovation in marketing and organization. Figure 1. shows the division of innovations, according to different criteria. The criteria according to which the division of innovations is made is according to the nature of the new, according to the type of the new, according to the activity, according to the degree of the new, according to the orientation and according to knowledge.

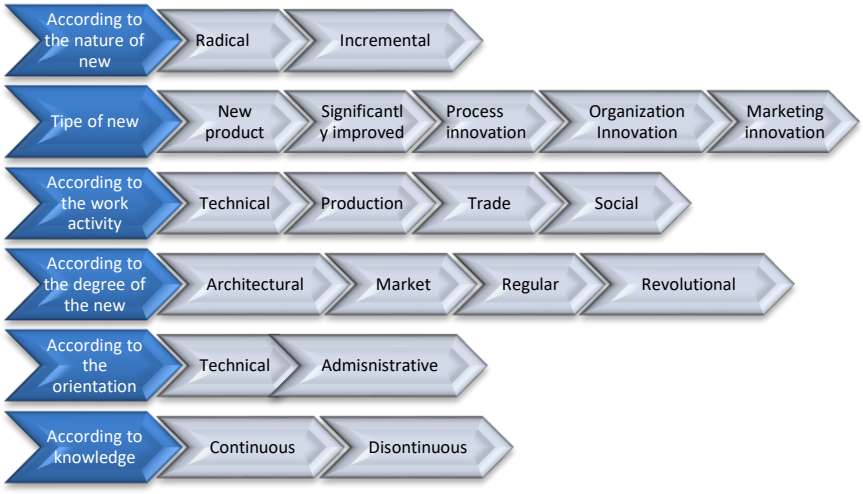

Figure 1. Different criteria of division of innovation.

One of the basic divisions of innovation is into radical and incremental innovation [1]. By radical we mean those that bring something that has not yet appeared on the market, while incremental refers to something that has been modified, in a modified form, and they are gradual. Radical innovations bring with them a high degree of risk, they include research and new technologies, while incremental innovations do not carry as much risk for the company, they are aimed at improving existing processes and, of course, contribute to the current market situation [7].

According to authors [7,8] innovations could be divided according to the type of novelty into innovation of a new product or service or significantly improved product or service, such as process innovation, organization and marketing. The division by activity, Murray, Caulier-Grice and Mulgan [9], divided innovations into technological, manufacturing, trade, and social innovation. Tidd and Bessant, [10] divided innovations according to the degree of novelty into architectural, market, regular and revolutionary. They presented the division of innovation according to the focus on technical and administrative. According to knowledge, Miller and Shamsie [11] divided innovations into continuous and discontinuous.

4. Innovations in the Agricultural Sector

Population growth, accelerated industrial and technological development, as well as drastic climate change have led to great environmental pollution. One of the biggest polluters of this natural resource is agriculture. In order to preserve the environment for future generations, it is the obligation of man to behave more responsibly towards the environment and to preserve natural resources. The solution to the problem of sustainable development of agriculture is in the concept called *precise agriculture.* This concept involves continuous monitoring of crops, as well as a quick response to unpredictable events in real time [12,13]. The quality and efficiency of precise agriculture can be significantly improved by using smart systems with the following capabilities for real-time decision making: 1. Real-time satellite and drone-based pattern recognition of problematic situations with the use of hyper spectrum cameras (illness, insects, etc.); 2. Real-time event-driven adaptive resource management for machines, pesticides and other resources, including unmanned vehicles [13]. These opportunities could be designed and implemented as smart web-services available for farmers via constantly running Internet portal and mobile applications [14]. Innovations in the agricultural sector include, for example, the issue of smart *farming*, as well as the use of *artificial intelligence*, which has proven to be an innovation of importance for agricultural development. The concept of Smart Farming as an augmented Artificial Intelligence (AI) solution for precise agriculture is considered [13]. A digital ecosystem is an open, knowledge-based, distributed and adaptive system of smart services which is able to self-organize and demonstrate other properties of complex systems [15]. For coordinated decision making, special protocols are developed for agents of service negotiations, which support the "round table" negotiations among experts [13]. The figure 2. is representing, according to authors Budaev and others, the roles of the individual agents who take part in "team work" related to innovative solutions in the field of agriculture or to be precise, precision agriculture.

