

## REVIEW

Assoc. Prof. Dr. Julia Dobрева, VUZF

On dissertation for the educational and scientific degree „doctor of sciences”

In area of sciences 3. Social, economic and law sciences

Professional field 3.8. Economics

Doctoral program “*Finance, insurance and social security*”

**Author:** Dr. Maria Borovska

**Topic: Increasing the financial and economic competitiveness of logistics companies using analytical models**

### 1. General description of the submitted materials

With order № 82 from 08.04.2021. of the Rector of the Higher School of Insurance and Finance Assoc. Prof. Dr. Grigoriy Vazov I have been appointed a member of the scientific jury for providing a procedure for defence of a dissertation on the topic “**Increasing the financial and economic competitiveness of logistics companies using analytical models**” for acquiring the educational and scientific degree “Doctor of Sciences” in the field of higher education 3. Social, economic and law sciences, Professional field 3.8. Economics, doctoral program "Finance, Insurance and Social Security" The author of the dissertation is Dr. Maria Borovska.

The materials submitted by the candidate for Doctor of Sciences include documents: CV, list of publications and scientific contributions, reference for fulfilment of the minimum national requirements, abstract, dissertation, publications on the topic of the dissertation.

The candidate has submitted 3 monographs, 3 chapters of collective monographs and 12 articles, 4 of which are co-authored.

Separation protocols for joint publications are not provided.

### 2. Brief biographical data about the doctoral student

Maria Borovska was born on September 28, 1952 in the town of Staleva Vola, Podkarpackie Voivodeship. She graduated from primary school in Staleva Volya - music school I and II degree in

Staleva Volya in the field of piano and violin playing. In 1971 she began her studies at a higher education institution majoring in Mathematics at the Faculty of Mathematics, Physics and Chemistry of the Marie Curie-Skłodowska University (UMCS) in Lublin (currently: Faculty of Mathematics, Physics and Informatics). In 1975 she began parallel studies in Philosophy at the UMCS Interuniversity Institute of Philosophy and Sociology in Lublin. In 1976 she received a master's degree in mathematics from the Faculty of Mathematics, Physics and Chemistry at UMCS in Lublin.

Since 1983 she has been working as a mathematics teacher in various secondary schools (for 19 years) and as a lecturer in higher education institutions: Rzeszow Polytechnic in Staleva Vola, branch of the Catholic University of Lublin in Staleva Vola, Higher School of Commerce school in Kielce - Higher School in Tarnobrzeg (adjunct and associate professor) and at the Academy of Sciences "Spelechnaya" in Lodz (during the academic year 2016/17).

Since 2015 she has been working at the State Higher Vocational School in Tarnobrzeg as a senior lecturer. In 1990-2000 she worked at the Regional Methodological Center in Tarnobrzeg as a methodological assistant in mathematics for secondary school teachers in the former Voivodeship of Tarnobrzeg and collaborated with the Krakow Polytechnic and AGH in Krakow in 1995-2000. in the field of conducting final examinations combined with the entrance examination for these subjects.

In 1989 she completed her postgraduate education in mathematics and computer science at the WSP in Rzeszów.

In 1990 she completed the methodological courses in mathematics in Nowy Sacz.

In 1995 she received a doctorate in economics from the Faculty of Management and Informatics of the Academy of Economics of V.I. Father Langego in Wrocław. Dissertation topic: "Analysis of the functioning of the non-deterministic system of stocks in the economy".

Many times in the course of her professional work she has received various awards. She actively participates in the work of various scientific conferences in Poland and internationally (about 40). She has published about 70 scientific papers.

Since 2015 she has been working as a senior lecturer at the State Higher School named after V.I. Prof. Stanislav Tarnovski in Tarnobrzeg. Maria Borovska has many years of experience in conducting research in the field of economics, which is confirmed by scientific publications and participation in numerous conferences.

### **3. Topicality of the topic and compliance of the set goals and tasks**

The study of the process of management of economic systems is always relevant and necessary to improve their applicability. The dissertation presents a new, innovative methodology for determining forecasts based on the laws of functioning of a logistics system interacting with a service center. The object of the study is a logistics system that maintains a service center. The research task is to check the functioning of the logistics system, which ensures the efficient operation of the service center, which provides increased financial and economic competitiveness of logistics companies. The logistics system analyzed in the work delivers products to the warehouse, which the service center sells to its customers - recipients. The components of the service center are the storage warehouse and the consignee.

The predictions obtained in the dissertation are based on mathematical models, which represent the probabilistic characteristics of the states of the processes occurring in the logistics system, which supports the effective management of the service center.

#### **4. Knowledge of the problem**

The candidate for Doctor of sciences knows the state of the considered problem. The dissertation proposes a new methodology for determining quantitative forecasts, which characterize and describe the management process of the studied logistics system and the supporting work of the service center of the logistics company. The result of the analysis is the author's mathematical model of the system operation in the structural version (presented in the third chapter) and a new author's methodology for determining forecasts for the functioning of the logistics system.

