REVIEW

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Of a dissertation for awarding the scientific degree „Doctor of Science"

In area of the higher education 3. Social, economic and legal sciences

Professional field 3.8. Economics

Author: Maria Borovska

Topic: "Increasing the Financial and Economic Competitiveness of Logistics Companies Using Analytical Models"

1. General description of the presented materials

By order № 82/08.04.2021 of the Rector of the Higher School of Insurance and Finance (VUZF) I am appointed as a member of the scientific jury to provide a procedure for the defense of a dissertation on topic "Increasing the Financial and Economic Competitiveness of Logistics Companies Using Analytical Models" for acquiring the scientific degree "Doctor of Sciences" in the field of higher education "3. Social, economic and legal sciences", professional field "3.8. Economics". The author of the dissertation is Dr. Maria Borovska – a candidate in the doctoral program "Finance and Insurance" at VUZF.

The materials submitted by the candidate include: CV, list of publications; dissertation work; dissertation`s abstract in Bulgarian and Russian; summaries of publications in Bulgarian and Russian; reference for fulfillment of the national minimum requirements; reference for the citations; reference for the scientific contributions of the candidate.

2. Brief biographical data about the candidate

Dr. Maria Borovska was born on 28.09.1952 in the city of Stalowa Wola (Poland), where she graduated from a music high school. She holds a Master's degree in Mathematics from Marie Skodowska-Curie University in Lublin. Since 1983 she works as a mathematics teacher in secondary schools and a lecturer in higher schools

and at the Spolje Academy of Sciences in Lodz. She holds a postgraduate degree in mathematics and computer science from the WSP in Rzeszow and a methodological course in mathematics at Nowy Sacz. In 1995 obtained a doctorate in economics from the Faculty of Management and Informatics of the Academy of Economics in Wroclaw. Participates in the development of teaching materials for mathematics teachers. Since 2015 has been working as a senior lecturer at the State Higher School "Prof. Stanislaw Tarnowski" in Tarnobrzeg. She has been awarded many times by various institutions for high results in her work. She actively participates in scientific conferences in the country and abroad. She is an author of about 70 scientific papers.

3. Relevance of the topic and expediency of the set goals and objectives

The axiom that quantitative methods have wide application in practice for optimizing the management of different economic systems is confirmed in the dissertation. Its object and subject *are not* unambiguously defined. In the dissertation`s abstract as an *object* of the research is pointed a logistics system that maintains a services center (p. 4), but in the dissertation this is its *subject* – "logistics system that maintains the service center of the logistic companies" (p. 11). In the dissertation`s abstract this expression sounds more like a task: "to verify the functioning of the logistics system, which ensures the efficient operation of the service center, ensuring the increase of the financial and economic competitiveness of the logistics enterprises (p. 11).

The main *goal* of the doctoral candidate "is to present a new toolkit – an innovative methodology for determining forecasts that provide the management of the service center based on probabilistic analysis of logistics systems activity, which allows to determine two versions of the author`s probabilistic model for the drug activity, i.e. the corresponding systems of mathematical equations" (p. 5). In the abstract of the dissertation this intention appears as a *main task* – "to present a new toolkit – an innovative methodology for determining forecasts, that support the management of the services center, grounded on the analysis of the work of the logistic system, which leads to two variants of recommendations in the proposed in the work probabilistic model of a logistics system, i.e. to the corresponding equations of mathematical systems" (p. 9). In the dissertation it is formulated a little more tersely:

"to present a new quantitative toolkit of preliminary methodology for processes forecasting, i.e. characteristics that provide management of the servicing center" (p. 19).

4. Knowledge of the problem

The candidate has an *excellent theoretical training* and *skills for empirical research* using a rich arsenal of methods and models. Her most important conclusions and suggestions are illustrated with numerous figures and tables.

5. Research methodology

Selected research methodology *allows* achieving the set goal. The forecasts of the processes describing the studied objects are determined with the help of known or newly created models.

6. Characteristics and evaluation of the dissertation

The volume of the dissertation is 289 pages and includes an introduction, three chapters and conclusion. At the end are presented the annexes, keywords, list of figures (67 in number), tables (5), used formulas (over 60) and bibliography of 165 sources in Polish and English.

From the statement in the *first section* it becomes clear that the quantitative (mathematical) models used so far in logistics do not allow the construction of various quantitative characteristics, including forecasts of the operational parameters of tested logistics system, which would lead to "financial and economic improvement in the competitiveness of logistics companies" (p. 91).

