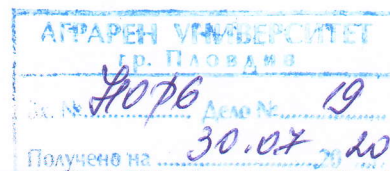


REVIEW



on a dissertation for obtaining the educational and scientific degree "Doctor" in the field of higher education 3. Social, economic, and legal sciences; professional field 3.8. Economics; scientific specialty Economics and Management

Author of the dissertation: Dobri Mateev Dunchev, a full-time doctoral student at the Department of Economics at the Agricultural University, Plovdiv.

Dissertation topic: "Evaluation of innovative technologies in precision agriculture"

Reviewed by: Prof. Dr. Ivan Dimitrov Penov, Agricultural University-Plovdiv, Department of Economics; the field of higher education 3. Social, economic, and legal sciences; professional field 3.8. Economics; scientific specialty "Economics and Management", appointed a member of the scientific jury by order № RD-16-546 / 25.06. 2020 by the Rector of AU

1. Brief introduction of the candidate

The doctoral student Dobri Mateev Dunchev graduated from the Agricultural University of Plovdiv with a degree in Ecology and Environmental Protection - a bachelor's degree in 2005. In 2008 he received a master's degree in Ecology of Settlement Systems, and in 2010 he received a master's degree in Accounting and Control. Since March 2017 he has been enrolled as a full-time doctoral student at the Department of Economics, Faculty of Economics, Agricultural University - Plovdiv.

He has worked for Haygrove LTD, UK, holding various positions from the head of a harvesting group to a labor planning and recruitment manager

He is fluent in English and Russian, which has allowed him to use literature from various theoretical schools.

2. The relevance of the problem

Agriculture is an important sector for the development of the economy in Bulgaria. Digital technologies are increasingly entering all industries, but due to the specificity of technological and social processes in agriculture, the entry here is relatively slow. However, in recent years, farmers are increasingly turning to them. The reasons for

this vary from labor shortages, striving to optimize processes and reduce costs, increased competition, etc. In our country, the process of implementation of digital technologies is relatively poorly studied. In this regard, the topic of the dissertation "Evaluation of innovative technologies in precision agriculture" is relevant for both theory and practice.

3. Purpose, tasks, hypotheses and research methods

The purpose of the study is clearly defined ".... to analyze the technical and economic efficiency of innovative technologies in agriculture, and to assess the possibility of their implementation in Bulgaria with its sector-specific production and institutional conditions ":

The subject of the study is an assessment of the effect of innovative technologies in precision agriculture

The object of study is the soft fruit sector, analyzed by four farms in the UK and one in Bulgaria.

Main hypothesis: the introduction of innovations helps to increase technical and overall economic efficiency

Tasks: Defining the concept of "Sustainable Development" and its manifestation in agriculture; synthesizing theories of innovation policies and their significance for farmers and agricultural systems; clarifying the link between precision farming and sustainable development; presentation of technologies in precision agriculture; adaptation of the research methodology; research in Great Britain and Bulgaria; analysis of the effectiveness of technologies; offering solutions for sustainable development of the Soft Fruits sector in Bulgaria

Research methods: The technical efficiency is analyzed with the indicators of land productivity, and the management of production based on separate parts of the field; average yield, etc. For the analysis of labor resources, the number of seasonal and permanent workers on average for the four years of the study was monitored. The production specialization of the farms is analyzed with the structure of the cultivated crops. Economic efficiency is analyzed with ration income/expenses, gross profit, investment, and production costs. The quality of the finished products is

examined with the share of quality products (which are sold on the market in fresh condition) and share of low-quality products (which are processed or discarded).

Sample size: Five farms were analyzed (four in the UK and one in Bulgaria). The study period is 2016-2019. The analysis is based on tracking the effect of different technologies.

4. Visualization and presentation of the obtained results

The dissertation is in a volume of 218 pages of which: introduction -4 pages; theoretical part - 83 pages; analytical part - 62 pages; constructive part - 25 pages; conclusions and recommendations - 5 pages; literature - 24 pages. The text includes 22 tables and 54 figures. 331 literature sources were used (17 in Cyrillic; 294 in Latin; 20 internet sources).

The dissertation is well structured and includes all the necessary elements.

5. Discussion of the results and used literature

The dissertation includes an introduction, three chapters, conclusions, and recommendations. The introduction presents the relevance of the problem; the purpose and stages of work; the subject and object of the research; the main thesis and research methods.

The first chapter is theoretical. It clarifies the essence of the categories of sustainable agricultural development. Different theoretical aspects of innovation, innovation technologies, the innovation process diffusion in the application of innovations are discussed. The essence of precision agriculture and its components are clarified. Basic technologies in precision agriculture are described. Theoretical concepts are considered in the context of the agricultural sector. The chapter ends with a presentation of the research methodology.

The second chapter is empirical. First, the types of soft fruits, their economic importance, and growing technologies are presented. Second, blackberry growing technologies in the UK have been examined. Third, the blackberry growing technologies in Bulgaria have been examined. The analysis includes the main elements; evaluation of technologies and evaluation of results (investments, revenues, production costs, gross profit).

The third chapter is constructive. It presents the strategies for digital agriculture in the world and Europe. Strategic documents in the field of information and communication technologies in Bulgaria were discussed. The state of digital technologies adoption in Bulgaria and the attitudes of actors was discussed.

The conclusions and recommendations follow from the research.

6. Contributions to the dissertation

The presented work is completed research work. I accept the contributions that the candidate has indicated in the work.

7. Critical remarks and questions

I have the following critical remarks about the presented work:

- The theoretical part can be shortened. In my opinion, some concepts that are not used in the empirical part are considered too deeply. For example, the presented FOC and SOC for optimization of the production process.
- 32 conclusions are drawn in the work. They could be grouped into several more generalized categories.
- In the table of content (at the beginning of the work), the part conclusions and recommendations is missing.
- When using figures directly from other sources, they should be processed with a specialized software to make them clearer. For example - figure 2.1 Precision irrigation systems.
- The conclusions and recommendations are basically what needs to be done, but there is little information on who should do it (some of the conclusions indicate the government) and why it has not been done so far. It would be good to indicate who will do it and how the individual participants in the process would react.

I have the following questions for the doctoral student:

- From the review and analysis of the regulatory documentation, it seems that the framework for the implementation of precision technologies is in place. Why then are the producers in Bulgaria reluctant to use precise technologies?
- Why are small producers even less inclined to use precision technology?
- What is going wrong with the diffusion of precision technologies in Bulgaria?

8. Published articles and citations

Five publications related to the dissertation are presented - 1 independent and 4 co-authored. They have been published in the Trakia Journal of Sciences (2019) of the Thracian University; Agricultural Sciences and Scientific Papers of the Agricultural University - (2019,2020); Problems of Agricultural Economics (2019).

CONCLUSION:

Based on the quality of the work, the applied different research methods and the conclusions made, I believe that the presented dissertation meets the requirements of the Law on the Development of the Academic Staff and the Regulations of the Agricultural University, which gives me a reason to evaluate it POSITIVE.

I allow myself to propose to the Scientific Jury also to vote positively and to award Dobri Mateev Dunchev the educational and scientific degree "Doctor" in the scientific specialty "Economics and Management".

Date 29.07.2020.

REVIEWER:

Plovdiv (Prof. Dr. Ivan Penov)