ИКОНОМИЧЕСКИ УНИВЕРСИТЕТ – ВАРНА
СЕРТИФИЦИРАНА СИСТЕМА ЗА УПРАВЛЕНИЕ НА КАЧЕСТВОТО ISO 9001:2015
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OPINION

1. Prepared by:

Prof. D.S. Vanya Kuzdova Banabakova, Ph D - Professor in the field of higher education 3. "Social, economic and legal sciences", professional direction 3.7. "Administration and management", scientific specialty "Organization and management outside the sphere of material production", "Vasil Levski" National Military University, Veliko Tarnovo.

The basis for writing the opinion is: Order of the Rector of the University of Economics - Varna No. RD-06-29/31.01.2025 on the appointment of a scientific jury and Protocol No. 1 of 18.02.2025 from the first meeting of the scientific jury.

2. Information about the competition.

The competition for the academic position of "Professor" is announced in the field of higher education 3. Social, economic and legal sciences, professional field 3.8. Economics, scientific specialty "Quantitative methods in logistics (Inventory management)".

The competition is announced in the State Gazette, issue 105/13.12.2024, for the needs of the Department of "Statistics and Applied Mathematics", at the Faculty of Informatics, University of Economics - Varna.

3. Candidate in the competition.

In the competition for the academic position of "Professor", there is only one candidate - Assoc. Prof. Dr. Tanka Vasileva Milkova from the University of Economics - Varna.

From the submitted certificate it is evident that the candidate **performs the minimum national requirements** for holding the Academic Position "Professor" in the field of higher education 3. Social, economic and legal sciences and the professional field 3.8. Economics, in which the competition is announced, in accordance with Art. 2b, para. 2 and 3 of the Act on the Development of the Academic Staff of the Republic of Bulgaria.

The submitted certificate shows that Assoc. Prof. Dr. Tanka Vasileva Milkova has met the minimum national requirements under Art. 2b, para. 2 and 3, respectively the requirements under Art. 2b, para. 5 of the Law on the Development of the Academic Staff of the Republic of Bulgaria, accordingly the additional requirements of the University of Economics - Varna for holding academic positions.

Assoc. Prof. Dr. Tanka Vasileva Milkova has presented the mandatory independent monographic work on the topic "Models for Optimal Inventory Management in the Logistics System", published in 2023, in a total volume of 188 pages, which extremely fully corresponds to the professional direction and scientific specialty of the announced competition.

The monograph on the topic "Models for Optimal Inventory Management in the Logistics System", under group of indicators V has not been declared in previous procedures for awarding scientific degrees or for occupying the academic position of Associate Professor.

Under groups G and D, she has presented the necessary publications and citations, and under group G she has formed a total number of points of 403.33, with a minimum required of 200 points. Under group D, she has formed 195 points with a minimum required of 100 points. Under group E, the candidate has formed 220 points with a minimum required of 100 points.

This shows that in sections G, D and E the candidate has exceeded the minimum national requirements by double.

With regard to the additional quantitative requirements of the University of Varna, pursuant to Art. 118 (2), item 6 of the Regulations for the Development of the Academic Staff at the University of Varna, on the basis of Art. 2b, para. 5 of the Act on the Development of the Academic Staff of the Republic of Bulgaria, the submitted report shows that the candidate Assoc. Prof. Dr. Tanka Vasileva Milkova exceeds them, as follows:

- Scientific reports – with a minimum number of required points of 60, the candidate has 123.33 points;
- Scientific articles and studies – with a minimum number of required points of 115, the candidate has 132.5 points;
- Publications in Scopus and/or Web of science - with a minimum number of required points of 30, the candidate has 147.5 points;
- Citations in Scopus and/or Web of Science - with a minimum number of required points of 15, the candidate has 195 points;
- PhD students - with a minimum number of required points of 40, the candidate has 60 points;
- Research projects (participation and/or supervision) - with a minimum number of required points of 15, the candidate has 120 points;

By all indicators of the additional requirements of the University of Varna, the candidate Assoc. Prof. Dr. Tanka Milkova has presented a higher number of points, but her achievements in the indicators - publications in Scopus and/or Web of Science, citations in Scopus and/or Web of Science and work on research projects (participation and/or supervision), where the overachievement is from 5 to 13 times, are particularly impressive.

4. Details of the candidate.

The candidate for the Academic position of Professor, Assoc. Prof. Dr. Tanka Vasileva Milkova obtained the Educational and scientific degree "Doctor" in 2012 by defending a dissertation on the topic "Opportunities for optimizing logistics activities in supply chains".

The candidate performs the requirements of Art. 118, para. 2, items 1 and 2 of the Regulations for the Development of Academic Staff at the University of Varna (PRAS).

The candidate Assoc. Prof. Dr. Tanka Milkova obtained the Bachelor's degree in "Informatics" at the University of Varna in 2001. In 2002, she obtained the Master's degree in the same specialty also at the University of Varna.

In 2012, she obtained the the Educational and scientific degree "Doctor" in "Economics and Management (Industry)" at the University of Varna.

She is uses in English and Russian.

In 2002, the candidate took up the academic position of Assistant Professor at the University of Economics - Varna, and during the period 2002 - 2014 she successively held the academic positions of Assistant Professor, Senior Assistant Professor and Chief Assistant Professor in the Department of Applied Mathematics - now Statistics and Applied Mathematics.

In 2014, she took up the academic position of Associate Professor in the Department of Statistics and Applied Mathematics, University of Economics - Varna.

For the period 2015 - 2023, she is the Vice Dean of the Faculty of Informatics, University of Economics - Varna, and from June 2023 to the present, she is the Head of the Department of Statistics and Applied Mathematics, University of Economics - Varna.

The scientific interests of the candidate Assoc. Prof. Dr. Tanka Milkova are in the field of applying quantitative methods in logistics in order to optimize logistics activities, and in particular in the field of inventory and transport management, as well as in the fields of financial mathematics and the study of problems related to mathematics education and mathematical competitions.

5. Description of scientific works.

The candidate Assoc. Prof. Dr. Tanka Vasileva Milkova participates in the competition for the academic position of Professor with 79 scientific publications, systematized by categories, as follows:

- Main monographic work – 1;
- Other monographs - collective – 11;
- Articles - 29;
- Studies – 3;
- Reports – 31;
- Textbooks – 3;

• Teaching aids – 1.

I accept that all scientific works submitted by the candidate for participation in the competition are for review.

I am not aware of any facts that would cast doubt on the authenticity of the works and the contribution of their author. The scientific works submitted correspond to the field of higher education, the professional field and the scientific specialty of the announced competition for the Academic position of Professor.

Of the scientific publications presented, 12 are independent and 67 are co-authored. The publications are in scientific journals in Bulgaria and abroad.

The large number of scientific publications that are referenced and indexed in the world-famous databases of scientific information Scopus and Web of Science is impressive – 10, of which 8 are scientific articles and reports and 2 are studies.

