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THE IMPACT OF DIGITALIZATION ON COMPETITIVENESS OF BULGARIAN AGRICULTURE

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Abstract

Digitization is the key topic of our time. The impact of new technologies has a huge potential especially in Bulgarian agriculture. In the conditions of the COVID-19 and financial crisis, Bulgarian agriculture faces a difficult choice – farmers have to make serious investments in digitalization in order to be able to meet the European requirements related to food quality and environmental protection. The purpose of this article is to present and analyze the impact of digitalization on competitiveness of agricultural sector in Bulgaria, and to outline the direction related to the proper use of technologies for the rapid development of Bulgarian agriculture. The study is based on the documentation method which made of laws and regulations in the sphere of agriculture, as well as specific legislation related to digitalization. In the conditions of the COVID-pandemic which has accelerated the process of digitization and support for farmers who introduce digital technologies, innovative technologies for production and organization in agriculture, in order to increase the competitiveness of the agricultural sector in Bulgaria.

Key words**:** *digitalization, competitiveness, agriculture, Bulgaria*

INTRODUCTION

Digitization is the key topic of our time. The influence of new technologies has a huge potential in almost all walks of life and industries – especially in agricultural sector. Digitization in agriculture could help farmers optimize their costs and achieve greater profitability, which is of vital importance in the background of our modern environment characterized by low production prices and ever-increasing rents and wages [3].

Digitalization allows the agricultural sector to realize its potential, adding value while increasing farmers' income and quality of life. Currently, in Bulgaria, average farms of 5,000 to 10,000 decares are the most innovative ones. The main reason for this fact is that small farms cannot afford the deployment of new technologies, while large farms rely mostly on their volumes of margin [5].

In this context, the purpose of this article is to present and analyze the status and impact of digitalization on competitiveness of agricultural sector in Bulgaria, and to outline the direction related to the proper use of technologies for the rapid development of Bulgarian agriculture.

MATERIALS AND METHODS

The study is based on the documentation method which made of laws and regulations in the sphere of agriculture, as well as specific legislation related to digitization comprising the following regulations: Act on Ownership and Use of Agricultural Land; Law on Restoration of Ownership of Forests and Land from the Forest Fund; Regulations on the Implementation of the Act on Ownership and Use of Agricultural Land; Regulations on the Implementation of the Law on Restoration of Ownership of Forests and Land from the Forest Fund; Forestry Act; Agricultural Lease Act; Law on aid to farmers, etc.

The most important strategic documents for Bulgaria, on the basis of which the political framework in the sphere of information and communication technologies is formed, are the following ones as mentioned by [2]:

-The updated Electronic Communications Policy of the Republic of Bulgaria 2015-2018 for development of communications and

achievement of a rapid economic growth within the Single European Market;
-The Strategy for development of e-Government in the Republic of Bulgaria 2014 -2020;
-The Smart Specialization Innovation Strategy of the Republic of Bulgaria (2014-2020);
-The National Cyber Security Strategy, *Cyber Resilient Bulgaria* 2020;
-Strategy for Digitization of Agriculture and Rural Areas in Bulgaria – 2019.

RESULTS AND DISCUSSIONS

Following the accession of our country to the European Union in 2007, until 2018 more than BGN 1 billion were invested in the modernization of farms under the European Agricultural Fund for Rural Development in Bulgaria [9].
Currently, the funds spent entirely for investments in digital solutions and precision farming technologies are exclusively private in nature and depend on the economic opportunities of the individual agricultural farm or entrepreneur. Therefore, at a national level there is a lack of overall information on the investments made so far, the level of digitization achieved and the technologies available for precision farming [7].
The Rural Development Program gives priority to assessment of projects that include up to 30% cost on digitization of farms. The focus of the Agricultural Modernization Fund, which forms a key part of the National Recovery and Sustainability Plan, focuses on digitalization, sustainable agriculture and digital connectivity [4].
According to Vladimir Nikolov, farmers' fear of trusting new technologies is a major obstacle to the digitization and implementation of innovations in agriculture [1].
In the presented methodological approach for assessing the impact of digitalization on the competitiveness of agricultural farms three analytical tools play a vital role:
-Driver that measures the level of digitalization in the agricultural farm;
-Marker that measures the effect of digitalization on the competitiveness of the agricultural farm;
-Indicator that measures the level of competitiveness of the agricultural farm.
In order to establish an efficient and better working agricultural farm in different agricultural industries, it is necessary to provide the required investments.
For example, for fruit and vegetable farms, it is necessary to invest mainly in processing and harvesting machines. This is necessitated by the difficulty in finding workers in agricultural areas [10].
There are already sensors on the market that monitor the maturity of fruit and vegetables in order to achieve optimal harvesting.
There are machines that allow for almost automated harvesting and they are an absolute must for more efficient farming [7].
In particular, digitalization of agriculture will increase farmers' incomes; it will also improve the quality of production according to consumer requirements and will reduce production costs [7].
The data in Table 1 clearly outline the increase in the share of people in Bulgaria who use the Internet for interaction with public institutions from 17.8% in 2015 to 26.9% in 2020.
This trend is even more noticeable in the conditions of the COVID-pandemic which has accelerated the process of digitization and support for farmers who introduce digital technologies, innovative technologies for production and organization in agriculture, computerization of workflow processes, etc., in order to increase the competitiveness of the agricultural sector in Bulgaria.
Digitization of agriculture leads to greater efficiency of agricultural farms, improves environmental protection and sustainability, animal welfare and, in particular, grants more transparency for consumers [1].

