OPINION

by **Prof. Dr. Georgi Petrov Dimitrov** – member of the scientific jury for awarding the educational and scientific degree **"Doctor"** in the professional field **4.6 "Informatics and Computer Science",** PhD program "Informatics" under an announced procedure by the University of Economics – Varna

1. General information

Prepared the opinion: Prof. Dr. Georgi Petrov Dimitrov, Department of Information Systems and Technologies, University of Library Studies and Information Technologies (ULSIT)

Reason: According to the Order of the Rector of the University of Economics – Varna No: RD-06-108/19.06.2025 and the Decision of the first meeting of the Scientific Jury

Author of the dissertation: Yordan Ivanov Yordanov – PhD student in the professional field 4.6 "Informatics and Computer Science", PhD program "Informatics"

Topic of the dissertation: "Cloud Information System for Managing Orders from Customers in a Manufacturing Enterprise"

2. General presentation of the dissertation

The dissertation is 180 pages. Structurally, the work consists of an introduction, a presentation in three chapters, a conclusion and a list of references from 186 literature and Internet sources. 44 figures, 20 tables and 4 appendices are included. The dissertation is well structured and balanced.

The relevance of the dissertation is determined by the tendency for cloud technologies to become a strategic tool for future growth, modernization and digital transformation of manufacturing enterprises. This trend is expected to continue, as cloud platforms provide opportunities for relatively quick implementation of innovative ideas.

The research goal of the dissertation is to design and test a cloud information system for managing orders from business customers, as well as to assess its applicability in a specific enterprise. To achieve the set goal, the following tasks are defined:

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- To study the basic principles of management of order and supply chains, as well as to analyze the problems related to information provision through corporate ERP and SCM systems.

- To propose a conceptual, logical and communication model that will serve as the basis for the architecture of the cloud information system. Models must meet security, scalability, and integration criteria.

- To study basic functionalities that will bring the necessary improvements in terms of order management by business customers.

- To prepare a plan for the implementation of the system and to select appropriate technological means for its implementation. The results of the study should be tested in a manufacturing plant.

3. Publications and participation in scientific forums

The dissertation presents 4 publications on the topic, with which it fully covers the minimal reguirments for awarding the educational and scientific degree of "Doctor", according to Art. 2b, para. 2 and para. 3 of the Law on the Development of the Academic Staff in the Republic of Bulgaria), as well as the Regulations for the Development of the Academic Staff at the University of Economics-Varna.

4. Assessment of the structure and content of the dissertation

The structure and content of the dissertation correspond to the requirements under Art. 34, para. 2 and para. 3 of the Regulations for the Development of the Academic Staff at the University of Economics – Varna. The dissertation consists of an introduction, three chapters and a conclusion, and is 180 pages long, including 44 figures, 20 tables and 4 appendices. The bibliography covers 186 literary sources. It also contains a list of abbreviations used.

In the **Introduction**, the relevance of the studied topic in relation to some modern approaches to the development of cloud applications is presented. The **first chapter** discusses the theoretical foundations, terminology and technologies of cloud systems in the management of customer orders in a manufacturing enterprise. The main problems of information provision are identified, basic components used in the delivery of finished products are presented, as well as the interconnections between different corporate subsystems in the internal supply chain. **In Chapter Two**, a conceptual, logical and communication model is presented to serve for the

modeling and implementation of mobile and web applications aimed at serving business customers. The scope and requirements for the developed system are defined. Use cases and business scenarios that support the design are presented. **Chapter Three** examines application issues related to the implementation of the proposed information system in a manufacturing enterprise, using a leading cloud service provider.

The **dissertation abstract** meets the requirements and correctly reflects the content of the dissertation work.

5. Identification and evaluation of scientific and scientific-applied contributions in the dissertation

I accept the scientific and scientific-applied contributions as follows:

A. Theoretically:

– after a study, a conceptual framework has been developed for streamlining and centralizing procurement management processes through a customized software system configured to a specific enterprise by applying cloud technologies in a domain-oriented architecture;

– conceptual, logical and communication models of a software system have been built, presented visually with the help of established software tools, in order to form a technological model for the application of cloud technologies in a customer order management system.