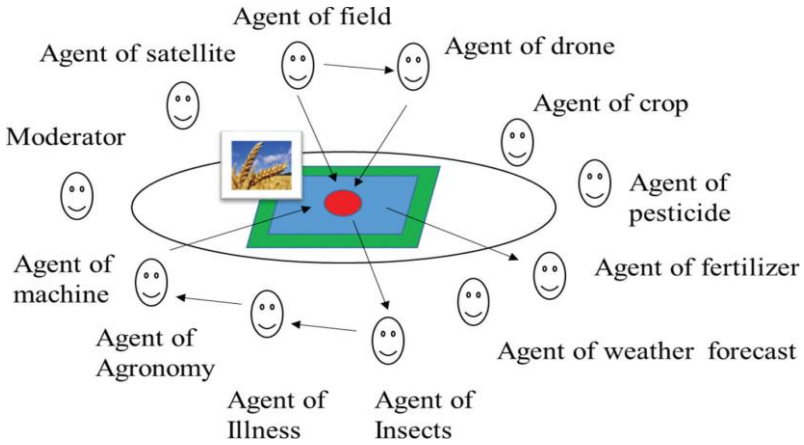

Figure 2. A team of agents responsible for the digital ecosystem and supporting innovation in the agricultural sector

Innovation is the only factor capable of increasing competitiveness in the agri-food sector. Innovation niches may facilitate transitions toward sustainable agriculture prospects [16]. Innovation in the agricultural sector is interlinked with a set of factors in which the implementation of new thinking models is implicit and represents the development of a set of technological, management, and socio-economic tools aiming at improving the living standards of society in a sustainable manner. According to the European 2020 strategy (Horizon 2020), European Union (EU) countries are encouraged to increase investments in research and development (R&D) so that by 2020 it may represent 3% of national Gross Domestic Product (GDP), allowing for an EU increase of around 3.7 million new jobs [17]. Edler and Fagerberg, emphasized that innovation is not first and foremost about generating new ideas, but that it is about putting ideas into practice to boost competitiveness and take action to solve problems or challenges: "It is 'problem-solving' nature that potentially makes innovation a relevant force to deal with important social and economic issues that politicians care about [18]. The CAP 2014–2020 reform states the importance of innovation and research development in agriculture. For this purpose, the Agricultural Knowledge and Innovation System (AKIS) is being developed and adapted to the agri-food chain, integrating production to the final consumer. Innovation in agriculture outreaches the traditional innovation framework common for other activity areas, in the sense that improvement, competitiveness, enhanced production, and value can steam from dynamics other than new products or new production processes [19]. To enhance innovation for adapting to climate change in the agriculture sector, AERAS providers need to embrace new organizational mandates, agendas, roles, and strategies. They should broaden their scopes by working with multiple actors and groups both within and beyond the agriculture sector [20].