The *second section* analyzes the functioning of the logistics system of the enterprise in an aggregate and systematic version. The level of filling the warehouse is controlled by the product delivery process. Its functioning is analyzed in three variants, to which the derived forms of conditional probabilities correspond. The logistics center maintenance system is analyzed assuming a non-critical level of subsystem occupancy and two boundary conditions (barriers). The connection between the boundary conditions of the stocks and the intensity of the process of structural delivery of the subsystem is established (pp. 109-115).

The *third section* examines the possibilities for forecasting the logistics activities in the enterprise. Based on a probabilistic description of the system and the

analysis of the dynamics of the process parameters, three simpler variants of the tested model in aggregate version are described (pp. 116-122). The "bottlenecks" of the logistics system have been identified and a methodology for their calculation has been proposed (pp. 124-146). It includes indicators for estimating the production losses of the contracting entity and the production subsystem, the extent of its use and its marginal conditions. The processes characterizing the functioning of the logistics system are forecasted (pp. 147-165). A probabilistic description of its functioning (pp. 166-174) and a forecast of its essential characteristics have been made (pp. 175-187).

7. Contributions and significance of the research for science and practice

The scientific and practical-applied contributions in the candidate's publications are a result of the application of existing theories for analysis and solution of specific socio-economic problems and for explanation of significant processes with formulated conclusions and recommendations. They could be systematized in the following *areas*:

1. An innovative methodology for the management of the services of a logistics system is presented and the regularities of its functioning are derived in the form of analytical models (systems of differential equations).

2. The application of the logistics system in different spheres of the economy is argued.

3. The use of quantitative tools as a theoretical and methodological basis for computer simulation is justified, with the help of which economic (financial) decision-making processes could be optimized.

8. Evaluation of dissertation publications

On the topic of the dissertation are presented 18 publications (16 individual and 2 collective):

- 3 monographs (2 in Poland and 1 in Bulgaria);
- 3 articles (2 co-authored) – in journals, refereed and indexed in world-famous databases with scientific information;
- 7 articles in national journals;
- 5 scientific reports in papers of national scientific conferences, sessions and seminars;

- 3 publications (articles) in English in scientific papers of VUZF and 15 (monographs, articles and scientific reports) – in Polish.

40 citations of the dissertation publications are declared, including 22 of individual and 18 of collective.

9. Assessment of the fulfillment of the minimum national requirements

There is an *overfulfillment* of the minimum national requirements for obtaining the scientific degree "Doctor of Science" in the professional field "3.8. Economy":

Group of indicators	Content	Minimum requirements (points)	Fulfillment (points)
A	Indicator 1	50	50
B	Indicator 2	100	100
C	Indicator 3	-	-
D	Indicators from 4 to 10	100	510
E	Indicators from 11 to 13	100	360
F	Indicators from14 to the end	-	-

10. Personal participation of the candidate

The dissertation is *entirely* author`s work. All of the cited literature sources and annexes are *correctly* used and / or commented in the exposition of each work.

11. Dissertation`s abstract

The dissertation`s abstract summarizes the content of the dissertation and presents the main research results.

12. Critical remarks and recommendations

First. The object, the subject, the goal, the tasks and the thesis of the dissertation need to be specified.

Second. Instead of the necessary for chapter one (according to its title) clarification of the financial and economic competitiveness of the logistics companies, there dominate the description of the subject and structure of the study, as well as some known statements about the genesis, subject and modern definitions of logistics.

It is not clear what is the candidate's understanding of the concept "financial and economic competitiveness" advertised in the title of the dissertation.

Third. The author's attitude towards digitalization in the field of logistics, which (whether it is warehouse management, transport or production) fundamentally changes the logistics processes, value chains and competitiveness of enterprises, is missing. To what extent will the proposed methodology for forecasting the management of logistics systems impress this "new normality"?

13. Personal impressions

I have no personal impressions of the candidate.

14. Recommendations for future use of dissertation contributions and results

I recommend the candidate to test the results of her research against the changes caused by the digital transformation of the logistics business.

CONCLUSION

The dissertation contains scientific, scientific-applied and applied results that meet all the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation. The presented materials correspond to the specific requirements of the Regulations for admission and training of doctoral students at the Higher School of Insurance and Finance.

I give a positive assessment of the dissertation and propose to the esteemed scientific jury to award Dr. Maria Borovska the scientific degree "Doctor of Science" in the field of higher education "3. Social, economic and legal sciences", professional field "3.8. Economy".

May 19th, 2021

Varna

Signature:

(Prof. Dr. St. Vachkov)