The candidate's scientific and applied scientific activity is in the field of applying quantitative methods in logistics in order to optimize logistics activities, and in particular in the direction of inventory management, optimization of transport activities, optimal distribution of logistics costs, etc. The candidate has also conducted scientific research in the field of applied mathematics and mathematics education.

The analysis of the information provided to me shows that Assoc. Prof. Dr. Tanka Vasileva Milkova closely connects scientific research, scientific applied, teaching and expert activities, which gives me reason to assess the scientific teaching and expert activities of the candidate as meeting the requirements for holding the Academic position of "Professor".

The presented monograph on the topic "Models for optimal inventory management in the logistics system" is developed in a volume of 188 pages and is extremely significant, on the one hand with its scientific nature, and on the other hand with its possibilities for practical application.

The relevance of the monographic work is determined by the extremely important role of effective inventory management for the functioning of the logistics system.

In the monographic work, the author has examined the essence and role of inventories for the logistics system in the sense that they guarantee the normal and continuous implementation of each activity, but on the other hand require significant financial resources and require costs for their management.

This necessitates the search for ways for their optimal management and, accordingly, determines the relevance of the scientific problem and, accordingly, the topic of the monograph.

Effective inventory management in the logistics system requires optimization through the application of certain methods, the most suitable in this direction being quantitative methods.

The monograph is developed on the basis of proving the research thesis that the construction of new models for optimal inventory management in the logistics system and the modification of existing ones can lead to the optimization of various logistics activities in the field of inventories in their real practical application.

To prove the thesis, the author has examined the essence of the methods for classifying the nomenclature of inventory, presented a modified method in this direction, developed according to two criteria, showed the application of ABC - analysis with an integral criterion for the classification of inventories, demonstrated the application of the method with exemplary numerical data and derived appropriate methods for dividing the nomenclature of inventory into groups.

The author has also conducted research on various possibilities for developing new and modifying existing inventory management models for deterministic and stochastic processes.

Appropriate methods for solving cases related to inventory management are also presented and the obtained optimal results are analyzed according to the criterion of minimizing the total costs of inventory management.

To illustrate the presented models and methods for optimizing inventory management and proving the stated research thesis, the author of the monographic work has presented appropriate examples.

The presented monographic work is developed consistently and logically. The author is fluent in the terminology of the issues under consideration. The work is of the necessary quality from a linguistic and stylistic point of view.

In the presented scientific publications of the candidate Assoc. Prof. Dr. Tanka Milkova, there are no texts with different titles but identical content (including foreign language translations of existing scientific works).

The presented scientific works of the candidate Assoc. Prof. Dr. Tanka Vasileva Milkova are in accordance with the requirements of Art. 118, para. 2 items 3-6 in connection with Art. 129 from the Regulations for the Development of Academic Staff at the University of Economics - Varna.

6. Identification of the contributions in the candidate's research work and assessment of the citations of the scientific publications.

The presented scientific works of Assoc. Prof. Dr. Tanka Vasileva Milkova are distinguished by clearly expressed scientific and applied scientific contributions, which are divided into three scientific areas - quantitative methods in logistics (inventory management), financial mathematics and problems related to mathematics education and mathematical competitions.

I accept the scientific and applied scientific contributions presented by the candidate.

In turn, I divide them into scientific and applied scientific contributions in the field of quantitative methods in logistics (inventory management), which are distinguished in the candidate's scientific publications, directly related to the possibilities for optimizing logistics activities and fully corresponding to the professional direction and scientific specialty of the announced competition, and scientific and applied contributions in the fields of financial mathematics and problems related to mathematics education and mathematical competitions, which stand out in scientific publications, examining scientific issues that are not directly related to logistics and the optimization of logistics activities, but indirectly support and influence them.

For some of the contributions, the division into scientific and applied scientific contributions is conditional.

The main scientific contributions in the field of quantitative methods in logistics (inventory management) are:

• The theoretical statements related to the classification of the inventory nomenclature and the models and methods for inventory management in deterministic and stochastic inventory consumption have been further enriched and developed.

• A method has been developed for classifying the inventory nomenclature taking into account two main factors for the activity - the total value of the inventory and the time for making deliveries from inventory.

• A method has been presented for classifying the inventory nomenclature with an integral indicator, which can include in itself with different weights the values of any number of factors influencing the degree of importance of the inventory for the organization's activity.

• A modification of Wilson's model has been constructed, which takes into account the possibility of a variable rate of consumption and an analytical method for its solution has been derived - the model has been developed in two versions: at a constant rate of change in consumption over equal time intervals; and at a constant rate of change in consumption and delivery time intervals.

• A modification of Wilson's model has been developed, which takes into account opportunity costs, which leads to a decrease in the level of inventories, an increase in their turnover and the release of financial resources.

• A nonlinear model has been developed for optimizing inventory management costs under deterministic demand, which has investigated the possibility of constructing the function of total inventory management costs based on available real data on these costs for past periods in order to overcome the difficulties associated with determining adequate values of the necessary parameters.

• The theory of economic and mathematical modeling related to inventory management has been further developed and enriched, and a nonlinear economic and mathematical model for inventory management with an objective function has

been proposed, which aims to ensure maximum profitability, expressed in increasing the profit per unit of inventory.

• The mathematical foundations of the three-index transport problem have been derived, which are important as a basis for developing multi-product models based on a comparative and critical analysis of the leading theoretical statements.

• Additions and extensions to a number of economic and mathematical models have been proposed, which formalize the diversity of possibilities for effective positioning of the units of the logistics system, through the selection of optimality criteria and through the direct inclusion of the technical and economic features of logistics activities in the studied systems.

The main scientific and applied contributions in the field of quantitative methods in logistics (inventory management) are:

• Specific results have been achieved regarding the application of methods for distributing inventories into groups, and in particular the graphical method, and an algorithm has been proposed, through which the boundaries between individual inventory groups can be accurately determined.

• Research has been conducted regarding inventory management models for random demand and possibilities for constructing a law for the distribution of inventory demand with a random nature of consumption have been derived, taking into account the specific features of the environment.

• A possibility has been proposed for the application of a matrix game model in inventory management with random demand and lack of information about the probability distribution of this demand, and the possibility of applying statistical games for choosing an optimal inventory management strategy taking into account the probabilistic nature of the environment has been considered.

• A statement has been formulated and proven, which helps to confirm the existence of a solution to the three-index transport problem and a multi-product production-transport model is constructed, which expresses the compilation of such a program for the production and distribution of different types of products, which takes into account the financial capabilities of producers and consumers and guarantees non-violation of the throughput of the logistics network at minimal total costs for the production and transportation of finished products.

• A methodology is proposed for analytically solving the constructed production-transport problem.

• New approaches for optimal positioning of individual units in logistics systems are derived, which are based on the Heron problem and an approbation with numerical examples of the application of some of the constructed economic-mathematical models is made in order to prove their usefulness.

• Some possibilities for optimizing the allocation of resources are investigated, as: modifications of the well-known multi-stage resource allocation problem are proposed and demonstrations with practical numerical examples in various fields are made; the possibility of carrying out a comprehensive analysis of

the optimal resource allocation problem in the case of a parametric change, both of the coefficients in the constraint conditions and of the coefficients in the objective function; and suitable adapted methods for solving the resource allocation problem.

