

## REVIEW

of a dissertation by PhD student **Yordan Ivanov Yordanov**, entitled „**Cloud Information System for Managing Customer Orders in a Manufacturing Enterprise**”, submitted for the educational and scientific degree of „**PhD**” in the professional field **4.6. Informatics and Computer Sciences**, doctoral program "Informatics"

**Author of the review:** Assoc. Prof., PhD, Ivan Kuyumdzhev, UE-Varna

**Basis for writing the review:** participation in the composition of the Scientific Jury for the defence of the dissertation according to the Order № ПД 06-108/19.06.2025 and the decision of the first meeting of the Scientific Jury.

### 1. PhD student data

Doctoral student Yordan Ivanov Yordanov is a full-time doctoral student in the Department of Informatics at the University of Varna, studying in the doctoral program "Informatics", his scientific supervisor is Prof. Pavel Petrov, DSc.

Doctoral student Yordanov completed his higher education - respectively in bachelor's and master's degrees, at the University of Economics - Varna. As a full-time student, he took part in the "Review of Student Scientific Activity" at the Department of Informatics, where he demonstrated interest and knowledge in the field of information technologies. He combines his studies with work as a software engineer in various companies.

Over the past 6 years, he has been actively involved in conducting and regularly updating lectures and exercises in the discipline "Hybrid Mobile Applications", conscientiously developing innovative tools to modernize the learning process and respond to the extremely dynamic nature of this discipline.

### 2. General presentation of the dissertation

The dissertation is 180 pages in length and comprises an introduction, three chapters, a conclusion, a bibliography with 186 sources and four appendices. The

language employed is academic and lucid, incorporating professional terminology and a rational style. The illustrative material, which comprises 44 figures and 20 tables, is instrumental in facilitating the comprehension of the information presented. The subject matter is of contemporary relevance and lies at the intersection of theoretical and practical aspects within the domain of cloud information systems.

The subject of the dissertation is of particular interest in the context of the Fourth Industrial Revolution and the growing needs of manufacturing enterprises for integrated, adaptive and scalable solutions for managing customer orders. The doctoral student has identified specific challenges facing enterprises, such as the need for rapid processing of large volumes of data, integration between existing ERP and SCM systems, and the need for adaptation to dynamically changing customer requirements. The dissertation proposes solutions to these issues by applying contemporary technologies – domain design, CQRS, cloud architectures and microservices – to construct a personalised cloud information system. It is imperative to acknowledge the author's comprehensive approach, which encompasses a meticulous integration of theoretical analysis and modelling, culminating in the practical implementation and rigorous testing of the system within a tangible real-world environment.

The Introduction justifies the need for digitalization of business processes in manufacturing enterprises using cloud technologies. The author notes that traditional ERP and SCM systems often do not fully cover the needs of modern supply chains, especially when flexibility, scalability and integration are needed. The main research thesis is that through a personalized cloud system, built using IaaS, PaaS and SaaS models and tailored to the specific needs of a given enterprise, it is possible to significantly improve order management, logistics activities and interaction with business customers.



The object of the study is the processes in the supply chain of a manufacturing enterprise, while the subject of the study is the methods for rationalization and automation of business processes through cloud platforms and modern architectural solutions. Scientific methods such as modeling, comparative and logical analysis, a systems approach and approbation through A/B testing were used.

### **3. General characteristics of the dissertation, assessment of the structure and content**

The initial chapter undertakes an examination of the primary theoretical aspects of ERP systems, domain design, cloud architectures and models such as CQRS and Event Sourcing. The text presents critical analyses and comparisons between different approaches and technologies. The second chapter delineates the architecture of the proposed system through a conceptual, logical and communication model. The models are presented visually and reasonably. The third chapter is dedicated to the practical implementation of the system in a real environment, namely the enterprise "Heidelberg Cement Devnya" AD. The document provides detailed information on the selection of technologies, their implementation, testing and monitoring.

The testing of the developed system in the real production environment of "Heidelberg Cement Devnya" AD represents a significant advantage of the work. The employment of an A/B testing strategy, categorised by roles (business client and supplier), serves to illustrate the practical efficacy and readiness of the system for utilisation in a real-world context. The system is designed to simulate a variety of scenarios, including the creation and modification of orders, real-time monitoring, the utilisation of IoT sensors, and the signing of electronic documents. A quantitative analysis was conducted using data from the SAP ERP subsystem, which demonstrates not only technological integration, but also accountability and control.

The selection of technologies employed – namely, ASP.NET Core, Azure, Cosmos DB, .NET MAUI, Blazor and RabbitMQ – is substantiated and aligned with the objectives of the project. The provision of high performance, scalability and security is guaranteed. The incorporation of a microservice architecture, in conjunction with the application of the CAP theorem (Brewer's theorem), is indicative of a profound level of analysis and technological sophistication. The built model incorporates communication between the user interface, microservices and ERP/SCM subsystems, utilising REST and gRPC. The system incorporates a CI/CD strategy that utilises Docker and GitHub Actions, thereby ensuring a high level of automation and compatibility with DevOps practices.

