REVIEW

by Prof. Dr. Ilin Aleksandrov Savov, PhD, DSc

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

in: field of higher education 9. Security and Defense;

professional field 9.1. National Security

doctoral program National Security

Author: Kostadin Rangelov Bakov

Topic: Cybersecurity as an element of the national security system

Scientific supervisors: Assoc. Prof. Ivan Dimitrov Stanchev, Prof. Dr. Iliya Nikolov Iliev

General description of the materials presented

By Order No. RD-22-1702 of July 18, 2025, of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury to ensure the procedure for the defense of a dissertation on the topic "Cybersecurity as an Element of the National Security System" for the acquisition of the educational and scientific degree "Doctor" in the field of higher education 9. Security and Defense; professional field 9.1. National Security, doctoral program "National Security" at the Department of Political Science and National Security of the Faculty of Economic and Social Sciences. The author of the dissertation is Kostadin Rangelov Bakov, a doctoral student in independent study with academic advisors Assoc. Prof. Ivan Dimitrov Stanchev, PhD, and Prof. Ilia Nikolov Iliev, PhD.

The set of materials on paper presented by Kostadin Bakov is in accordance with Article 36 (1) of the Regulations for the Development of Academic Staff at PU and includes the following documents:

– application to the Rector of PU for the initiation of the procedure for the defense of a dissertation;

– curriculum vitae in European format;

– minutes of the departmental council meeting related to reporting the readiness to open the procedure and preliminary discussion of the dissertation;

– dissertation;

– abstract;

– list of scientific publications on the topic of the dissertation;

– copies of scientific publications;

– list of citations;

– declaration of originality and authenticity of the attached documents.

The doctoral student has published three articles, two of which are co-authored, two in refereed journals, and one in a non-refereed journal.

1. Relevance and significance of the developed scientific problem.

Cyberbiosecurity is an emerging field at the intersection of cybersecurity and biosecurity. The goal of cyberbiosecurity is described as aimed at “the potential or actual malicious destruction, misuse or use of valuable information, processes and materials at the interface of life sciences and digital worlds”. Cyberbiosecurity is part of a system of measures that collectively aim to protect the bioeconomy.

The relevance and significance of the present dissertation work is based on the missing national doctrine, concept and programs for cyberbiosecurity. There are no known scientific publications and developments by other Bulgarian authors on the proposed topic of the dissertation work, examining in detail the aspects of cyberbiosecurity in the context of sharing sensitive databases. Based on the above circumstances, we can formulate the research problem that this work solves: The NS system lacks an element responsible for biosecurity and cyberbiosecurity. Also, there is no structure functionally responsible for protecting biosecurity and cyberbiosecurity, as well as a concept for its provision.

2. Characteristics and evaluation of the dissertation work

The dissertation work is 221 pages long and contains an introduction, six chapters, a conclusion and references. 69 tables and 63 figures are included. The bibliography includes 35 sources in Cyrillic and 160 in Latin. Three author's publications in English are presented on the topic of the dissertation work. The structure of the dissertation is logically constructed and fully meets the stated research goals and the tasks set.

The topic of the dissertation is correctly and precisely formulated - there is a full correspondence between the title and the content of the dissertation work. Along with the above, the research is distinguished by a balanced combination of theoretical knowledge and skills for practical analysis.

The formal and substantive merits of the dissertation research can be summarized as follows:

- Precisely specified object, subject, main goal, tasks of the study, research questions, which are sought to be solved in the process of analysis; the defined tasks are not self-serving and abstract, but also determine the structure of the research;

- The main hypothesis of the dissertation research is clearly formulated - "the development and implementation of an integrated model for cyberbiosecurity, covering legal, technical and organizational aspects, will significantly increase the resilience of the national security of the Republic of Bulgaria against cyberbioattacks and will minimize the risks arising from the sharing of sensitive databases in the context of membership in the European Union (EU)";

- The literature used is satisfactory in terms of volume and time relevance - 195 sources (in Bulgarian and English);

- Correctly stated and used methodological tools, adequate to the research goals: analysis of regulatory, strategic and other documents were used; comparative analysis of theoretical developments and information sources related to contemporary trends, etc.;

- Logical integrity and internal consistency of the analysis, as well as scientific correctness in using literary sources and in citing;

- A significant advantage of the reviewed text is that each chapter ends with summaries and conclusions, thus ensuring a smooth transition to the following parts of the dissertation research.