B. In the applied plan:

– the choice of appropriate software technologies for the physical implementation of the cloud system is justified, and both the technical requirements and the possibilities for integration with the existing subsystems in a real operating enterprise are examined, where the choice includes both programming languages and frameworks, as well as tools that meet the specific needs of the project; – a plan for the construction and implementation of the cloud system has been developed, consistently presenting the different stages of its integration, configuration and testing, which provides an appropriate structure and predictability in the implementation of the project;

– For approbation of the system, an A/B testing strategy has been applied in a real manufacturing plant by performing test procedures that simulate real user behavior in a cloud environment.

6. Established or unestablished plagiarism in the dissertation and abstract

I have not found plagiarism in the dissertation and abstract, as well as the use of incorrect data or incorrect reference to other people's scientific works.

7. Critical notes and recommendations

I have no critical remarks.

8. Questions to the dissertation

I have no questions for the dissertation.

9. Conclusion

The dissertation is an independent author's scientific research with a significant scientific-applied and applied nature. I **positively** assess the contributions of the dissertation work of Yordan Ivanov Yordanov, the results of which have been popularized among the scientific community. I believe that they are scientific-applied and applied and meet the requirements of the ZRASRB and the Regulations for the implementation of the ZRASRB. I recommend that the scientific jury award doctoral student **Yordan Ivanov Yordanov** the educational and scientific degree "doctor" in professional field 4.6 "Informatics and Computer Sciences", doctoral program "Informatics"
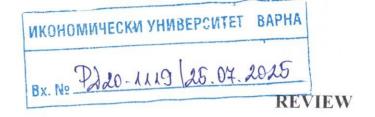
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Sofia

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/Prof. Dr. G. Dimitrov/

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REVIEW

by **Prof. Teodora Ivanova Bakardjieva, PhD, Eng.**
Varna Free University "Chernorizets Hrabar"

of the Dissertation Thesis

submitted for the award of the Educational and Scientific Degree **"PhD"**
Field of Higher Education: **4. Natural Sciences, Mathematics and Informatics**
Professional Field: **4.6. Informatics and Computer Science**
Doctoral Program: **Informatics**, University of Economics – Varna
Author: **M.Sc. Yordan Ivanov Yordanov**
Title: **Cloud-Based Information System for Managing Customer Orders in a Manufacturing Enterprise**
Scientific Advisor: **Prof. Pavel Stoyanov Petrov, Dr. Sc.**

Prepared following Rector's Order No. РД-06-108/19.06.2025 of the University of Economics – Varna

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1. General Characteristics and Relevance of the Dissertation

Yordan Yordanov was admitted to full-time doctoral studies by Order No. РД-17-975/05.10.2021 of the Rector of UE–Varna, under the Department of Informatics, for three years (from 01.09.2021 to 01.09.2024), funded by the state as per Council of Ministers Decision No. 332/14.05.2020. He was granted the right to defend his dissertation by Order No. РД-17-504/01.10.2024.

The dissertation is written in a competent academic style, comprising 180 pages, and structured into an introduction, three chapters, a conclusion, references, and appendices. The research findings are illustrated by 44 figures, 20 tables, and 4 appendices.

The research problem addressed is topical, and the results have practical applicability. The implementation of cloud-based information systems in manufacturing management underscores the relevance and value of the presented study, which demonstrates both scientific merit and current significance.

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2. Review of the Cited Literature

The bibliography includes 186 sources (books, articles, and conference papers), of which 24 are in Bulgarian and 162 in English. Not all entries meet the standards for bibliographic formatting.

The doctoral candidate demonstrates a comprehensive understanding of the state of the art in the domain, possesses in-depth theoretical knowledge, and applies the literature appropriately in conducting the research and interpreting results, reflecting analytical competence and the ability for creative synthesis of known theoretical dependencies.