#### **4. Identification and evaluation of scientific and applied scientific contributions in the dissertation work**

In theoretical terms, a comprehensive conceptual framework and technological model for a personalised customer order management system using cloud technologies have been developed. Conceptual, logical and communication models have been built using principles such as DDD, CQRS and Event Sourcing. In applied terms, a selection of technologies has been justified, and testing has been conducted through A/B tests in a real environment. A phased implementation plan has also been proposed.

It is hypothesised that the contributions are significant and justified. It is predicted that the proposed system, if implemented, will be capable of efficiency, adaptability and a high degree of automation.

#### **5. Publications on the dissertation**

The doctoral student has published three scientific articles and one report, which reflect the results of the research and their approbation. The publications are in accordance with the topic and the minimum national requirements.



## **6. Detected or not detected plagiarism in the PhD thesis and in the abstract**

I do not find any traces of plagiarism in both the thesis and the abstract, as well as in the collateral scientific publications.

## **7. Critical notes, recommendations and questions on the dissertation**

A comprehensive review of the extant research demonstrates that the author has both an in-depth knowledge and practical experience of the subject area under consideration. This has enabled him to construct and present his ideas and solutions in a convincing and professional manner within the framework of this work.

In this regard, the following questions can be posed to the author:

1. The question that arises is how the proposed conceptual framework for an information system can be adapted in an environment where organisational processes are not clearly formalised and are subject to frequent unstructured changes.?
2. Which principles of software engineering are most appropriate when creating a personalized cloud system in a real production environment and how would they be applied or interpreted in a project?

## **8. Conclusion**

The dissertation demonstrates significant scientific and technological value and is a full-fledged example of the application of an interdisciplinary approach, including economic analysis, IT architecture and software engineering. The PhD student has successfully formulated both conceptual models and implemented them in a specific production environment. The work demonstrates independence, analytical skills and a profound understanding of the subject. The doctoral student has demonstrated an aptitude for adapting scientific methodologies to the practical requirements of business, thereby creating a product that possesses inherent value outside the academic environment.

In this sense, the dissertation of Yordan Ivanov Yordanov is an original, complete and balanced study, reflecting a high level of professional training, methodological precision and applicability. The formulated contributions are significant for science and practice. This gives me reason to give a positive assessment of the dissertation and to propose that the degree "PhD" be awarded in professional field 4.6. Informatics and Computer Science, doctoral program "Informatics" to Yordan Ivanov Yordanov.

04.08.2025 г.

Varna

Reviewer.....

(Assoc. Prof. I. Kuyumdzhev, PhD)

Заличена информация съгласно  
ЗЗЛД и регламент (ЕС) 2016/ 679

## REVIEW

by Prof. Miroslav Nikolov Galabov, PhD  
Department of Computer Systems and Technologies,  
Faculty of Mathematics and Informatics  
St. Cyril and St. Methodius University of Veliko Tarnovo  
regarding the

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

Field of Higher Education: 4. Natural Sciences, Mathematics and Informatics

Professional Field: 4.6. Informatics and Computer Science

Faculty: Informatics

Department: Informatics

Title of the dissertation: *"Cloud Information System for Managing Customer Orders in a Manufacturing Enterprise"*

PhD Candidate: **Yordan Ivanov Yordanov**

This review is written and submitted pursuant to Order No. RD-06-108 of 19.06.2025 issued by the Rector of the University of Economics – Varna, as well as based on the decision of the academic jury taken at its first meeting.

### **1. Information about the PhD Candidate**

Yordan Ivanov Yordanov graduated from the University of Economics – Varna in 2018 with a Bachelor's degree in Informatics, and in 2019 he completed the Master's program in Informatics at the same university. Since 2019, he has been working as a software engineer. He was admitted as a doctoral student by Rector's Order No. RD-17-975 of 05.10.2021, with a completion deadline of 01.09.2024.

### **2. General Overview of the Dissertation**

The aim of the dissertation is to design and validate a cloud-based information system for managing customer orders in a business context and to evaluate its applicability within a specific manufacturing enterprise.



Chapter One reviews the theoretical foundations, terminology, and technologies that highlight the importance of cloud systems in managing customer orders in a manufacturing company. As a result of the conducted research, the main problems of information support are identified, the basic components of a product delivery strategy are presented, as well as the interrelationships between various corporate subsystems within the internal supply chain. The necessity of developing a customized cloud management system that processes and provides real-time information on specific orders and deliveries is substantiated.

