REVIEW

by Dr. Vladimir Vassilev Monov,

Professor at the Institute of Information and Communication Technologies - BAS

of a dissertation for the award of the educational and scientific degree **"Doctor"**

in: field of higher education: *4. "Natural Sciences Mathematics and Informatics"*

professional field *4.6. "Informatics and Computer Sciences"*

doctoral program *"Informatics"*

Author: Todor Atanasov Todorov

Topic: "Risk Analysis in the Conditions of Intelligent Agriculture"

Scientific Supervisor: Prof. Dr. Stanimir Nedyalkov Stoyanov, Plovdiv University "Paisii Hilendarski"

1. General description of the submitted materials

By order No. РД-22-1032 of 19.05.2026 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury for conducting a procedure for the defense of a dissertation on the topic "Risk Analysis in the Conditions of Intelligent Agriculture" for the acquisition of the educational and scientific degree "Doctor" in the field of higher education 4. "Natural Sciences, Mathematics and Informatics", professional direction 4.6. "Informatics and Computer Sciences", doctoral program "Informatics". The author of the dissertation is M.Sc. Todor Atanasov Todorov - a doctoral student in full-time study at the Department of "Computer Systems" with scientific supervisor Prof. Dr. Stanimir Nedyalkov Stoyanov from PU "Paisii Hilendarski".

The set of materials presented by Todor Todorov is in accordance with Art. 36 (1) of the Regulations for the Development of the Academic Staff of the University of Plovdiv and includes the following:

– application to the Rector of the University of Plovdiv for opening of the procedure for the defense of a dissertation;
– curriculum vitae in European format;
– protocol of preliminary discussion of the dissertation in the department and a statement of the scientific supervisor on the readiness to open the procedure;
– dissertation;
– abstract in Bulgarian and English;
– list of scientific publications on the topic of the dissertation;
– copies of publications on the topic of the dissertation;
– declaration of originality and authenticity of the attached documents;

– reference of compliance with the minimum national requirements.

The attached documents comply with the regulatory requirements set forth by the Law on the Development of the Academic Staff of the Republic of Bulgaria and the Regulations for its implementation for the acquisition of the educational and scientific degree "doctor".

2. Brief biographical data of the doctoral student

The attached CV shows that in the period 1998-2023 Todor Todorov acquired master's degrees in several specialties, respectively: master's degree in "Computer Technologies" at the "Paisii Hilendarski" University, 1998, master's degree in "International Economic Relations" at the UNWE, 2003 and master's degree in "Pedagogy of Education in Informatics and Information Technologies" at the University of Plovdiv, 2023. He has worked as an expert and team leader in Bulgarian commercial banks, a specialist in computer systems at the Bulgarian Telecommunication Company AD, Plovdiv, as well as a part-time lecturer at the Faculty of Mathematics and Informatics of the University of Plovdiv. Since 2018, he has been a full-time doctoral student at the Department of "Computer Systems" at the "Paisii Hilendarski" University. His research interests are in the field of information technology and computer systems, smart agriculture, analysis and management of financial and technological risks in the agricultural sector.

3. Relevance of the topic and appropriateness of the set goals and tasks

The dissertation work is in the field of modern smart agriculture, and the set goal and tasks include the development of a concept and model for identification and analysis of financial risk in the agricultural sector. It is planned to integrate the model into the smart agriculture platform ZEMELA using agrarian, climatic and financial data. The dissertation topic is in line with modern trends in this area, which require the ever-wider use of information systems and digital technologies for managing agricultural holdings in order to assess, manage and limit the many risk factors in agriculture. The problems being developed are also directly related to the prospects for the development of smart agriculture in our country, enshrined in the Strategy for the Development of Artificial Intelligence in Bulgaria until 2030. All this undoubtedly determines the topical nature of the research conducted and the usefulness of the scientific and scientific-applied results obtained in the dissertation.

4. Knowledge of the problem

The introduction and literature review made in Chapter 1 of the dissertation are presented on 35 pages. An analytical review of scientific research and practices related to financial risk is made, the main types of financial risks are considered and analyzed. The role of digitalization and electronic systems in agriculture is emphasized and existing gaps and challenges in their development and practical application are indicated. The conclusions to Chapter 1 determine the need for integrated

systems that use different types of data and provide a comprehensive framework for financial risk management. New opportunities and modern solutions for risk management in agriculture are outlined.

The review and analysis show a thorough knowledge of the subject and current problems in the research area, on the basis of which the goal and objectives of the dissertation work are formulated in a reasoned manner.

5. Research Methodology

The methodology of the conducted research includes the phased implementation of the following main steps: systematic review and analysis of existing approaches and modern solutions for financial risk management in agriculture, determination of their main advantages and limitations, development of a concept and architectural model for identification of financial risks, based on an event-oriented approach, integration of the developed model into the software platform for smart agriculture ZEMELA. The implemented research methodology fully corresponds to the set goal and specific tasks of the dissertation. The results obtained show that the doctoral student has successfully used the chosen research approach to achieve new results with scientific, applied and practical contribution.

6. Characteristics and evaluation of the dissertation work

The dissertation is 131 pages long and consists of an Introduction, 4 chapters, Conclusion and Bibliography. The text uses 16 figures and 8 tables. The list of literary sources includes 102 titles, including sources from Bulgarian and foreign authors and Internet sites. The list of publications on the dissertation topic contains 2 titles. According to the requirements, a Declaration of originality and authenticity of the results obtained is attached to the materials.

