# DIMITAR A. TSENOV ACADEMY OF ECONOMICS – SVISHTOV

## REVIEW

of dissertation work
for the establishment of an educational and scientific degree „doctor" in the doctoral program „Economics and Management (Agricultural Economics)" of the Dimitar A. Tsenov Academy of Economics - Svishtov

*Author of the review:* Assoc. Prof. Simeonka Alexandrova Petrova, Ph.D., Dimitar A. Tsenov Academy of Economics - Svishtov, Department of Commerce, Scientific Specialty „Economics and Management (Commerce)".

*Grounds for writing the review:* Participation in the Scientific Jury, determined by Order No. 681/10.07.2023 of the Rector of the Dimitar A. Tsenov Academy of Economics – Svishtov regarding an open procedure for the public defense of a dissertation work, by professional direction 3.8. Economics, doctoral program "Economics and Management (Agricultural Economics)", and decision of the Scientific Jury, taken at the first meeting held on 11.07.2023.

*Author of the dissertation:* Elena Dimitrova Tashkova, d020419188, part-time doctoral student at the Department of Agricultural Economics, Dimitar A. Tsenov Academy of Economics - Svishtov.

*The topic of the dissertation:* "Possibilities for applying digital technologies in the agricultural sector".

### I. Information about the doctoral student

Doctoral student Elena Dimitrova Tashkova, d020419188, is studying part-time for a doctorate in the field of higher education 3. Social, economic and legal sciences, professional direction 3.8. Economics, in the doctoral program "Economics and Management (Agricultural Economics)" at the Department of Agricultural Economics, Dimitar A. Tsenov Academy of Economics - Svishtov. Enrollment in doctoral studies is on 01.09.2019 with a designated scientific supervisor Assoc. Prof. Violeta Blazheva, Ph.D. During the study period, the individual doctoral student plan is implemented according to the planned activities. The dissertation has been discussed and referred for defense by the Department of Agricultural Economics.

In 2018, the doctoral student acquires Master's degree in "National Security" at Southwestern University "Neofit Rilski" - Blagoevgrad. The CV submitted by the doctoral student confirms that the developed dissertation research is the result of theoretical knowledge and practical professional experience in the field of implementing programs, measures and schemes for financial support for the development of rural areas. Doctoral student Elena Dimitrova Tashkova has seven years of professional experience corresponding to the topic of the dissertation work. During the period 2016-2023, he successively held the positions of senior expert in the "Implementation of schemes and support measures" department, chief expert in the "Regional Technical Inspectorate" department, chief expert in the "Wine, Promotions and Licenses" department at the State Fund. "Agriculture", Sofia. She has an acquired qualification – computer engineer, computer systems and technologies. The fulfilled professional commitments of the doctoral student are relevant to the topic of the dissertation research and represent a

prerequisite for professional solving of practical cases.

## II. General presentation of the dissertation work

The review was written in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria - LDASRB, the Regulations for the Implementation of the LDASRB and the Regulations for the Development of the Academic Staff at the Dimitar A. Tsenov Academy of Economics - Svishtov. From the documents prepared according to the procedure, it is clear that the dissertation student has the ability to develop independent scientific research and to disseminate the obtained results.

The manuscript submitted for review on the topic "Possibilities of applying digital technologies in the agricultural sector" has a total volume of 185 pages, of which 172 pages are main text. It consists of an introduction, three chapters, a conclusion, references and appendices (13 pages). The main text of the development contains 31 tables and 22 figures. The author refers to 111 literary sources, the majority of them (85) are in Bulgarian, and the rest (26) are in English. Sources are used and cited in good faith. The rules of scientific ethics have been followed in respect of copyright. The dissertation work of doctoral student Elena Dimitrova Tashkova is presented in a form and volume corresponding to the necessary academic requirements for writing.

## III. Assessment of the structure and content of the dissertation

The dissert ability of the presented development is a consequence of the topicality of the researched issues. The scientific question interpreted by the doctoral student is put through the focus of digital technologies and their application in the economy and specifically in the agrarian sector. **The relevance of the topic studied by the doctoral student** is in the scientific and practical benefits of the introduction and application of digital technologies in the agricultural sector, by examining their manifestation and application in agricultural holdings . In the dissertation digital technologies are considered in separate aspects of definition, as socio-technical processes of application of digital innovations necessary to improve the efficiency of use of resources, productivity, profitability and sustainability of agricultural production, as well as optimizing decision-making on digital data management. In a more general sense, digital agriculture is perceived as a consequence of its predecessors precision agriculture and smart agriculture. In the cited study, a number of national, European and international documents are discussed. Economic benefits are sought from the digital transformation of agricultural holdings through a complex unity between technological solutions and management. The arguments presented in this way are a basis for the statement that the dissertation examines an actual scientific problem and has the potential to supplement agrarian economic knowledge in its theoretical and practical aspects.