Table 1. Persons using the Internet for interaction with public institutions (%)

	2015	2016	2017	2018	2019	2020
Total	17.8	18.4	20.7	22.2	25.4	26.9
A. By sex						
Men	16.6	17.3	19.8	21.8	24.5	26.5
Women	19.0	19.5	21.6	22.7	26.4	27.4
B. By types of purposes						
-To obtain information from a website or application of a public institution	16.0	15.0	14.7	17.1	19.8	19.0
Men	14.8	14.0	14.1	17.0	18.9	18.9
Women	17.2	16.0	15.3	17.1	20.7	19.1
-To download official documents, forms, declarations or reports	12.9	9.3	10.4	9.4	12.5	14.4
Men	11.9	8.3	9.4	8.9	11.6	13.6
Women	13.9	10.4	11.4	9.8	13.3	15.1
-To submit on-line official documents, forms, declarations or reports	9.1	6.5	8.3	9.5	10.2	15.0
Men	8.2	5.9	7.3	9.0	8.9	14.2
Women	10.0	7.1	9.3	9.9	11.4	15.8

Source: National Statistical Institute, 2021 (NIS) [8]

The field studies were carried out on the basis of primary data - we used the data from the the Strategy for Digitization of Agriculture and Rural Areas in Bulgaria, Ministry of agriculture and Food. Around 260 farmers of different types of agricultural holdings were interviewed about their readiness to introduce digital technologies on their farms. Figure 1 clearly outlines the following results: 22% of the farmers report an increase in efficiency, 17% report a decrease in production costs, 16% - better planning and management, 14% - report an increase in productivity, 9% report maintaining competitiveness, 4% - increasing turnover, 2% say that added value has increased, while 1% do not see the benefit of the introduction of digital technologies.