In Chapter 1, financial risk in agriculture is defined and studied, a wide range of risk factors are analyzed, such as market, credit, operational, climate changes and natural disasters. Modern electronic systems and technologies that support the assessment, management and limitation of risks are examined. A concept of a module for identification of financial-risk events in the ZEMELA platform is presented.

In Chapter 2, a classification of many types of financial and agrarian risks in the conditions of the modern business environment is made. Parameters and logical rules for risk identification and assessment, basic objectives and principles for financial risk management are presented.

In Chapter 3, a mathematical model for financial risk assessment is developed, based on specific parameters, indices and assessment intervals. The model allows for assessment of the financial condition and identification of possible financial risks in the enterprise.

In Chapter 4, a prototype of a system for studying financial risk in the field of smart agriculture is developed. The software implementation of the prototype is presented, as well as the results of its testing for risk analysis in examples of companies with different financial risks.

In general, the dissertation work is characterized by a thorough knowledge of the existing approaches and modern systems for identification, analysis and management of financial risk in agriculture. The main result of the dissertation research is the developed conceptual and architectural model for identification of financial risks, based on an event-oriented approach and intended for integration into the software platform for smart agriculture ZEMELA. The obtained author's solutions and results have been tested and analyzed and meet the set goals and objectives.

Each chapter of the dissertation contains the conclusions drawn from the conducted research, and in the final part, the results of the dissertation work are summarized and directions for future research are outlined.

7. Contributions and significance of the development for science and practice

I accept and positively evaluate the contributions of the dissertation work. They are mainly of a scientific and scientifically applied nature, among which the following results can be highlighted.

Scientific contributions:

- A model for identifying financial risks in agriculture has been developed, based on an event-oriented approach and taking into account the cause-and-effect relationships between different types of risks in the agricultural sector.
- A systematization and classification of financial risks in agriculture has been proposed, including a concept for integrating financial, agrarian and climatic factors for describing and analyzing the risk environment in the conditions of intelligent agriculture.

Scientifically applied contributions:

- An architecture of a system module for identifying and analyzing financial risks has been designed, based on event-based data processing. The module is intended for integration into the software platform for smart agriculture ZEMELA.
- A prototype of a system implementing the proposed model and algorithms for analyzing financial risk in agriculture has been developed. The applicability of the system has been demonstrated through appropriate test scenarios for risk assessment in agricultural holdings.

The listed contributions relate to the enrichment of scientific knowledge and practice in the field of intelligent agriculture by creating new and improving existing methods and approaches for analysis, assessment and risk management in agricultural enterprises. The results obtained have useful practical applications and potential for future development through the implementation of the

developed prototype in a real environment, as well as by expanding the set of risk analysis models in order to increase the financial stability of companies and enterprises in the agricultural sector.

8. Assessment of publications on the dissertation work

Two publications in English on the dissertation topic, which are co-authored, are presented. One of the publications was published in 2024, and for the other a document is presented that it was accepted for publication in the proceedings of an international conference in 2026. Both publications are in editions that are referenced and indexed in the Scopus databases, and in one of the publications the doctoral student is the first co-author. The publications reflect essential parts and main results of the research conducted and meet the minimum national requirements and the requirements of the Regulations for the implementation of the law on the development of the academic staff at the University of Plovdiv for the acquisition of the educational and scientific degree "doctor".

9. Personal involvement of the doctoral student

I do not know the doctoral student personally and have no direct impressions of his work. My acquaintance with the dissertation, the abstract and the publications made gives me reason to believe that the dissertation work and its contributions are the personal work of the doctoral student, obtained under the direct supervision of his scientific supervisor. I am not aware of any evidence of plagiarism.

10. Abstract

The abstract is 32 pages long and meets the requirements for its formatting. Its content corresponds to the content of the dissertation and presents the main results of the dissertation work. An abstract of the dissertation in English is also presented in a volume of 30 pages.

11. Critical remarks and recommendations

I have no critical remarks on the substance of the dissertation and the presented results. Of an editorial and technical nature, the following remark can be made.

The scientific and scientifically applied results, representing contributions of the dissertation work, should be formulated in a more systematic and synthesized form, emphasizing the main and most important achievements of the research conducted. Also, the wording "Scientific and scientifically applied results" is used in the text of the dissertation, and "Scientific and scientifically applied contributions" are noted in the abstract, and the corresponding texts in the dissertation and the abstract are not well consistent and refined.

The indicated remark is not on the merits of the work and does not reduce the value of the contributions in the dissertation work.

My recommendation to the doctoral student is to continue the research activity in accordance with the guidelines for future work outlined in the dissertation, as well as to prepare and publish independent publications.

CONCLUSION

I positively assess the scientific research work carried out and the results obtained in the dissertation. The dissertation contains original scientific and applied scientific results that meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the Law and the relevant Regulations of the University "Paisii Hilendarski". The dissertation shows that the doctoral student possesses in-depth theoretical knowledge and professional skills in the scientific specialty "Informatics", demonstrating qualities and skills for conducting scientific research.

I strongly propose to the esteemed Scientific Jury to award the educational and scientific degree "doctor" to Mag. Todor Atanasov Todorov in the field of higher education: 4. "Natural Sciences, Mathematics and Informatics", professional direction 4.6. "Informatics and Computer Sciences", doctoral program "Informatics".

09.06. 2026 Reviewer: …….

/prof. Dr. Vladimir Monov/