O P I N I O N

of dissertation work
for acquiring the educational and scientific degree "doctor"

in the field of higher education – **5. „Technical sciences"**
professional field – **5.3. „Communication and Computer Engineering"**
doctoral program – **„Automated Information Processing and Control Systems"**

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Topic of the dissertation: „Modelling of Data Structuring, Storage, and Processing Operations on the Internet"

Member of the scientific jury: Prof. eng. Stanimir Mihaylov Sadinov, PhD

1. Topic and relevance of the dissertation work

The dissertation examines essential problems related to structuring, storing and processing data on the Internet, which are significant for modern information technologies. The development of effective data management models is of great importance for various areas such as cloud computing, distributed systems and business process automation.

The paper analyses existing methods and architectures for data management on the Internet, considering their efficiency, performance, and scalability. The author identifies the shortcomings of traditional approaches and proposes improvements through a hybrid model that combines the advantages of different approaches for data storage and processing. This is of particular importance for the development of systems for managing large volumes of information, where the optimization of operations is a critical factor.

I believe that the topic of the dissertation is relevant and significant, as it addresses essential issues related to the effective structuring, storage and processing of data on the Internet, which is important for the development of modern information technologies and their application in various digital environments.

2. Research methodology

The dissertation work has applied a purposeful methodological approach, including the analysis of existing methods, the development of models and algorithms, as well as their experimental evaluation. Various techniques for structuring, storing and processing data have been studied, and their advantages and disadvantages have been identified. Particular attention has been paid to methods for optimizing data operations on the Internet, considering both classical and modern approaches. Based on this analysis, established methods for structuring, storing and processing data have been selected, and a hybrid model has been developed on their basis, providing improved productivity and better data organization.

To confirm the effectiveness of the developed model, tests were conducted on data sets with different volumes and structures. Through simulation experiments, key parameters such as access time, resource utilization, processing speed and accuracy of results were investigated. The results obtained allow an objective comparison between different approaches and the formation of recommendations for choosing optimal strategies for structuring and processing data.

The methodology used is designed to ensure the reliability of the study by combining analytical and empirical methods. Through theoretical modelling and experimental verification, the applicability and effectiveness of the developed solutions have been assessed. The results obtained have been used to summarize and derive recommendations that may be useful for future research in this area.

I believe that the methodology used is justified and adequate to the set goals, providing a reliable basis for evaluating the proposed models and their application in practice.

3. Contributions of the dissertation work

The presented dissertation contains original scientific and applied contributions that contribute to the development of methods for structuring, storing and processing data on the Internet. I accept and support the contributions formulated by the author, since they are clearly justified, logically developed and supported by experimental results. The developed models and proposed solutions represent a significant contribution to the improvement of existing approaches in the field. In view of the scientific research work performed, two categories of contributions can be grouped, reflecting the qualities and new aspects in compiling the dissertation.

Scientific and applied contributions:
- An in-depth review of the contemporary literature in the field of modelling, structuring, storing and processing data on the Internet has been conducted.
- An in-depth analysis of architectures for structuring, storing and processing data in a cloud environment was performed, which serves as the basis for the development of sustainable and scalable systems that meet the requirements for database accessibility for a wide range of users.
- A methodology has been developed for the selection and evaluation of models for structuring, storing and processing data, providing a systematic approach for adapting models to specific requirements for structuring, storing and processing data.
- Models for structuring, storing and processing data were evaluated and analysed with an emphasis on the application of the developed methodology for their evaluation. Software tools were used for the analysis, which allow for an objective assessment of critical aspects such as efficiency, sustainability and scalability of the models.
- A hybrid model was created that combines certain functionalities of the selected models, meeting specific requirements for structuring, storing and processing data and ensuring access to the databases by a wide range of users. The developed data flow diagram highlights the effectiveness of the model in various practical scenarios.
- A detailed SWOT analysis of the hybrid model was performed, which confirms the possibilities for integration of the hybrid model into real systems and highlights its flexibility and resilience for different solutions.

Applied contributions:
- A method for optimizing data operations has been developed that integrates best practices and proven techniques for structuring, storing, and processing data. Its applicability has been demonstrated through simulations and tests in real conditions.
- The effectiveness of the proposed hybrid model has been proven through empirical tests. The tests include an assessment of performance, resilience, and scalability.
- Based on the data operations optimization method, a web-based system for structuring, storing and processing data has been developed, which provides opportunities for providing access to databases for a wide range of users. Tests conducted in real scenarios confirm its practical effectiveness.

4. Publications and citations of publications on the dissertation work

The results of the dissertation work have been published in a total of 9 scientific publications, which testifies to their significance and recognition in the scientific community. Of these, 5 have been published in international scientific conferences, and 4 – in national scientific conferences and journals. Some of the publications are indexed in prestigious databases, such as Scopus and Web of Science, which indicates the high level of approbation of the research.

The author has 5 publications in conferences organized by IEEE, which is an indicator of the high quality of the scientific work and its compliance with modern research standards in the field of information technology.

The presence of three citations for some of the publications is an indicator of interest in the developed models and methods by other researchers. This further confirms the significance of the dissertation work and its influence on the development of the relevant scientific topic.

I believe that the author's publication activity is sufficient and meets the requirements for acquiring the educational and scientific degree "doctor".

5. Authorship of the results obtained

The author presents original scientific results that are entirely developed by him. The text clearly distinguishes the doctoral student's own contributions from the existing methods and approaches used. The results obtained are analysed in detail and supported by experimental data, which proves their validity and reliability.

The publications related to the dissertation work are independent or co-authored with the scientific supervisor, with the main contribution to the developments being made by the doctoral student. This fact is confirmed by the comprehensive nature of the research and the logical consistency in the presented scientific achievements.

The presented scientific results are fully original and reflect the independent scientific activity of the doctoral student.

From the author's reference, I did not find any plagiarism by the author in the presented dissertation and the published works to it. I believe that the content and layout of the dissertation and the abstract meet the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the Acquisition of Scientific Degrees and Holding Academic Positions at the Technical University of Gabrovo.

6. Opinions, recommendations and remarks on the dissertation

The dissertation is structured logically and presents a thorough analysis of the issue under consideration. The methodology is well-founded, and the results are clearly argued and supported by experimental data.

Despite the overall completeness of the study, some recommendations can be made. It is possible that in future developments the author will expand the applicability of the proposed models by testing them in different scenarios and environments. In addition, it would be useful to present a more detailed comparison with some alternative approaches to highlight the advantages of the proposed solution.

I recommend that the doctoral student actively participate in the research teams of the Technical University of Gabrovo in international and national projects and publish the results achieved in ranked conferences and journals from the Scopus/WoS databases.

7. Conclusion

The topic of the dissertation is current and well developed. The issues raised and the related research, as well as their justification, are significant and comprehensively described in the paper. In conclusion, the dissertation achieves the stated goal, and the defined tasks are fulfilled at a good scientific level and the dissertation has a complete character.

I believe that the presented dissertation **meets** the requirements of the Act on the Development of Academic Staff in the Republic of Bulgaria. The achieved results give me reason **to propose** that the educational and scientific degree "Doctor" be acquired by **eng. Velin Sabinov Hadzhiev** in the field of higher education - 5. "Technical Sciences", professional field – 5.3. "Communication and Computer Technology", PhD program – "Automated Information Processing and Control Systems"

05.02.2025   *Member of the Scientific Jury:* ……/signature/…………
(*Prof. eng. Stanimir Sadinov, PhD*)