• Adequate models have been developed and tested, which complement the theory of quantitative methods in logistics, related to the optimal implementation of transport activities, taking into account various specific features of three specific situations, and the possibilities for their practical application have been highlighted.

In the areas of financial mathematics and problems related to mathematics education and mathematical competitions, the contributions are mainly of a scientific-applied nature, as follows:

• Various options for preparing repayment plans and calculating annuities are proposed, based on known mathematical methods, from the point of view of the need for financial institutions to offer diverse and attractive lending conditions to potential users, and some main advantages and disadvantages of these approaches are highlighted, which allow the selection of the most suitable one, according to the individual preferences of users.

• Some specifics are highlighted in the selection of an appropriate mathematical apparatus for evaluating and comparing investments as a means of increasing available cash capital, and a specific possibility for accepting an investment with a negative net present value (NPV) in recessionary conditions is highlighted.

• Theoretical and applied results have been achieved, related to the construction of formulas and ready-made solutions for various specific conditions for deposits with simple and compound interest, and the classical formulas for simple and compound interest with constant parameters have been upgraded, taking into account the possibility of changing the principal amount and the interest rate.

• Positive results have been achieved in terms of enriching the content of textbooks and teaching aids in the direction of applying different approaches in the presentation of theoretical teaching material, with a view to its better comprehension and perception by students, and in this aspect, a number of theoretical statements have been demonstrated with appropriate examples of great practical significance.

• The need for studying various mathematical and statistical disciplines has been argued, some specific features in their teaching and in the choice of a specific method for calculating certain elements have been brought out, and a number of possibilities for applying the acquired knowledge have been presented.

Candidate Assoc. Prof. Dr. Tanka Vasileva Milkova shows the ability to connect scientific research with its practical applicability, good literary awareness,

mastery and successful application of appropriate models and methods for optimizing logistics processes. On this basis, it can be concluded that Assoc. Prof. Dr. Tanka Vasileva Milkova is a teacher, researcher and expert with serious research and scientific-applied activity.

The main personal contribution of Assoc. Prof. Dr. Tanka Vasileva Milkova, which stands out in her scientific publications and fully corresponds to the announced competition in relation to the field of higher education, professional direction and scientific specialty, is expressed mainly in in-depth research, creative understanding and further development of the theory and methodology for optimizing logistics activities, as the candidate develops and proposes new or modified methods, models, algorithms and others for optimization mainly in the areas of inventory management and transport.

I consider the achievements formulated in this way to be significant for science and practice, including the methods and models proposed by it. The contributions are entirely the work of the candidate and are the result of consistent and purposeful scientific research work.

The candidate's scientific publications are obviously of interest to the scientific community, which is clearly evident from the number of **citations.** It is evident that there is a large number of citations, which in total form 195 points, which are only in publications in Web of science and Scopus.

7. Participation in scientific projects and scientific forums.

For the period 2014 - 2023, Assoc. Prof. Dr. Tanka Vasileva Milkova has participated in 6 scientific research projects (SRP). These scientific research projects fully correspond in terms of topics and scientific research to the field of higher education, the professional field and the scientific specialty of the announced competition for the position of Academic Professor.

All projects have been successfully completed, with the set indicators being met, including developed monographic works with the participation of the candidate. Only the project that started in 2023 is currently in the process of implementation.

Assoc. Prof. Dr. Tanka Vasileva Milkova was the leader of two of these projects.

Assoc. Prof. Dr. Tanka Vasileva Milkova is a member of the editorial board of the "Mathematics Plus" Magazine as editor of the "M + Financial Literacy" section.

She has participated in a number of scientific forums in Bulgaria and abroad, such as:

• International Scientific Conference "Information Technologies in Business and Education", EU-Varna, 2014;

• International Scientific and Practical Conference "Ukraine - Bulgaria - European Union: Current Status and Prospects", Kherson and Varna, 2014 and 2015;

• Tenth International Scientific and Applied Conference "Economics and Management of Innovations - Contemporary Theories and Practices", Varna, 2015;

• 4th and 5th International Multidisciplinary Scientific Conference on Social Sciences and Arts - SGEM, 2017 and 2018, Albena, Bulgaria;

• VIII International Scientific Conference "Economy in a Changing World: National, Regional, and Global Dimensions", EU - Varna, 2017;

• Eleventh International Scientific and Practical Conference "Digital Economy and Blockchain Technologies", Varna, 2018;

• International Scientific Conference "Trade 4.0 – Science, Practice and Education", Varna, 2018;

• International Scientific and Practical Conference "Industrial Business and Entrepreneurship – Innovations in Science and Practice". EU-Varna, 2018;

• International Conference "Information and Communication Technologies in Business and Education", Varna, 2019;

• First Scientific and Business Conference on Logistics and Supply Chain Management "Knowledge of Logistics and Supply Chain Management in Bulgaria: Education, Business, Science", UNWE, Sofia, 2019;

• Second Scientific and Business Conference on Logistics and Supply Chain Management. UNWE, Sofia, 2021;

• International Scientific and Practical Conference "Fundamental Preparation in Higher Education", Varna, 2022;

• Round Table "Logistics in Crisis Conditions: Challenges and Solutions", EU-Varna, 2022;

• International Scientific and Practical Conference, Moscow Regional Socio-Economic Institute, Moscow, 2023;

• Roundtable "Industrial Business - Prospects and Opportunities", EU-Varna, 2023 and others.

8. Teaching work.

Assoc. Prof. Dr. Tanka Vasileva Milkova is a lecturer in the Bachelor's and Master's programs at the University of Economics - Varna.

Over the past 10 years, she has taught (lectures and exercises) in the following disciplines at the Bachelor's level: Applied Mathematics (full-time and distance learning), Quantitative Methods in Logistics (full-time) and Inventory Management (full-time).

For the same period of time, she has taught (lectures and exercises) in the Master's level: Quantitative Methods and Operations Research.

For the academic years 2022/2023 and 2023/2024, the total classroom workload of Assoc. Prof. Dr. Tanka Vasileva Milkova is 529 hours equivalent to

exercises in the Bachelor's level, and in the Master's level for the same period of time - 18 hours.

For participation in the competition for the Academic position, Professor Assoc. Prof. Dr. Tanka Vasileva Milkova has submitted 3 textbooks and 1 teaching aid.

The textbooks are as follows: Operations Research - 2015, Applied Mathematics - 2020 and Applied Mathematics - 2021.

The teaching aid is entitled Operations Research - 2016.

The three textbooks and the teaching aid were developed in co-authorship.

The textbook and the teaching aid entitled Operations Research exactly correspond to the professional direction and scientific specialty of the announced competition and are designed to increase the quality of training in the relevant disciplines.

Assoc. Prof. Dr. Tanka Milkova has also participated in the International Educational and Scientific Project on the topic "School of Network Design" at the "Russian Foundation for Fundamental Research "Network Mentoring in Organizing Research Activities of Gifted Students".