Chapter Two presents an architectural model aligned with the specifics of customer order management. Conceptual, logical, and communication models have been developed, serving as a basis for modeling and implementing mobile and web applications aimed at serving business clients. The scope and system requirements are defined. Use cases and business scenarios are presented to support the system design process. Configured to meet the specific needs of a manufacturing enterprise, the cloud system manages key processes and activities within the internal supply chain by extracting and analyzing real-time data. Clients receive notifications regarding estimated delivery times or changes in delivery status.

Chapter Three addresses practical aspects related to the implementation of a personalized cloud system for the manufacturing enterprise "Heidelberg Cement Devnya" JSC, located in the town of Devnya, Varna Region. The main characteristics of the company's operations are described, and suitable technological tools for the physical realization of the system are selected, enabling its testing in a real working environment. The system's capabilities and functionalities, monitoring methods, and projected implementation costs are assessed.

A guarantee of compliance with regulatory requirements is the fact that the academic jury, in accordance with its responsibilities, has not identified any violations. I would also like to emphasize that the PhD candidate has obtained the right to defend the dissertation after successfully passing the exams outlined in the individual study plan and following a successful pre-defense, with corresponding recommendations from the Department of Informatics for proceeding to public defense.



### **3. Assessment of the Structure and Content of the Dissertation**

The dissertation includes an introduction, three chapters, a conclusion, a list of publications on the topic, and a list of references – all structured within 180 pages. The topic of the dissertation is relevant and timely. I have no doubt that the PhD candidate has acquired a deep understanding of the subject matter. The total number of cited sources is 186, and the cited literature is well distributed over time. The abstract reflects very well all aspects of the dissertation, particularly the author's claims and contributions. It also achieves a reasonable level of compactness, being presented in 35 pages.

### **4. Identification and Evaluation of Scientific and Applied Contributions in the Dissertation**

Overall, the candidate's scientific achievements lie in the enrichment of existing knowledge and the practical application of scientific results.

#### **The contributions related to the enrichment of existing knowledge include:**

1. A conceptual framework has been developed for rationalizing and centralizing the order management processes through a personalized software system, configured for a specific enterprise through the application of cloud technologies in a domain-driven architecture.
2. Conceptual, logical, and communication models of the software system have been constructed and visually represented using established software tools in order to form a technological model for the application of cloud technologies in a customer order management system.

#### **The contributions related to the practical application of scientific results include:**

1. The choice of appropriate software technologies for the physical implementation of the cloud system has been substantiated, based on a study of both technical requirements and integration possibilities with existing subsystems in a real enterprise. The selection covers programming languages, frameworks, and tools tailored to the specific needs of the project.

2. A plan has been developed for the design and implementation of the cloud system, presenting the various stages of integration, configuration, and testing. This plan ensures an appropriate structure and predictability in the project execution.
3. For the system's validation, an A/B testing strategy has been applied within a real manufacturing enterprise through the execution of test procedures simulating real user behavior in a cloud environment.

## **5. Publications and Participation in Scientific Forums**

There are four publications related to the dissertation topic, of which three are in international scientific journals and one was presented at a conference in Bulgaria. These publications reflect the essential results of the dissertation. It would be beneficial for the PhD candidate to consider publishing in journals or presenting at conferences of even higher prestige in the future. The author does not provide data on citations received, which is understandable at this stage. According to the provided information, each publication was associated with the author's participation in the respective scientific event.

The report confirms that the minimum national requirements for awarding the educational and scientific degree "Doctor" in the field of higher education 4. Natural Sciences, Mathematics, and Informatics, under group of indicators "G", have been fulfilled with a total of 210 points.

## **6. Verification of Plagiarism in the Dissertation and the Abstract**

According to the report from the **StrakePlagiarism** check conducted on 22.04.2025, the results are as follows:

- SC1 (matches with external sources): 4.02%;
- SC2 (matches with internal sources): 1.55%.

Based on these results, no plagiarism has been identified, and the text meets the academic requirements for originality.



## 7. Critical Remarks and Recommendations

It would be advisable to include several screenshots of the mobile application of the information system in the dissertation.

Furthermore, the dissertation lacks the development of a payment system, which is a key component for such types of applications. It is worth noting, however, that this functionality has been outlined as a future task.

It is also recommended that the conclusions at the end of each chapter be numbered to enhance clarity and readability.

## 8. Questions to the PhD Candidate

Please name a few Bulgarian ERP systems.

## 9. Conclusion

In my opinion, the submitted materials comply with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), its implementing regulations, and the Rules for Academic Staff Development at the University of Economics – Varna.

Based on Article 59, paragraph 6 of the aforementioned regulations at the University of Economics – Varna, I propose that the esteemed Academic Jury award the educational and scientific degree "Doctor" to **Yordan Ivanov Yordanov** in the professional field 4.6. Informatics and Computer Science.

10.07.2025 г.

With respect:

(Prof. M. Galabov)