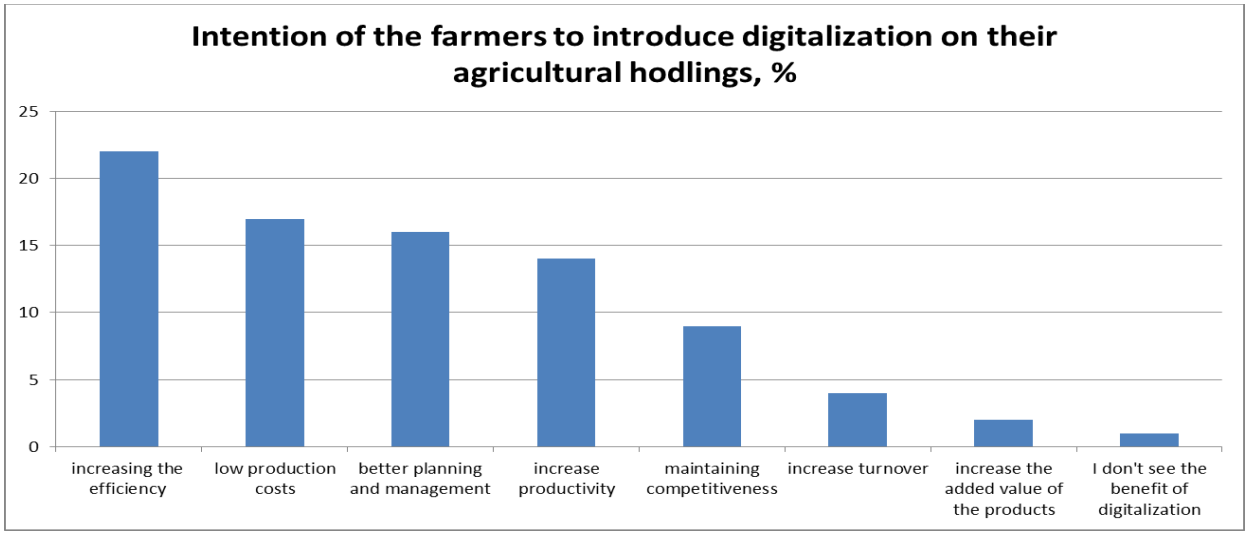

Fig. 1. Intention of the farmers to introduce digitalization on their agricultural holdings, (%)
Source: Own design based on the Strategy for Digitization of Agriculture and Rural Areas in Bulgaria, Ministry of agriculture and Food, 2019.

The analysis of the presented data shows that only 4% of the producers intend to invest in digitalization of the process, 10% plan to do so, while 86% intend to invest no more than 10% of revenues.

In our country there is a significant difference in the level of digitization in the agricultural sub-sectors, farms of different juridical type and size, as well as in different regions in Bulgaria [11]. A large part of agricultural

farmers are unaware of the nature of digital farming, with only 14% using modern digital technologies [7]. The main challenge for Bulgaria is to support agricultural farms to successfully cope with the implementation of modern digital technologies in agriculture in order to increase the competitiveness of Bulgarian agriculture [6].

CONCLUSIONS

Bulgaria is comparatively small both in territory and population. By tradition, agriculture has been a major sector of Bulgarian economy because of its crucial social and economic significance. In the conditions of the COVID-19 and financial crisis, Bulgarian agriculture faces a difficult choice – farmers have to make serious investments in digitalization in order to be able to meet the European requirements related to food quality and environmental protection. The key objectives of digitization of Bulgarian agriculture are related to the increase of productivity and competitiveness of agricultural production and promotion of the interest and attraction of young farmers to engage in agriculture. The opportunities for increasing the competitiveness of Bulgarian agriculture are revealed by means of the effective process of digitization. The resources to achieve the European level of digitalization can be identified in different areas: rapid deployment of technological solutions and modern innovations developed by scientific organizations; promotion of good agricultural practices; enhancing the national support for the Bulgarian agricultural sector.
Bulgaria lags significantly behind the rest of the EU member states in terms of the implementation of digital technologies in the economy and agriculture.

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REFERENCES

[1]Agri.bg, 2020, Fermer.bg.
[2]Alekseeva, V., S., Sukhanova, O., Fudina, E., 2021, Digital transformation of agricultural industrial complex in the implementation of its development strategy, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.21(2):19-25.
[3]Bashev, Hr., 2020, Digitalization of Bulgarian Agriculture and Rural Areas, Economics and Management of Agriculture Magazine, 65(2):3.
[4]Borisov, B., 2021, What will over BGN 4.3 billion from the new Fund for Modernization of Agriculture go for?, Agro Club, 2021
[5]Chobaligova, B., 2019, What are the benefits of digitization in agriculture?, Investor.BG, 2019.
[6]Kaneva, K., Nikolov, D., Yovchevska, P., 2018, Bulgarian Agriculture: Ten Years of CAP – Results and Future Challenges After 2020, Economics and management of agriculture Magazine, 2/2018, pp. 3-13, Sofia.
[7]Ministry of agriculture and Food, 2019, Strategy for Digitization of Agriculture and Rural Areas in Bulgaria, pp. 7, 10, 25.
[8]National Statistical Institute, 2021 (NIS).
[9]Novikov, I.S., Serdobintsev, D.V., Aleshina, A., E., 2021, Conceptual approaches to information transformation (Digitalization) of an agricultural enterprise, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.21(2):425-436.
[10]Yovchevska, Pl., Krishkova,I., Stoeva,T., Dirimanova,V., Georgiev, M., Dimitrova, D., Mihailova, M., Venev V., 2019, 2019 Studio 'Land relations: theory, practice, perspectives', Institute of Agricultural Economics, Sofia, p.18.
[11]Yovchevska, Pl., Nikolov, D., Chopeva, M., Kaneva, N. et al., 2015, Significance of vulnerable sectors for Bulgarian agriculture, In: Analysis of the sectors with coupled support, pp.20, Institute of Agricultural Economics, Sofia, 2015.