**The subject of the dissertation development** is digital technologies, which are expected to contribute to increasing the efficiency of processes and lead to the creation of new products and services in the economy, respectively in agriculture, and as a subject - the possibilities of applying **digital** technologies in the agricultural sector. Thus defined, the object and the subject correspond to **the main goal,** which is formulated by the doctoral student quote "... to trace and analyze the application of digital technologies in the agricultural sector".

To achieve the goal, the author defines four **research tasks:** 1) to reveal the essence and distinctive characteristics of digitalization in the economy, respectively in the agrarian sector - a foundation for deriving basic concepts; 2) to develop the methodological

foundations of digital technologies and propose a model for partial testing in the agricultural sector; 3) to analyze the state of digital technologies applied in the agricultural sector; 4) to formulate recommendations for the entry of digital technologies into the agricultural sector.

**The research thesis of the dissertation** is appropriately formulated and argued in the presentation. In the process of research, the dissertation student introduces **restrictive conditions,** which he correctly highlights in the introductory part. The choice of the studied period - 2014-2020, is motivated by the author's understanding of studying reporting years in which the state of digitalization of the agricultural sector is tracked after certain measures.

**The structure of the dissertation** is predetermined by the object, subject, purpose and research thesis defended by the author. **The first chapter** is entitled "Theoretical-methodological foundations of digital technologies". Her presentation is focused on the systematic exposition of leading concepts and theoretical statements about digital technologies. Definitions of basic concepts for the dissertation work are presented. In this research area, relevant examples of: big data (Big Data); cloud computing; social media; Internet of Things (IoT); AI; blockchain. A European ranking of the Member States is being carried out to measure the index of penetration of digital technologies in the economy and society (DESI). In the last paragraph, principle models for introducing the considered technologies in the agricultural sector are presented. Solutions are being sought to overcome the barriers to the implementation of digital technologies in Bulgaria, with the research focus being directed to foreign experience. For a more complete and sufficiently convincing entry of this paragraph, the doctoral student outlines the characteristics of the first Bulgarian Digital Innovation Hub for Agriculture (pages 48-49). In this part of the study, the innovative potential of a digital innovation center in the agricultural sector is presented and appropriately illustrated (p. 50). Each separate paragraph ends with more important conclusions and summaries drawn up by the doctoral student.

**The second chapter** focuses on the study of European and national policies for digital transformation in the agricultural sector. The exhibition begins with a description of the advantages in the field of information and communication technologies at the European level. Special attention is paid to the priority areas of the Digital Single Market strategy and to the opportunities to build digital infrastructure as a prerequisite for digital transformation. In the second paragraph, the dissertation presents a sequence of documents related to the introduction of digital technologies in the economy and in particular in the agricultural sector. In the following third paragraph, the author outlines the methodological framework of the dissertation research, including a graphical representation of the sequence of stages of a model supporting the implementation of digital technologies in agricultural holdings (pp. 90-93). The model thus presented is of key importance for the study and is tested in the third chapter. For the purposes of the model, ONDO Intelligent Automated Control System is investigated Smart Farming of a Bulgarian company for precision agriculture. The theoretical-empirical value of the analysis of the reduced system is in the findings and conclusions reached, built on a sequence of expected benefits of the application. The second chapter concludes by providing arguments in favor of the thesis that for the deployment of digital transformation at the European and national level, a permanent update of the documents for digitization of the economy and, in particular, the agricultural sector, is necessary.

**The third chapter** focuses on testing the digitalization model in the agricultural sector in the period 2014-2020. The presentation highlights the main factors influencing

the introduction of digital technologies in the research sector. The need to determine indicators forming the index for the penetration of digital technologies in the economy and society (DESI) is brought out. Empirical data for the given index within the framework of the European Union and Bulgaria are specified. Of greatest cognitive value in this part of the dissertation development are the author's analyses, evaluations and reasoning regarding the reported values of basic indicators (for human capital, connectivity, integration of digital services and digital public services) and the results achieved by Bulgaria regarding the entry of digital technologies (pp. 102-118). The basis of this paragraph is the comparison of the national position against the European average.