5. Innovations in the Wine Sector

According to OECD several types of innovation depending on various criteria. In the Oslo Manual 2018 (4th edition) the Organization for Economic Co-operation and Development (OECD) gave a new classification of innovations. There are two major groups – product innovation and business process innovation. Product innovations can be innovations of goods and of services. Business process innovations include innovations in production of goods or services, distribution and logistics, marketing and sales, information and communication systems, administration and management and product and business process development [21]. As the scholars pay more and more attention on the general effect of innovations on growth, there are some more focused studies, which aim at examining the role of innovations in certain sectors. Such sector is the wine industry and many authors seek to find the role of innovations on its development. Wine producers are motivated to produce such wines as they possess higher quality, because of the chemicals free land, and because the consumers demand for such products. Among the EU countries, which are the biggest producers of organic wines are Italy, France and Spain. This good practice requires efforts by Bulgarian wine producers to implement such innovations and to become part of the global trends [22]. According to Veissiere [23] gathered data from online media websites and individual wine company websites. Such approach provides the opportunity to have a clearer vision of the overall innovations. It also gives information on where the enterprises are located in the wine industry value chain according the innovation tendencies that occur in the global wine market. It designs the adequacy between them and the existing wine business strategies followed in the industry. The author reaches the conclusion that the marketing strategies of the wine producers does not correspond to the views and expectations of the consumers. The author believes that the growth of such wine companies is undermined by insufficient knowledge of the entrepreneurs on what marketing strategies they should implement [23]. In a recent study conducted by authors Angelova and Pastarmadzhieva [22] the results of their research indicate that wine producers in Bulgaria invest or are ready to invest in product, marketing and to some extent in bio innovations. In the

conclusion this authors in their scientific article discusses the initial steps to develop a valid and reliable instrument to assess innovation performance and entrepreneurial endeavours [22].

The wine of the future will be produced by applying high advanced technologic resources in different production phase. In the future, consumers want to be sure that the wine is authentic, therefore is important to adopt some approaches to detect wine adulteration/mislabeling practices [24]. Considering all these elements, it appears that global commerce actors - including players from the wine industry - tend to pursue the direction of supply chain traceability and dissemination of technologies that enable a significant improvement of currently available services [25]. Against such background, keywords such as the Internet of Things (IoT), Big Data Analytics, Blockchain, Waste, Higher costs for shipments, Unchecked preservation conditions, Operational efficiency and Consumer care, can indeed contribute to shed light on the challenges of the logistical revolution in the AgriFood system and the role of startups [26].

6. Conclusions

With regards to the Food & Beverage sector, particularly if the wine industry is taken into account, many scholars pointed out the dynamism and complexity of global markets [27, 28, 29, 30]. Globalisation has boosted competition in wine markets [31]. In this new competitive arena firms that invest in technologies for wine standardisation, processes optimisation and control, certifications and cost reduction usually increase their competitiveness [32]. The wine market is particularly attractive for developing innovative solutions that have the potential to improve process efficiency and the connection between businesses and customers [33]. It has been shown what is the potential of new technologies such as IoT, Big Data Analytics and Blockchain and how it is possible to use them to both drive wine supply chains and provide a smart environment for wine exhibitions [33]. Innovation in agriculture outreaches the traditional innovation framework common for other activity areas, in the sense that improvement, competitiveness, enhanced production, and value can steam from dynamics other than new products or new production processes [19]. Much research and innovation has emphasized technical innovation; however, it may be much more important to understand institutional innovations [34]. Agricultural economic literature on innovation highlights that innovations do not occur arbitrarily, and that incentives and institutional policies affect the nature and rate of innovation and adoption [35]. System changes aiming at more sustainable agriculture take longer to be evaluated, since they need new and innovative procedures and practices to create more resilient and well-adapted systems. Designing policies for innovation in agriculture will need improved understanding of these complex innovation learning and adaptation processes at several institutional and technological scenarios [19]. The aim of this paper is to present the most relevant literature on the importance of innovation in the agricultural sector with an emphasis on the wine sector in order to help creators of innovative policies to learn how better to develop and implement innovation policies in the agricultural sector of the Republic of Serbia and on the other hand to point out to the all participants on the production side the importance of development and respect modern technologies as one of the types of innovations in agriculture and wine sector. The views of the authors are presented chronologically. The shortcoming of this paper is reflected in the lack of empirical research. The proposal for the further research is the implementation of empirical research on the topic of types and adaptability of innovations in the agricultural and wine sector of the Republic of Serbia with a possibility of doing a comparative analysis of countries with similar economic development.

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