ACADEMIC REVIEW

Regarding: competition for obtaining the academic position PhD in:
Field of higher education: 3. Social, economic, and legal sciences
Professional field: 3.8 Economics
Scientific Specialty: Agricultural Economics and Management

Author: Dafinka Vasileva Grozdanova,
part-time PhD student at the Department of Economics,
Agricultural University - Plovdiv

Dissertation topic: **ECONOMIC EVALUATION AND FUTURE PROSPECTS FOR USING UNMANNED TECHNOLOGIES SUPPORTING ECOLOGICAL ORIENTATION AND PRECISION AGRICULTURE IN BULGARIA**

Reviewer: Prof. Toni Bogdanova Mihova, PhD
Technical University of Sofia, Plovdiv Branch
Higher Education Area: 3. Social, Economic, and Legal Sciences
Professional Field: 3.7 Administration and Management
Scientific Specialty: Economics and Management
Appointed as a member of the Scientific Jury by Order No. RD-16.491 / 06.04.2026 issued by the Rector of the Agricultural University (AU).

1. Relevance of the Topic and Appropriateness of the Goals and Objectives Set

Financial, economic, and demographic problems in Bulgaria's agricultural sector generate the need for management changes that lead to higher efficiency, sustainability, and ecological orientation. One of the directions for implementing these changes is the adoption of innovative technological solutions. The advantages of using digital technologies are reflected in more efficient production process management, optimized resource utilization, and mitigation of negative environmental impacts. Despite the potential of digital technologies, issues related to their economic efficiency and applicability in the agrarian sector remain insufficiently researched. This determines the study of economic efficiency, applicability, and development prospects of unmanned technologies, as a tool for sustainable management in precision agriculture, as a highly topical issue from both a scientific and scientifically applied perspective.

2. Aim, Tasks, Hypotheses, and Research Methods.

The aim, research thesis, and tasks of the study are precisely and clearly formulated, in full accordance with the research topic. The methods used include: document analysis, comparative economic analysis, scenario and case-study analysis, economic efficiency evaluation, empirical research through a survey among agricultural producers, as well as statistical and economic-mathematical methods for processing and interpreting the obtained results.

3. Visualization and Presentation of the Obtained Results

The dissertation features a well-balanced structure and consists of an introduction, four main chapters, a conclusion, a list of references, and appendices – totaling 193 pages.

The results are illustrated and presented through 27 tables and 24 figures

4. Discussion of the Results and References

Chapter One clarifies the essence of the key concept of 'sustainable agriculture' as an economic and technological system. The institutional environment in which agricultural holdings operate is examined. The role of science, technology, and innovation in agricultural sustainability is substantiated. The emphasis is on the specific structural characteristics of Bulgarian agriculture, which exert a significant influence on both the sector's sustainability and the opportunities for adopting new technologies. The conclusions in the first chapter determine the need to develop an integrative analytical model to investigate the interrelations between technologies, economic performance, and the institutional environment.

Chapter Two of the dissertation contains the methodological framework and research design of the study, aimed at evaluating the economic efficiency of unmanned technologies within the context of Bulgarian agriculture, with an empirical focus on maize production. The conceptual framework of the study is presented through four interconnected dimensions – economic, environmental, social, and institutional.

Chapter Three provides an empirical evaluation of unmanned technologies by applying a case-study analysis of maize production in Bulgaria. The developed analysis focuses on direct production costs and transaction costs associated with the adoption and use of various technological solutions in maize production. The results of the survey are presented, showing a distinct positive attitude toward the adoption of unmanned technologies in Bulgarian maize production. The most serious barriers remain high costs, insufficient practical experience, and administrative burden. The need for targeted financial incentives, training programs, and regulatory relief is substantiated to support the process of technological adaptation and modernization of agriculture in Bulgaria.

Chapter Four provides a synthesis of the results from the conducted analyses, emphasizing the integration of economic, production, social, and institutional aspects. In this manner, the aim of deriving a comprehensive evaluation of the potential of unmanned technologies and outlining the main directions for their application and development within the context of modern agriculture has been achieved.

The literature review covers 160 references. The cited sources correspond to the main directions of the dissertation. Strategic documents of the European Union have been used, specifically the European Green Deal and the integrated national environmental plans. I believe that the PhD student is well-acquainted with the contemporary state of the researched problem.

5. Contributions of the Dissertation

I accept the presented report on the PhD student's contributions in the dissertation. I highly evaluate the following:

Scientific Contributions:

- Further developed existing approaches, viewing the process of technological adaptation as a complex and multifactorial phenomenon.
- Systematized and enriched theoretical views on the role of the institutional environment in the adoption of innovations in the agricultural sector, within the context of unmanned technologies.
- Hybrid technological integration model developed, combining unmanned technologies with conventional mechanization, in order to achieve a balance between innovation, economic efficiency, and manageable risk.

Scientific and Applied Contributions:

- Assessment tool for unmanned technology applicability developed at the farm level, alongside an economic efficiency evaluation model for adopting unmanned technologies through cost analysis and their optimization potential in agricultural production.
- Recommendations formulated for the sustainable adoption of unmanned technologies at three levels – institutional, sectoral, and farm-level – which can be utilized in developing policies and management decisions.

6. Critical Remarks and Questions

I have no critical remarks or questions. My recommendation to the PhD student is to publish the obtained results in articles for international scientific journals with a high impact factor (indexed in Scopus and Web of Science), which will ensure greater visibility of the achievements.

Question:

1. What is your assessment of the capacity of the participants in the process of adopting unmanned technologies at three levels – institutional, sectoral, and farm-level?

7. Publications and Citations

The PhD student has presented four co-authored publications on the topic of the dissertation.

The presented abstract objectively reflects the structure and content of the dissertation.

CONCLUSION:

Based on the various research methods learned and applied by the PhD student, the correctly conducted experiments, and the formulated generalizations and conclusions, I consider that the presented dissertation meets the requirements of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Regulations of the Agricultural University for its application, which gives me grounds to evaluate it **POSITIVELY**

I strongly recommend that the esteemed Scientific Jury vote positively and award Dafinka Vasileva Grozdanova the educational and scientific degree of **'Doctor'** (PhD) in the academic specialty of Economics and Management (Agriculture).

01.06.2026

Plovdiv

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