The second paragraph of this chapter presents research results from a partial validation of the agricultural digitization model. The ONDO Smart digital system application is tracked Farming (pp. 119-132). For this purpose, the dissertation examines six farms with practical experience in implementing digital technology, five of which are from Bulgaria and one from North Macedonia. The advantages and benefits, including economic ones, of implementing the reduced digital system are outlined. At the heart of this paragraph, the dissertation presents evidence to support the idea that economically efficient management of resources (human resources, water, energy, fertilizers, etc.), increased yields, and return on investment in agriculture are dependent on the management of processes and activities. by application of digital technologies. The last third paragraph outlines recommendations for increasing the benefits of digital technologies in the agricultural sector.

In **the final part of the dissertation,** the doctoral student systematizes the main conclusions and generalizations reached within the framework of the conducted scientific research, as well as determines possible directions for subsequent author searches.

What has been stated so far gives grounds for **the assessment** that the dissertation meets the requirements for the structure and content of a development of this nature and can be defined as a finished scientific product with sufficiently convincing evidence of scientific results.

**The language** and **writing style** used by doctoral student Elena Dimitrova Tashkova correspond to the standards of scientific expression. The literary sources are used by the author in good faith and correctly.

The author's abstract accompanying the dissertation, in a volume of 38 pages, reflects the content of the dissertation work and the scientific results achieved by the author with the necessary completeness and truthfulness.

**IV. Identification and assessment of scientific and scientific-applied contributions in the dissertation**

The submitted report on the contributions in the dissertation contains four points of contribution, which is in accordance with art. 6, par. 3 of LDASRB. One of the formulated contributions is theoretical, one - methodological, and two - practically oriented. The theoretical contributions are related to: (1) carrying out an analysis of theoretical statements regarding the definition of the concept of digital technologies and offering an author's interpretation. The methodological contribution concerns: (2) a reasoned presentation of a sequence of stages of a developed model supporting the implementation of digital technologies in agricultural holdings.

Contributions of a practically oriented nature are found in: (3) study of the benefits of the implementation of digital technologies, allowing optimization of the management of activities in agricultural holdings; (4) identifying the problems and making recommendations for implementing digital technologies in the economy, respectively in

the agrarian sector.

The contributions indicated by the doctoral student in the dissertation work can be defined as actual and complementary to a certain extent basic theoretical-practical knowledge on a specific researched scientific problem.

### V. Publications and participation in scientific forums

The list of publications of doctoral student Elena Dimitrova Tashkova, presented with the documents, is the basis for the assessment that it meets the minimum national requirements for acquiring the ESD "doctor" according to the order of RILDAS in the Republic of Bulgaria. The doctoral student is the author of 3 independent publications - 2 of them published in the scientific publication Annual Almanac "Scientific Research of Doctoral Students" of the Dimitar A. Tsenov Academy of Economics - Svishtov. The doctoral student participated with 1 independent scientific report in the Bulgarian language in a jubilee international scientific conference.

The reported publications are in refereed editions and disclose more significant results of the conducted dissertation research.

### VI. Detected or undetected plagiarism in the dissertation and abstract

I did not find any signs of plagiarism and incorrect use of foreign texts in the dissertation work and the abstract developed by doctoral student Elena Dimitrova Tashkova. When composing the dissertation, the doctoral student adheres to the rules of scientific ethics. The requirements for bibliographic citation and reference have been met.

### VII. Critical notes and recommendations

I have no significant critical comments on the dissertation submitted for review. I would like to recommend Elena Dimitrova Tashkova, based on the experience and motivation she has, to continue her research in the agricultural holdings of Bulgaria, applying digital systems in the management of the business activities. I also recommend publishing the obtained results in specialized and indexed scientific publications in Bulgaria and abroad.

### VIII. Questions for the dissertation student

Within the framework of the dissertation, the author's position on the following issues is of interest:

1. In the context of the research thesis defended in the dissertation development, what more significant economic effects can be highlighted regarding the relationship "expenditure - income" of agricultural holdings in Bulgaria, applying digital technologies in the business activity?

2. Clarify which more significant factors determine the introduction of digital technologies in Bulgarian farms and which have a limiting impact on this process?

### IX. Conclusion

The presented dissertation work on the topic "Possibilities of applying digital technologies in the agricultural sector" represents a completed scientific study on a current and significant topic for economic theory and practice. The dissertation development is structured according to the academic standards adopted in the country. The scientific work covers the requirements of the LDASRB and the regulations for its implementation.

This gives me the reason with full conviction to vote **"for" awarding Elena Dimitrova Tashkova the educational and scientific degree "doctor"** in professional

direction 3.8. "Economics" in the doctoral program "Economics and Management (Agricultural Economics)" and to propose to the honorable Scientific Jury to make a positive decision.

Date: 01 September 2023          Prepared the review: ...........................
Svishtov                                    (Assoc. Prof. Simeonka Petrova, Ph.D.)