The author successfully defends the thesis: *in order to increase the competitiveness of logistics companies, tools must be provided to improve and support the process of their management.* According to the author, given the penetration of ICT in all processes, it is best to be mathematical tools. In the dissertation as such tools the forecasts for the characteristics of the process, which describe the work of the logistics system, are indicated. These forecasts are built in such a way that they depend on the parameters of the studied logistics system, ie. from the parameters of the production process, the parameters of the transport process and the level of filling of the warehouses.

#### **5. Research methodology**

The chosen research methodology - use of mathematical models and systems of equations for forecasting processes, allows to achieve the set goals and solve the tasks of the dissertation. The problems of the dissertation are mainly related to the issues of increasing the efficiency of the logistics

systems and financial improvement of the economic competitiveness of the logistics companies working in different areas of the economy. The modelling and forecasting approach is used for this purpose.

## **6. Characteristics and evaluation of the dissertation**

The dissertation covers 289 pages with title page, content, introduction, three sections, conclusion and appendices, keywords, list of figures, list of tables, list of used formulas and bibliography.

The sections consist of subsections thematically related to this section. Some subdivisions are divided into special parts - modules. The applications include detailed mathematical conclusions and formulas, leading to the production of specific models describing the functioning of the considered logistics system. The bibliography consists of 165 sources.

The content of the dissertation is appropriately structured and includes the following three sections:

*Section 1 - Theoretical aspects of increasing the financial and economic competitiveness of logistics companies*

*Section 2 - Analysis of the functioning of the logistics system of the enterprise*

*Section 3-Forecasting the functioning of the logistics activities of the enterprise.*

## **7. Contributions and significance of the development for science and practice**

The dissertation highlights the following main scientific contributions:

1. The dissertation presents a new, original and innovative methodology for determining forecasts that support the process of managing the services of a logistics system in order to increase the financial and economic competitiveness of logistics companies.

2. A new methodology for forecasting has been developed on the basis of the laws of operation of a probabilistic logistics system, taking into account the dynamics of its parameters.

3. The regularities of the functioning of the studied logistics system are derived and presented in the form of the obtained analytical models - systems of differential equations, describing the processes taking place in the logistics system and its subsystems.

4. The obtained and implemented model can be used to determine quantitative indicators describing the operation and correctness of the developed test logistics system, as well as to build quantitative forecasts of characteristics describing the operation of this system.

These contributions are important for science and have a strong applied character.

## **8. Evaluation of the publications on the dissertation**

The presented 18 publications, which reflect the results of the dissertation, can be classified as:

- 12 articles, 4 of which are co-authored; 3 of them are in English
- 3 monographs
- 3 chapters from collective monographs

## **9. Assessment of compliance with the minimum national requirements**

The candidate for doctor has attached a certificate for fulfilment of the minimum national requirements for acquiring the educational and scientific degree "Doctor of sciences" in the professional field 3.8. Economics. Based on what is stated in the report, the candidate meets the requirements.

## **10. Personal participation of the doctoral student**

The formulated contributions and results obtained are with the personal participation of the candidate. There is no established plagiarism.

## **11. Abstract**

The abstract is prepared according to the requirements and reflects the main results achieved in the dissertation.

## **12. Critical remarks and recommendations**

The dissertation would have a better comprehensibility and more effective illustration of the effectiveness of the forecast models, if it includes practical research on a specific company (ies), which performs the function of a logistics centre.

During the discussion, Dr. Borovska could answer the following question:

Is it possible to create a software product based on the model and if so, are there other products with similar characteristics and what would make this new software better than existing ones?

### **13. Personal impressions**

I do not know the candidate for Doctor of sciences and I have no personal impressions, but from the presented materials I believe that she is precise, demanding, ambitious and purposeful, with attention to detail and a distinct affinity for research.

### **14. Recommendations for future use of dissertation contributions and results**

I recommend using the dissertation as a basis for publishing a book that reaches a wider range of readers.

### **CONCLUSION**

The dissertation *contains scientific, scientific-applied and applied results, which represent an original contribution to science and meet all the requirements* of the Law for development of the academic staff in the Republic of Bulgaria and the Regulations for application of the law. The presented materials and dissertation results fully comply with the specific requirements of the Regulations for admission and training of doctoral students at the Higher School of Insurance and Finance.

The dissertation shows that the candidate for Doctor of sciences has in-depth theoretical knowledge and professional skills in Professional field 3.8. Economics, demonstrating qualities and skills for independent research.

Due to the above, I confidently give my positive assessment of the research presented by the above-reviewed dissertation, abstract, results and contributions, and *I invite the esteemed scientific jury to award the educational and scientific degree of Doctor of Sciences to* Maria Borovska in the field of higher education 3. Social, economic and law sciences; Professional field 3. 8. Economics; doctoral program "Finance, Insurance and Social security".

23.05. 2021

Referee: Assoc. Prof. Dr. Julia Dobreva