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3. Contributions of the Dissertation

I concur with the declared contributions of the dissertation and classify them as **scientific-applied** and **applied**.

Scientific-Applied Contributions:

1. Development of an integrated conceptual framework for the rationalization and centralization of customer order management processes through a customized cloud-based system tailored to the specifics of a manufacturing enterprise.
2. Design of conceptual, logical, and communication models based on modern architectural approaches, including Domain-Driven Design (DDD), CQRS, and microservice architecture.
3. Formulation of a technological model employing cloud services (IaaS, PaaS, SaaS) for the creation of an intelligent information system with real-time functionality, mobile and web accessibility.

Applied Contributions:

1. Development and deployment of a customized cloud-based information system. The system was designed, implemented, and tested at a real-world enterprise—*Heidelberg Cement Devnya*—using A/B testing in a controlled environment.
2. Development of web and mobile applications integrated with ERP and SCM subsystems. Interfaces were created for various user roles (dispatchers,

clients, suppliers), based on real business scenarios to enhance operational efficiency.

3. Implementation of IoT functionalities for real-time delivery parameter monitoring. The system collects and processes sensor data (temperature, humidity, GPS) to optimize logistics performance.

4. Development of a monitoring and feedback model using Azure Monitor, enabling systematic and application-level diagnostics for rapid response to anomalies and operational issues.

4. Publications Related to the Dissertation

The doctoral candidate has published three articles and one conference paper based on the dissertation. According to the report on compliance with the **minimum national requirements** for awarding the degree of Doctor in field 4 "Natural Sciences, Mathematics and Informatics" under Art. 2b, para. 2 and 3 of the Act on the Development of the Academic Staff in the Republic of Bulgaria, the candidate has achieved **210 points in Group G**, exceeding the required minimum of 30 points.

The publications reflect key results of the research and demonstrate sufficient academic dissemination. However, no data on citations have been presented.

5. Comments and Recommendations

The dissertation is written in a coherent and academically sound style. The plagiarism check confirms originality. The abstract is concise and well-structured, comprising 35 pages.

Technical remarks and recommendations:

- Some entries in the reference list need to be formatted in accordance with bibliographic standards.
- It is advisable to indicate, for each contribution, the specific section in which it is discussed and substantiated.

6. Conclusion

The above remarks do not diminish the academic and practical value of the research. The doctoral candidate demonstrates solid theoretical preparation in the field, along with the ability to conduct independent research and apply the results in practice.

The dissertation addresses a relevant topic, and the methodologies and models proposed have potential for wide application in various domains. The presented work is a well-developed and thorough study, containing sufficient scientific-applied and applied contributions.

The dissertation fulfills the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the corresponding regulations, and the internal rules of the University of Economics – Varna.

In conclusion, I give a **positive evaluation** of the dissertation and recommend that the Scientific Jury award **Yordan Ivanov Yordanov** the educational and scientific degree **"PhD"** in the professional field **4.6. Informatics and Computer Science**, doctoral program **Informatics**.

Date: 24.07.2025

Reviewer:

/ Prof. Teodora Bakardjieva, PhD, Eng. /

OPINION

by prof. Dr. Julian Vasilev

University of Economics – Varna,

Professor in the professional field 4.6 "Informatics and Computer Science", validated in the register of the academic staff of NACID "Habilitated persons with scientometric indicators"

Author of the dissertation: PhD student Yordan Yordanov

Dissertation topic: Cloud-based information system for customer order management in a manufacturing enterprise

Supervisor: Prof. Pavel Petrov

Primary unit that opened the procedure for defending the dissertation: Department of Informatics at the University of Economics Varna (University of Economics Varna)

Reason for writing the opinion: Order No RD-06-108/19.06.2025 of the Rector of the University of Economics in Varna for opening a procedure for defence and determining the composition of the scientific jury; The first meeting of the scientific jury was held on 30.06.2025.

Professional field: 4.6

Doctoral Program: Informatics

I. General Labour Representation

The work has a total volume of 181 pages.

