

Opinion

С.А. "Д.А.ЦЕНОВ" - СВИШТОВ
Вх.№ 93.00-20/22.05.2026

by Assoc. Prof. Dr. Monika Veselinova Tsaneva

Regarding the dissertation work for the acquisition of the educational and scientific degree "Doctor" in the scientific specialty "Application of Computer Technology in Economics" at the "D. A. Tsenov" University of Applied Sciences - Svishtov

Author of the dissertation:

Penka Stefanova Chernaeva

Topic of the dissertation:

" Role of the information system in the process of digital transformation of the agricultural enterprise "

I. General presentation of the dissertation:

1. Subject

The subject of the study is "the influence of information systems on the process of digital transformation of the agricultural enterprise and the possibilities for their optimization through modern approaches and technologies." The thesis developed in the dissertation is that "the evolution of information systems in agricultural enterprises from reporting to intelligent and analytical platforms is a determining prerequisite for the implementation of a full-fledged digital transformation of production and management processes." In accordance with this, the author sets as his main goal - "...to study the role of the information system in the process of digital transformation of the agricultural enterprise and to propose a model for optimizing this system to increase efficiency.." and correctly defines the main tasks that must be consistently solved to achieve it. The scope of the study is correctly limited within the boundaries of Bulgarian grain production enterprises.

2. Volume;

The dissertation submitted for review has a total volume of 262 pages, with the main presentation comprising 244 of them, and the rest being appendices. The work is richly illustrated with 34 tables and 33 figures. The volume of the dissertation exceeds the generally accepted for this type of work, but corresponds to the impressive amount of work done, scope and significance of the achieved results.

3. Structure;

The dissertation is structured classically - an introduction, three chapters and a conclusion, with each chapter containing three sub-points and conclusions.

The first chapter sets the theoretical foundations of the development, by analyzing the conceptual model of information systems (IS) and their importance for the digital transition in agriculture and, more specifically, in the field of grain production. Information systems (IS) are considered to be decisive for the efficiency and competitiveness of agricultural enterprises, as they serve as the basis for sustainable production. Digital transformation in the sector is defined as a complex process, which in grain production requires specialized solutions due to the specific needs of the industry. The conclusion is substantiated that despite technological progress, the mass implementation of IS is hindered by serious barriers, which requires better integration, data standardization and increased organizational competence.

In the second chapter a detailed overview of the current state of digitalization in grain production is provided, analyzing the degree of use of modern software platforms and comparing the technological level internationally. Special attention is paid to innovative solutions such as IoT, sensor systems, drones and artificial intelligence, as well as the role of ERP and CRM systems in optimizing management. The direct impact of these technologies on business efficiency is investigated in depth, emphasizing the benefits of automation of

production processes, cost reduction and the importance of big data analysis for making precise management decisions. The main processes that can be subject to digital transformation through the implementation of integrated solutions through innovative technologies are identified.

Chapter three presents an original, functionally complete and technologically robust model for digital transformation in grain production, which combines management, technological and organizational components in a unified architecture of a modular, multi-layered (land, field, communication, integration, business logic/CBD, analytical, interface layer) system, which is simultaneously adapted to Bulgarian conditions and complies with regulatory requirements. A system of agronomic, economic, environmental and operational KPIs has been formulated, which upgrade the proposed model to a management tool with measurable effect. Overall, the developed and empirically tested model offers a comprehensive framework for digitalization, in which the software architecture and implementation methodology are supported by an objective system for measuring effects and empirical evidence for their achievability in a real environment.

In the conclusion, the main conclusions and results of the study are systematized, namely that "digital transformation in grain production is most successful when implemented through an integrated model combining flexible architecture, phased implementation, standardized data and active staff participation." The main guidelines and recommendations for effective digital transformation are also outlined.

The content of the individual parts of the dissertation is logically consistent, well-balanced and excellently illustrated, providing a consistent and logical presentation of the scientific research process and its results.

4. Literature;

For the purposes of the study, 222 books, articles, reports and regulatory documents, including Internet resources, published in the period 1991-2026 in Bulgarian (15) and in a foreign language (207) - mainly in English, 2 in Russian and 1 in Dutch - were studied. The literature review is very detailed and in-depth, covering authoritative and up-to-date sources and provides a good basis for the analyses and developments made in the work. The author demonstrates excellent knowledge of world standards, Bulgarian and European regulations and good practices in the area and the ability to apply them creatively in scientific research.