Assoc. Prof. Dr. Tanka Vasileva Milkova also carries out other teaching work such as:

• Teaching and theoretical guidance as a scientific supervisor (academic consultant) of a master class on innovative teaching approaches, implemented under the project "Qualification of Pedagogical Specialists", 2024.

• Lecturer in trainings of pedagogical specialists, carried out by the Institute for Educational Policies "Archimedes and Diogenes" EOOD in "Financial Mathematics" and "Combinatorics and Probability" - 2020, 2021.

• Lecturer in summer schools at the "Minyu Balkanski" Foundation in "Fun Mathematics" and "Financial Mathematics" - from 2020 to present.

• Lecturer in a summer school with outstanding students from the "European Kangaroo" competition - from 2020 to present.

• Delivering lectures on "Financial Mathematics" to students from the "Ivan Vazov" High School of Natural Sciences and Mathematics, Dimitrovgrad as a guest lecturer.

Assoc. Prof. Dr. Tanka Milkova regularly participates in compiling, adapting and editing tasks and solutions included in the competition topics in various mathematical olympiads and competitions at the national and international level, in order to assist students in the process of their preparation in mathematics for exams and olympiads.

Assoc. Prof. Dr. Tanka Milkova has compiled tasks for national competitions in financial literacy, some of which have been published in the specialized column "Tasks M+" of the Mathematics Plus Magazine.

Assoc. Prof. Dr. Tanka Milkova works actively with doctoral and graduate students.

She was the scientific supervisor of two doctoral students who acquired the Ph D Degree, as well as of two doctoral students who were dismissed with the right to defend their thesis. She participated in examination committees for conducting doctoral minimums and conducting doctoral candidate exams. She works actively with doctoral students on research projects.

In the specialty Logistics, Assoc. Prof. Dr. Tanka Milkova was the supervisor and reviewer of the diploma theses of students in the Bachelor's Degree Program.

She also actively supervises students from the University of Economics of Varna for participation in the "National Student Mathematics Olympiad".

In 2024, Assoc. Prof. Dr. Tanka Milkova developed the following curricula for the needs of the University Economics of Varna in:

• For Bachelor's Degree Program - Applied Mathematics, full-time study; Applied Mathematics (in English), full-time study.; Applied Mathematics, distance learning; Quantitative Methods in Logistics, full-time study; Financial Mathematics, full-time and part-time study;

• For Master's Degree Program - Project Risk Management, full-time and part-time study.

The curricula developed by the candidate are at a high theoretical level and reflect the fundamental theoretical propositions of the leading authors in the relevant fields, as well as the candidate's views on education in the relevant discipline.

9. Others.

Assoc. Prof. Dr. Tanka Vasileva Milkova, in addition to teaching and research work, is also involved in administrative activities and holds leadership positions as Vice Dean and now Head of Department at the University of Economics -Varna.

The candidate also has a number of other appearances in various fields such as:

• Member of a team on a project for organizing and conducting the "Financial Mathematics Olympiad for Students" at the University of Economics - Varna, funded by the Municipality of Varna - from 2022 to the present.

• Member of the "European Kangaroo" association.

• Participation in the General Assembly of the international mathematical competition "European Kangaroo" in 2024, held in the city of Santos, Brazil.

• Member of the National Commission, appointed by Order of the Minister of Education of the Republic of Bulgaria, for the mathematical competition "European Kangaroo" and participation in the compilation of competition topics.

• Member of the National Commission, appointed by Order of the Minister of Education of the Republic of Bulgaria, for the competition "Financial Literacy" and participation in the preparation of competition topics.

• Member of the expert group on the procedure for program accreditation of the professional field 3.7. "Administration and Management" at the "D. A. Tsenov" Economic Academy in 2019 and others.

10. Plagiarism.

I have no doubt about plagiarism in the candidate's scientific publications, the use of incorrect data in them and incorrect references to other people's scientific works.

11. Questions to the candidate. Critical remarks to the candidate.

I have no questions or critical remarks to the candidate.

12. Conclusion.

Considering the scientific works and pedagogical qualities of the candidate, their contributions and significance for science and practice, as well as the fulfilled national minimum requirements for holding the Academic Position "Professor", the Act on the Development of the Academic Staff of the Republic of Bulgaria and the Regulations for its Implementation, as well as the additional requirements of the University of Economics - Varna, I express a positive opinion on the works and propose Assoc. Prof. Dr. Tanka Vasileva Milkova to hold the Academic Position "Professor" in the field of higher education 3. Social, Economic and Legal Sciences, professional field 3.8. Economics and scientific specialty "Quantitative Methods in Logistics (Inventory Management)" for the needs of the Department of "Statistics and Applied Mathematics", Faculty of "Informatics", University of Economics - Varna.

As a recommendation and wish for the future scientific research work of the candidate, it is to continue the development of theoretical statements and scientific and applied research in the field of optimization of logistics activities, which are of exceptional importance for the development of logistics in a scientific and appli aspect.

Member of the scientific jury:

/Prof. D.S. Vanya Banabakova/

15.03.2025

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OPINION

for a competition for professor in the professional field 3.8 Economics, scientific specialty "Quantitative Methods in Logistics (Inventory Management)", announced in the State Gazette No. 105 / 13.12.2024 for the needs of the University of Economics - Varna, Department of Statistics and Applied Mathematics with a single candidate Assoc. Prof. Dr. Tanka Vasileva Milkova.

Opinion by: Prof. Dr. Vladimir Sulov,

from the University of Economics – Varna,

member of the scientific jury of the competition according to Order RD 06-29 / 31.01.2025 of the Rector of the University of Economics – Varna and appointed to prepare an opinion at a meeting of the jury held on 18.02.2025.

I. Competition candidate

The only candidate in the competition is Assoc. Prof. Dr. Tanka Vasileva Milkova, who graduated with a bachelor's degree in 2001 and a master's degree in 2002 at the University of Economics – Varna, majoring in Informatics. In 2002 she joined the Department of Mathematical Sciences (now called Statistics and Applied Mathematics) at the University of Economics – Varna. Later she became a senior and chief assistant. In 2009 she was enrolled in a doctoral program, and in 2012 she defended and received a PhD degree in Economics and Management (Industry) with the topic of her dissertation "Opportunities for optimizing logistics activities in supply chains". In 2014 she

won a competition for Associate Professor at the Department of Statistics and Applied Mathematics in PF 3.8 Economics, scientific specialty "Economics and Management (Quantitative Methods)".

II. Scientific papers, research work and contributions of the candidate

In the competition for Professor Assoc. Prof. Dr. Tanka Milkova presents a total of 75 scientific publications, including:

- 1 single-authored monograph (habilitation work) and participation in 11 more collective;
- 3 studies, of which 1 is single-authored;
- 29 articles, of which 6 are single-authored;
- 31 reports, of which 4 are single-authored.

In addition to scientific publications, the candidate has participated in 4 textbooks and teaching aids.