3. Contributions and significance of the work for science and practice

I accept the contributions of the dissertation work indicated by doctoral student Kostadin Bakov, namely:

1. An analysis of the current state of cyberbiosecurity and its place in the national security system has been carried out.

2. A study of biological weapons has been carried out and a classification has been carried out through the prism of scientific achievements in the field of molecular biotechnology.

3. The dangers and threats have been determined, as well as the degree of risk in cyberbioattacks.

4. The results obtained have been systematized and evaluated and a model of a cyberbiosecurity concept has been proposed.

5. The guidelines for the development and improvement of the activity to counter cyberbioattacks have been determined.

6. An analysis and assessment of the effectiveness of the application of rapid methods for diagnosing diseases as a risk factor for biosecurity has been carried out.

The dissertation work and the contributions received are the work of the author and are the result of in-depth knowledge, creative research, adaptation and further development of contemporary theories and practical approaches.

4. Assessment of publications on the dissertation work

Kostadin Bakov has submitted a reference for the necessary publications in English (3 issues) related to the topic of the dissertation, which reflect essential highlights of it.

The content and style of presentation in the publications are evidence of the personal participation of the doctoral student.

5. Personal participation of the doctoral student

I have carried out the plagiarism check with automatic specialized software, which is an online check for the uniqueness of the text. The check did not establish the presence of plagiarism. No non-anonymous and motivated written signal has been received for the establishment of plagiarism in the dissertation work and/or in the publications on it. The formulated contributions and obtained results are the personal merit of the doctoral student.

6. Abstract

The doctoral candidate has submitted an abstract to the dissertation, which complies with the Law on the Protection of the State from Cybercrime and the Regulations for its application and reflects the main points and contributions of the dissertation.

7. Critical remarks and recommendations

I have no formal basis for making critical remarks to the reviewed dissertation. The research is by doctoral candidate Kostadin Bakov and his opinions, conclusions, suggestions and conclusions are defended correctly and precisely.

I have two recommendations to the doctoral candidate:

- To optimize his future research activities by increasing the evaluation and analytical part;

- To actively participate in national and international forums related to cybersecurity in order to expand his knowledge in the field of cyber resilience.

8. Personal impressions

I know the candidate Kostadin Bakov. His professional career is in the security system. His dedication and professionalism in the field of national security are known to the public, not only in the city of Plovdiv, but throughout the country.

CONCLUSION

Taking into account the significance of Kostadin Bakov's research, the scientific problem, the research approach and the achieved scientific-applied results, I believe that the dissertation represents a completed scientific study that meets the requirements of the Law on the Protection of the Rights of Persons with Disabilities of the Republic of Bulgaria and the Regulations for the Implementation of the Law on the Protection of the Rights of Persons with Disabilities of the Republic of Bulgaria.

The presented scientific work represents an original study with clearly expressed benefits for practice. The educational and scientific goals and tasks set for the doctoral student have been achieved.

Due to the above, I confidently give my **positive assessment of the conducted research**, presented by the above-reviewed dissertation work, abstract, achieved results and contributions, and I propose to the esteemed scientific jury to award the educational and scientific degree "doctor" to Kostadin Bakov in the field of higher education: 9. Security and defense, professional field 9.1. National Security, Doctoral Program in National Security at Plovdiv University "Paisiy Hilendarski", Faculty of Economic and Social Sciences (FISN), Department of "Political Science and National Security".

28.08.2025 Reviewer: .....

Prof. Dr. Ilin Savov, PhD, DSc