5. Appendices

The dissertation includes 2 appendices "Production processes in grain production" and "General implementation schemes", containing illustrations of the relevant type, which are referenced in the second and third chapters of the study. The set of materials submitted for review includes the dissertation's CV, references for fulfilling national minimum requirements, for the dissertation's publications, for participation in scientific forums and a declaration of originality and credibility. Judging by the presented work, the publications made, the professional experience and participation in projects, Penka Stefanova Chernaeva has carried out a huge amount of targeted research work in the field of design, development and implementation of information systems as a basic prerequisite for the digital transformation in agribusiness.

II. Assessment of the form and content of the dissertation.

1. Topicality and elaboration of research in the dissertation scientific problem;

In the context of the need for a priority and accelerated digital transformation of Bulgarian agriculture, the topic of the dissertation is very current, it is both practical and applied and has serious scientific potential. It is dedicated to identifying the key prerequisites for effective digital transformation in grain production and creating such through the design, development and testing of a comprehensive model for a multi-layer modular architecture of an innovative system specially adapted to Bulgarian conditions in the industry. The conclusions, generalizations and proposals are based on a very thorough complex analysis of Bulgarian, global and European theoretical and practical achievements, regulations and standards in this area. Judging by the presented work, the publications made, the projects developed with her

participation and her professional experience, Penka Chernaeva has carried out a huge amount of targeted research work in the field of modernization and management of information technologies in the agricultural sector.

2. Language, volume and tools of the dissertation;

The overall impression of the dissertation is that it is an excellently structured result of thorough and conscientiously carried out research. The exposition is very detailed, consistent, logical and appropriately illustrated. The author clearly defines his position on each issue, and the conclusions drawn and the approaches adopted on this basis are excellently motivated.

3. Abstract

The abstract is developed in total volume of 43 pages (including a reference to the contributions of the dissertation work and a list of publications on the dissertation). In terms of structure and content, it fully corresponds to the content of the dissertation work and correctly summarizes the scientific research conducted and the results achieved.

III. Scientific and applied scientific contributions of the dissertation.

I fully accept and highly appreciate the contributions listed in the Statement of Contributions to the Dissertation, but as the most significant among them I would note:

- The developed conceptual framework for the application of information systems in agribusiness, taking into account the specific requirements and challenges facing the digitalization of the agricultural sector.
- The defined system of key performance indicators (KPI) for quantitative measurement of the effects and expected benefits of digitalization.
- The created and tested, original comprehensive model for digital transformation of information systems with a multi-layered architecture and a specific "ground layer", for real-time management and predictive control, which is applicable in the practice of Bulgarian grain production enterprises.
- The created conceptual model for managing land relations using AI, for a "Real Estate Bank" type platform.

As very significant and useful scientific and applied results of the development, I also accept the study of the role of digital transformation for the intelligent grain production enterprise through a systematized model for the use of key modern technologies and their integration into the architecture of the information system, the analysis of the level of digitalization and the use of modern information systems in grain production enterprises, the proposed application and management solutions for digital transformation and recommendations for automation, change management and increasing efficiency .

IV. Dissertation questions.

Some questions can be asked about the development that do not diminish its value, but aim to clarify the prospects for its future application:

- Which of the researched innovative information technologies does the author consider to be the most promising in terms of the effectiveness of digital transformation in the analyzed sector and for what reasons?
- What are the new knowledge and skills that will be required from the specialists who will lead, design and implement the process of digital transformation in the agricultural sector?

V. Summary evaluation of the dissertation work and conclusion.

In conclusion, I believe that Penka Stefanova Chernaeva presented a dissertation based on detailed, thorough and conscientiously conducted research and serious development work, which has been developed at an excellent scientific and professional level. With its scientific and applied scientific contributions, the development can be useful both for future theoretical research in this area and in the practice of IT specialists who will actually plan, implement and manage the processes of digital transformation in the field of grain production, and in the agricultural sector as a whole. The dissertation submitted for review fully meets the requirements of the Act on the Development of the Academic Staff of the Republic of Bulgaria

and the Regulations for the Implementation of the Act on the Development of the Academic Staff of the Republic of Bulgaria. Therefore, I strongly propose to the esteemed scientific jury to award the scientific and educational degree "Doctor" to Penka Stefanova Chernaeva in the scientific specialty "Application of Computing in the Economy".

Date: 21.05.2026

Prepared the opinion:

(Assoc. Prof. Dr. Monika Tsaneva)