The main monographic work of Assoc. Prof. Dr. Tanka Milkova "Models for optimal inventory management in the logistics system" has a volume of 187 pages, including an introduction, 3 chapters, a conclusion and a list of references from 128 sources.

In the preface, the author briefly justifies the relevance of the problem by pointing out the need for "the application of scientifically based approaches to inventory management in the logistics system". In this regard, the thesis of the monograph is that "the construction of new models for optimal inventory management in the logistics system and the modification of existing ones can lead to the optimization of various logistics activities in the field of stocks in their real practical application". The object of the study is "economic and mathematical

models for optimization of activities related to inventory management in the logistics system", and the subject is "the possibility of constructing new and modifying existing ones, which will lead to optimal results in inventory management". The goal of the work is "by constructing new and modifying existing models and methods for their solution, to supplement and further develop the theoretical and methodological base, on the basis of which optimal inventory management in the logistics system is carried out." 3 tasks are defined to achieve the goal. I accept the thesis, purpose, object and subject as suitable for monographic research.

Main positive aspects of the work:

The topic of using mathematical models and optimization in economics is always relevant as far as it could contribute to increasing the efficiency of business functioning. In particular, the issue of stock management is also relevant, especially in the context of globalization and increased competition.

The author shows that she is competent in the issues under consideration and the presented models, formulas, transformations and solutions are correct.

New and improved methods, models are proposed, some original application options are indicated.

As a critical note to the monograph, I would point out the lack of a closer connection with contemporary economic practice.

The rest of the author's scientific publications concern a variety of topics, which can nevertheless be consolidated on the following main topics:

- quantitative methods in logistics and inventory management (as well as in the main monograph);
- financial mathematics;
- application of mathematical methods in other areas of the economy;

- problems of education;
- some "pure" mathematical problems, etc.

10 of the publications are in journals indexed in Scopus and/or Web of Science. Almost all other scientific publications are indexed in other databases.

At the time of submission of the documents, the publications have been cited a total of more than 80 times, of which 13 times in Scopus and/or Web of Science.

The following main directions can be indicated in the contributions in the publications of Assoc. Prof. Dr. Tanka Milkova (according to the reference presented by her; consolidated by me, and some of them already indicated in the main monograph):

1. New and improved methods, models, original possibilities for application in the field of quantitative methods in logistics.
2. Proposals and improvements in the field of application of mathematical methods in finance, incl. in deposits, lending, investments, etc.
3. Studies of education problems, and the results are mainly in the direction of enriching the educational content, new algorithms and tasks, analysis of specific features.

Assoc. Prof. Milkova has supervised two successfully defended PhD students (one under joint supervision) and two more with the right to defense. She has participated in 6 scientific projects and led 2 of them. She is a member of the editorial board of the magazine. "Math Plus".

III. Teaching and other activities of the applicant

Assoc. Prof. Dr. Tanka Milkova has 23 years of experience as a full-time lecturer, incl. 11 years as an associate professor. For each of the school years, she has over 400 hours of classroom workload equated to exercises.

In the recent years, she has taught classes in many disciplines such as "Applied Mathematics", "Quantitative Methods in Logistics", "Inventory Management", "Quantitative Methods", "Operations Research", and in previous years – many others.

She has participated in 4 textbooks and teaching aids, she has participated in the development of several curricula in various disciplines.

Assoc. Prof. Milkova has an active administrative and other activity. In the period 2015-2023, she was Deputy Dean of the Faculty of Informatics at the University of Economics – Varna, and since 2023 she has been Head of the Department of Statistics and Applied Mathematics. She participates as a lecturer in a number of trainings, schools, public events, etc. in the country and abroad, and is a member of committees and juries of numerous competitions.

IV. Critical notes and recommendations

As a note to the materials presented, I will express the opinion that some of the so-called monographs (from No. 6 to No. 15 in the general numbering), although they correspond to such in volume and form, are in fact rather educational materials in which there are no scientific novelties. But anyway, they do not play a significant role in the competition and, even if they are considered as textbooks or teaching aids, they do not change my final grade, since the candidate and the achievements continue to meet the necessary requirements.

V. Compliance assessment and conclusion

In conclusion, I can summarize the compliance of the candidate's achievements with the mandatory requirements of the Academic Staff Development Act in the Republic of Bulgaria, the Regulations for the Implementation of the Academic Staff Development Act in the Republic of Bulgaria, including the minimum national requirements, and the Regulations for the Development of the Academic Staff at the University of Economics – Varna.

With regard to the requirements of the Law on the Protection of Persons with Disabilities Act and the Rules for its Application:

The candidate has the educational and scientific degree of "Doctor".

The candidate has held the academic position of associate professor for more than 2 academic years.

The candidate has submitted a monographic work, as well as other publications in specialized scientific journals.

The candidate meets and exceeds the minimum national requirements for the academic position of "Professor" in the professional field 3.8 in terms of all categories and in general.

No plagiarism was detected.

With regard to the additional requirements in the Regulations for the Development of the Academic Staff at the University of Economics – Varna:

The main monographic work was published in a specialized scientific publishing house, and was discussed in advance in a department and was reviewed by two habilitated persons.

The applicant also fulfils the other minimum quantitative requirements regarding publications and citations.

The candidate has participated in at least one research project and has supervised at least one successfully defended PhD student.

In view of the above, I consider that the candidate meets the requirements of the Academic Staff Development Act in the Republic of Bulgaria, the Regulations for the Implementation of the Academic Staff Development Act in the Republic of Bulgaria and the Regulations for the Development of the Academic Staff at the University of Economics – Varna. Based on this, and also on the basis of all the real achievements of the candidate, I recommend to the esteemed jury to award the academic position of "Professor" in the professional field 3.8 Economics to Assoc. Prof. Dr. Tanka Vasileva Milkova.

24.03.2025

Varna

Opinion by:

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

(Prof. Dr. Vladimir Sulov)

Statement of opinion
by ~~competition~~ for the academic position "Professor",
announced by the University of Economics - Varna

1. General information

Statement of opinion written by: Prof. Svetlana Raycheva Dimitrakieva, PhD, Technical University – Varna, department "Industrial management"

Reason for writing the statement of opinion: The statement of opinion is written according Order RD-06-29/31.01.2025 of the Rector of the University of Economics - Varna for appointing a scientific jury by competition for the academic position "Profesor" and the decision of the scientific jury from 18.02.2025 for electing the chairman and its members who need to submit reviews and statements of opinion.

2. Information about the competition

The competition for the academic position of "Professor" in the field of higher education 3. Social, Economic and Legal Sciences, professional field 3.8. Economics, scientific specialty "Quantitative Methods in Logistics (Inventory Management)" is announced in the SG no. 105/13.12.2024 for the needs of the Department of Statistics and Applied Mathematics, Faculty of Informatics at the University of Economics - Varna.

3. Information about the candidate in the competition

Associate Professor Tanka Vasileva Milkova from the department of Statistics and Applied Mathematics at the University of Economics - Varna is the only candidate in the announced competition. She presents documents and evidence certifying the complete fulfilment of the minimum national requirements for the academic position "Professor" in professional field 3.8. Economics, as per Article 2b, paragraphs 2 and 3 of the Academic Staff Development Act in the Republic of Bulgaria (ASDA) and the Regulations for its Implementation (RASDA), as well as the additional quantitative requirements of the University of Economics - Varna, as per Article 2b, paragraph 5 of ASDA.