The object of the study is "the processes in the supply chains in a manufacturing enterprise that offers and supplies its products".

The subject of the study is "methods for rationalisation and automation of business processes carried out through the modern capabilities of cloud platforms and technologies".

The purpose of the work is "to design and approve a cloud information system for managing orders from business customers through the use of mobile and web applications, as well as to assess its applicability in a specific manufacturing enterprise".

The first chapter (53 pages) is entitled "Problems of Information Assurance in the Management of Customer Orders". Terms are discussed in the context of the labour topic, including logistics, supply chains, information flows, reverse logistics, logistics management, supply chain management, ERP systems, SAP, and microservices.

The second chapter (40 pages) is entitled "Architecture of a cloud system for managing customer orders".

The third chapter (40 pages) is entitled "Building and Using a Cloud System for a Manufacturing Enterprise".

Odds from Strike Plagiarism.com. SC1: 4.02%, SC2: 1.55%. Based on the data from the full report from Strike, Plagiarism.com can say that no problematic parts were identified in the manuscript.

The conclusion provides basic conclusions, recommendations, and guidelines for future work.

A reference to the contributions is given.

II. Positive aspects

The literature review is based on reputable sources from recent years. Continuity in the Department of Informatics is ensured – references to publications of colleagues from the Department about the dissertation are included. In addition, colleagues from other departments of the University of Economics-Varna, who have publications in the field of logistics, are also quoted.

The PhD student knows the concepts of informatics and handles them correctly. It gives a clear picture of the existing concepts and models in the supply chains, and their information provision.

Chapter 1 ends with conclusions and generalisations.

The author has a clear vision (and concept) on how to improve the existing order acceptance process in SAP HANA by building additional software modules and using microservices.

To describe the conceptual model of the system, formal means are used – UML diagrams.

The author is familiar with several standards and communication channels, technologies: REST, API Gateway, ASP.NET, micro services.

The author has views on data synchronisation in individual data warehouses.

The description of microservices is made in compliance with formal rules.

A UML diagram of the sequence of a business scenario for executing customer requests is given.

Chapter II ends with conclusions and generalizations.

The third chapter is a logical sequence of the second chapter.

In the third chapter, a reasoned choice of software systems for building the proposed system in the second chapter is made.

Native, hybrid and progressive web applications have been studied in the context of the system being developed.

I consider the development of Fig. 3.6 "Architectural diagram of the software technologies that make up the cloud system" and the explanations to it as a contribution of the author.

As another contribution, I take into account the derived strategies for testing a cloud system (Table 3.6) in the context of the system being developed.

The author has made a calculation of the monthly costs of using a cloud service.

The reference to the publications shows a wide visibility of certain parts of the dissertation.

The submitted publications meet **the minimum national requirements for the PhD degree in the professional field 4.6**.

I accept **the contributions** as achievements of the author.

The abstract (in a volume of 35 pages) presents essential parts of the work.

The PhD student has a profile in Scopus (https://www.scopus.com/authid/detail.uri?authorId=58410159500): 7 publications, 16 citations, h-index: 2. In a positive direction, I report on the scientific supervision of Prof. Pavel Petrov.

III. Observations and recommendations.

The work was submitted and discussed at the Department of Informatics (Minutes 2/03.10.2024; Minutes 12/12.06.2025). During the discussions, a number of notes and recommendations were given aimed at improving the quality of the manuscript. The PhD student has looked professionally – he has taken into account the comments and recommendations given.

IV. Conclusion

I believe that PhD student **Yordan Yordanov** has shown the ability to develop an independent scientific research on the scale of a dissertation. The PhD student is able to handle the latest achievements in informatics and express a personal opinion.

As a member of the scientific jury for awarding the educational and scientific degree of "Doctor", I give my positive assessment of the readiness of the candidate Yordan Yordanov to acquire the educational and scientific degree of "Doctor" in the professional field 4.6.

18.07.2025   Sincerely:
Varna

/Julian Vasilev/