4. Information about the competition

Assoc. Prof. Tanka Milkova, PhD holds a Bachelor's degree and a Master's degree in Informatics from University of Economics - Varna. In 2012 she obtained her PhD in professional field Economics and Management (Industry). The topic of

her dissertation is "Opportunities for optimization of logistics activities in supply chains". From October 2002 to June 2014 she successively held the academic positions of Assistant Professor, Senior Assistant Professor and Chief Assistant Professor in the department of Applied Mathematics (now Statistics and Applied Mathematics). Since 01.07.2014 until now she holds the academic position of "Associate Professor" in the professional field 3.8. Economics, scientific specialty "Economics and Management (Quantitative Methods)" in the same department. In the current competition she participates with a monographic thesis entitled: "Models for optimal inventory management in the logistics system". Based on the above, I can state that Assoc. Prof. Tanka Milkova, PhD meets the requirements of Article 118, paragraph 2, items 1 and 2 of the Regulations for the Development of Academic Staff at University of Economics - Varna.

The candidate's research interests are in quantitative methods in logistics, financial mathematics and problems of education in mathematics and mathematical competitions. Her research activity is characterized by consistency and upgrading, since both her dissertation and her monographic work for her first habilitation, as well as a large part of her publications are related to modeling and optimization of logistics activities using mathematical methods. The results of her research in this field are deepening and are reflected in a large part of the scientific works submitted for the competition for the academic position of "professor".

5. Description of the scientific works

The thorough review of the submitted documents and publications for participation in the competition shows that Assoc. Prof. Tanka Milkova, PhD fulfills the requirements of Article 118, Paragraph 2, Items 3 and 6 of the Regulations for the Development of Academic Staff at the University of Economics - Varna. She participates in the competition for professor with 79 works:

№	Type of publications	Standalone		Co-authored		Общо	
		Count	Pages	Count	Pages	Count	Pages
1.	Monographs	1	187	11	85	12	272
2.	Studies	1	22	2	18	3	40
3.	Scientific articles	6	71	23	93	29	164
4.	Scientific reports	4	42	27	98	31	140
5.	Textbooks and educational	-	-	4	555	4	555
6.	Other publications	-	-	-	-	-	-
	Общо:	12	322	67	849	79	1171

In the submitted Report on the fulfilment of the minimum national requirements Assoc. Prof. Tanka Milkova has included 52 of her publications, namely:

- Monograph – 1 (one);
- Scientific articles and reports, published in scientific journals, refereed and indexed in world databases with scientific information (Scopus u WOS) – 8 (eight);
- Scientific articles and reports, published in unrefereed peer-reviewed journals or edited collective volumes – 41 (fourty one);
- Studies published in scientific journals, refereed and indexed in world databases of scientific information (Scopus u WOS) – 2 (two);
- Studies published in unrefereed peer-reviewed journals or edited collective volumes – 1 (one);
- Published university textbook – 3 (three)
- Published university handbook – 1 (one)

The fulfilment of the minimum national requirements for each indicator is as follows:

Group of indicators	Minimum national requirements	Points declared by the candidate
V (В)	100	100
G (Г)	200	403,33
D (Д)	100	195
E (Е)	100	220

Fulfillment of the additional quantitative requirements of University of Economics – Varna:

№	Indicator	Points required for "Professor"	Points declared by the candidate
1.	Scientific reports	60	123,33
2.	Scientific articles and studies	115	132,5
3.	Publications in Scopus and/or Web of Science	30	147,5
4.	Citations in Scopus and/or Web of Science	15	195
5.	Defended doctoral students	40	60
6.	Research and scientific projects (participation and/or leadership)	15	120

A report on publications refereed and indexed in world-known databases with scientific information Scopus and/or Web of Science, as well as publications

in journals included in the national reference list maintained by NACID is presented.

In quantitative terms, it can be argued that the publications submitted by Assoc. Prof. Tanka Milkova, PhD not only meet, but also significantly exceed the required minimum standards.

The main work for the competition is a monograph entitled "Models for optimal inventory management in the logistics system". It has been discussed at a meeting of the Primary Unit and is directed for review and publication in the editorial board of the specialized scientific journal "Library "Prof. Tsani Kalyanjiyev". It is devoted to a relevant problem, since inventory management is an important element of the overall process of optimal management in the logistics system. The monograph defends the thesis that the construction of new models for optimal inventory management in the logistics system and the modification of existing ones can lead to the optimization of various logistics activities in the field of inventory in their real practical application. Some possibilities of adaptation and modification of the existing methods of classification of the inventory into groups according to their degree of importance for the organization's activities depending on various indicators are investigated; analyses of the results with a view to the optimal implementation of the corresponding activities are developed. Various possibilities of constructing new and modifying existing inventory management models under deterministic and stochastic processes are also investigated; methods for their solution are developed, and the optimal results obtained are analyzed with a view to minimizing the total cost of their management.

The other publications that Assoc. Prof. Tanka Milkova, PhD participates in the competition for professor with can be divided into the following areas: application of mathematical methods for modeling various economic activities, financial mathematics and problems of education in mathematics and mathematical competitions. Most of the publications are in the thematic area of the announced competition "Quantitative Methods in Logistics (Inventory Management)". Their titles confirm the relevance of the problems studied, and their content is evidence of their author's good awareness of the relevant field, aspiration to modern interpretation and search for innovative solutions.

My overall impression of the candidate's scholarly output is that there is consistency, logic, continuity and accuracy.

It outlines clearly enough the scientific interests and searches of Assoc. Prof. Tanka Milkova, PhD.

6. Identification of contributions

In the scientific research work of Assoc. Prof. Tanka Milkova, PhD the required contributions are identified and presented in the respective reference.

The main and most significant contributions are directly related to the scientific specialty "Quantitative Methods in Logistics (Inventory Management)" in which the competition for "Professor" is announced. The main monographic work submitted by the candidate also belongs to this field, as do most of the publications. The contributions in this field are presented in detail by the candidate. These include:

- A method is proposed for classifying the inventory nomenclature taking into account two factors essential for the activity, as well as a method for classifying the inventory nomenclature with an integral indicator. Publications (1.1, 26.11, 27.12, 58.14, 66.22)
- A modification of Wilson's model is presented, where opportunity costs are taken into account, leading to a reduction in the level of inventories, an increase in their turnover and the release of financial resources. Publications (1.1, 2.1, 37.22, 57.13)
- A nonlinear economic-mathematical model for inventory management with an objective function aimed at ensuring maximum profitability expressed in terms of profit per unit of inventory is proposed. Publications (1.1)
- A possible application of a matrix game model to inventory management with random demand and no information about the probability distribution of that demand. Publications (1.1, 39.24, 69.25)
- The capabilities of the three-index transport problem are used to construct a multiproduct manufacturing-transportation model that provides minimum total costs for manufacturing and transportation of finished products. Publications (5.4, 29.14, 52.8, 54.10)
- Additions and extensions to a number of economic-mathematical models are proposed that formalize a variety of options for the efficient positioning of the logistics system units, both through the selection of optimality criteria and through the direct incorporation of the technoeconomic features of the logistics activities in the systems studied. Fundamentally new approaches for optimal positioning of logistics system units are derived, based on the well-known problem of Heron. The efficiency of the application of some of the constructed economic-mathematical models is demonstrated with the help of appropriate approbations with numerical examples. Publications (19.4, 50.6, 51.7, 65.21)
- Some possibilities for optimizing resource allocation are explored by proposing modifications to the well-known multistage resource allocation problem

and the same are presented with practical numerical parameters in different fields. Publications (33.18, 34.19, 35.20, 45.1, 46.2, 77.3, 55.11, 61.17, 63.19)

- Adequate models are developed, which complement the theory of quantitative methods in logistics, related to the optimal performance of transport activities, taking into account various specific features of the particular situation, and the possibilities of their practical application are revealed. Publications (3.2, 18.3, 24.9, 49.5, 53.9, 59.15)

The following contributions can be referred to the candidate's second area of research interest "Financial Mathematics":

- Different repayment plan options have been proposed, allowing a choice to be made as to the most appropriate one. Publications (40.25, 48.4, 56.12, 70.26)
- Some specific characteristics of the choice of an appropriate mathematical apparatus for evaluating and comparing investments as a means of increasing available cash capital are outlined. Publications (44.29, 73.29)
- Formulas and complete solutions are constructed for various specific conditions in simple and compound interest bearing deposits. Publications (25.10, 41.26, 43.28)

The following contributions can be referred to the candidate's third field of scientific interest "Problems of mathematics education and mathematical competitions":

- The content of textbooks and teaching aids is enriched in the direction of application of different approaches in the presentation of the theoretical material in order to improve its comprehension by students. To this purpose, a number of theoretical propositions are demonstrated with appropriate examples. Publications (76.1, 77.2, 78.3, 79.4)
- Algorithms and rules for solving some classes of mathematical problems are proposed. Publications (17.2, 20.5, 21.6, 22.7, 23.8. 62.18)
- The need to study various mathematical and statistical disciplines is argued and a number of possibilities for the application of the acquired knowledge are presented. Publications (4.3, 31.15, 31.16, 32.17, 60.16, 64.20, 67.23, 68.24, 71.27, 72.28, 74.30, 75.31)
- Tasks are proposed in the composition of competition topics in various Olympiads in mathematics and mathematical competitions at national and international level. Publications (6.5, 7.6, 8.7, 9.8, 10.9, 11.10, 12.11, 13.12, 14.13, 15.14, 16.1, 28.13, 36.21, 38.23, 42.27)

The above scientifically applied contributions contain original and valuable for business practice ideas, results and visions, which can be successfully used by

Bulgarian companies, and the creative approach used in the presentation of the theoretical teaching material would be useful in the training of students and the organization of mathematical Olympiads and competitions.

The reference for the citations of Assoc. Prof. Tanka Milkova, PhD is very precise. It lists 42 citations. A link to them is given, where both the cited and the citing publication are in Scopus / Web of Science (13 issues). A link to the "Academic Staff Publications Register" of the University of Economics - Varna is also provided. More than 80 citations have been found there. In the Declaration of fulfillment of the minimum national requirements in indicator "E" only the above mentioned 13 citations are presented, which bring the applicant 195 points with a required minimum of 100 points. The same applies to the Declaration of fulfilment of the quantitative requirements of the University of Economics - Varna. I would like to point out that Assoc. Prof. Tanka Milkova, PhD has the following citation indexes:

- h - index in Web of Science - 3
- h - index in Scopus - 1
- h - index in Google Scholar - 6

7. Participation in scientific projects and scientific forums

The high scientific and research qualification of Assoc. Prof. Tanka Milkova, PhD, as well as her vast expertise are confirmed by her leadership and participation in research projects. She reports participation in six research projects, supervising two of them. All projects are related to the application of quantitative methods in economics. As I have been a reviewer of some of the projects, I would like to highlight the meticulous attention to detail. From the submitted Declaration on the fulfilment of the quantitative requirements of University of Economics - Varna for the position of "Professor" in terms of participation in/leadership of research projects with the required 15 points, it scores 120 points.

From the presented List of Scientific Publications it is evident that Assoc. Prof. Tanka Milkova, PhD has participated in many national and international conferences. She has participated in the Organizing Committees of three conferences organized by the Department of Statistics and Applied Mathematics.

Assoc. Prof. Tanka Milkova, PhD is a member of the editorial board of the journal "Mathematics Plus", being the editor of the section "M + Financial Literacy".

8. Teaching

From the submitted materials, the following generalizations can be made about the candidate's pedagogical activity:

- Assoc. Prof. Tanka Milkova, PhD has the necessary pedagogical experience and practice (more than 20 years of academic experience at the University of Economics - Varna. She is actively involved in the teaching-learning process;
- - Currently, she teaches classes in a number of disciplines that are in the field of the competition. Attached is a detailed reference of the applicant's teaching load for the last two years at the Bachelor and Master programmes;
- She has also participated in teams that have developed syllabuses for a number of disciplines such as Quantitative Methods in Logistics, Applied Mathematics, Financial Mathematics, Project Risk Management, Quantitative Methods, etc. Some of the syllabuses are also developed in English;
- Assoc. Prof. Tanka Milkova, PhD reports international teaching activities Participation in International Educational and Scientific Project „The Network Project School" within the „Russian Foundation for Basic Research 'Network mentoring in the organisation of research activities of gifted students'";
- She has carried out teaching activity and theoretical guidance as an academic consultant of the master class "Innovative approaches to teaching in the context of National External Assessment and State Matriculation Examinations", implemented under the SP "Qualification of pedagogical specialists", 2024;
- She has been a lecturer in trainings of pedagogical specialists carried out by the Institute for Educational Policies "Archimedes and Diogenes" Ltd. on "Financial Mathematics" and "Combinatorics and Probability" -2020, 2021;
- Assoc. Prof. Tanka Milkova, PhD has extensive experience in organizing and conducting students' events and seminars. She has led the University of Economics - Varna team to participate in the National Student Olympiad in Mathematics; she has been a lecturer in summer schools at the "Minyu Balkanski" Foundation in "Fun Mathematics" and "Financial Mathematics" (since 2020); she has been a lecturer in a summer school with outstanding students from the "European Kangaroo" competition (since 2020); she has been a guest lecturer in the discipline of "Financial Mathematics" to students from "Ivan Vazov" Secondary School, Dimitrovgrad;
- Assoc. Prof. Tanka Milkova, PhD has been a supervisor and reviewer of graduates in the Bachelor's degree programme "Logistics", University of Economics - Varna;

- Assoc. Prof. Tanka Milkova, PhD reports active work in the third level of education. She reports the scientific supervision of two PhD students who have obtained their PhD. She has also supervised two PhD students who were dismissed with the right to defend their PhD. She reports collaborative work with PhD students in research projects. She participated in examination committees for conducting PhD minima and conducting PhD candidate examinations;
- For participation in the competition for the academic position "Professor" Assoc. Prof. Tanka Milkova, PhD submitted contributions to three textbooks and one university handbook.

In conclusion, I would like to state that Assoc. Prof. Tanka Milkova, PhD is one of the outstanding and beloved lecturers at the University of Economics - Varna. The development of textbooks and handbooks suitable for the students' education, the individual work with students and PhD students, the incorporation of the results of scientific and applied research into the educational process, are a small part of the factors that have established Assoc. Prof. Tanka Milkova, PhD as one of the leading lecturers at the University of Economics - Varna.

9. Others

Assoc. Prof. Tanka Milkova, PhD was Deputy Dean of the Faculty of Informatics at the University of Economics - Varna in the period 06.2015 - 06.2023. Since June 2023 she has been Head of the Department of Statistics and Applied Mathematics.

Since 2022 - until now, Assoc. Prof. Tanka Milkova, PhD is a member of the project team for organizing and conducting the "Olympiad in Financial Mathematics for Students" at the University of Economics - Varna, funded by the Municipality of Varna.

She is a member of the European Kangaroo Association.

She participated in the General Assembly of the International Mathematical Competition "European Kangaroo" in 2024 in the Pre-Ecolier section, held in Santos, Brasil.

She is a member of the National Committee, appointed by Order of the Minister of Education of the Republic of Bulgaria, for the mathematical competition "European Kangaroo", as well as for the competition "Financial Literacy". She also participates in the drafting of competition topics.

Assoc. Prof. Tanka Milkova, PhD participated in the jury and co-authored the themes for the 11th and 12th grades in the regional mathematics tournament "Perperikon", Kardzhali, from 2018 until now.

Assoc. Prof. Tanka Milkova, PhD is a member of the expert group for the procedure for programme accreditation of the professional field 3.7 "Administration and Management" at "Dimitar A. Tsenov" Academy of Economics during the period 05.11 - 07.11.2019.

Assoc. Prof. Tanka Milkova, PhD was a member of 6 scientific juries - 2 for PhD competitions and 4 for academic positions.

10. Plagiarism

Assoc. Prof. Tanka Minkova, PhD has signed a Declaration of Originality, by which she declares that the monographic work and publications submitted by her are her personal work, that she has complied with the copyright requirements regarding the sources used, and that the publications submitted by her for participation in the competition do not repeat those submitted for participation in previous competitions for academic positions and for obtaining the degree of PhD.

11. Critical remarks and recommendations

I have no critical remarks.

I recommend Assoc. Prof. Tanka Milkova, Phd using her high professionalism and acquired experience, to continue and upgrade her scientific research activities.

12. Conclusion

Taking into account the fact that the candidate in the competition has fulfilled the minimum national requirements as well as the additional quantitative requirements of the UE - Varna for holding the academic position of "Professor" and taking into account her potential, values and public commitment, I strongly recommend the members of the Honourable Scientific Jury to propose to the Faculty Council of the Faculty of Informatics, Assoc. Prof. Tanka Vassileva Milkova, PhD to be elected to the academic position of "Professor" in the professional field 3.8. Economics, scientific specialty "Quantitative Methods in Logistics (Inventory Management)".

27.03.2025
Varna

Author of the
Statement of opinion:.

/Prof. Svetlana Dimitrakieva, PhD/

STATEMENT OF OPINION

From Prof. Todorka Ignatova Kostadinova, PhD, Professor in professional field 3.7 "Administration and Management" at the Faculty of Public Health, Director "Accreditation, Quality and Project" at Medical University - Varna, 55 "Marin Drinov" Str., Varna 9002, tel. 052 677 089, mobile: 0889588408, e-mail: kostadinova@mu-varna.bg

Member of the scientific jury according to Order No. RD-06-29/31.01.2025 of the Rector of University of Economics – Varna

Subject: competition for the academic position of "Professor" in the field of higher education 3. Social, economic and legal sciences, professional field 3.8. Economics, scientific specialty "Quantitative Methods in Logistics (Inventory Management)" for the needs of the Department of Statistics and Applied Mathematics of the Faculty of Informatics at University of Economics - Varna, announced in the State Gazette No. 105 / 13.12.2024.

Documents for participation in the competition were submitted by a single candidate - **Assoc. Prof. Dr. Tanka Vasileva Milkova**, lecturer at the Department of Statistics and Applied Mathematics at University of Economics - Varna, and the competition procedure has been followed. All documents comply with the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the regulations for its implementation and the additional quantitative requirements of University of Economics - Varna.

1. General characteristics of the candidate's scientific production and pedagogical activity

The candidate has submitted sufficient scientific publications for the competition: 79 (75 of them are scientific publications).

In structural terms, they are as follows: monographs - one independent and 11 collective; studies - one independent and 2 co-authored; articles - 6 independent and 23 co-authored; reports - 4 independent and 27 co-authored; textbooks and teaching aids - 4 collective. All this contributes to fulfilling the minimum national requirements by groups of indicators for a professor in the professional field 3.8. "Economics" (**403.33 points with 200 points required**). The additional quantitative requirements of University of Economics - Varna regarding publications have also been fulfilled.

Assoc. Prof. Milkova's works cover current contemporary topics and issues related to the problems of mathematics education and mathematical competitions, as well as opportunities for applying mathematical methods for modeling various economic activities - classification of inventory nomenclature, inventory management in random and deterministic demand, transport and production-transport models, positioning of units in the logistics system, resource allocation, financial flow management and investment evaluation, and others.

Assoc. Prof. Tanka Milkova combines her research work with active teaching and sharing the results of the studies with the students at tUniversity of Economics - Varna. She has led lectures and seminars in the disciplines "Applied Mathematics", "Quantitative Methods in Logistics", "Inventory Management", etc. In the past, she has led seminars in "Mathematics" (parts one and two), "Optimization Methods", "Mathematical Analysis" (part one), "Operations Research", "Applied Game Theory", "Theory of Management Decisions", "Financial Mathematics", "Risk Management", etc. She has participated in teams for developing curricula in many different disciplines, and only during the last update of the curriculum documentation in 2024, she participated in the development and enrichment of seven bachelor's and

master's curricula. Assoc. Prof. Milkova is a scientific supervisor of graduate students and four doctoral students.

For participation in the competition for the academic position of "Professor", Assoc. Prof. Dr. Tanka Milkova also submits participation in 3 textbooks (Operations Research, Applied Mathematics) and 1 teaching aid (Operations Research). All of them are written in an understandable way, at the required high level and can be used by students and doctoral students from University of Economics - Varna and other universities.

2. Assessment of the candidate's scientific and applied scientific contributions

I accept the main scientific contributions that are defined in the presented report of Assoc. Prof. Dr. Tanka Milkova. They could be systematized in the following main areas:

I. In the field of scientific interests **"Quantitative methods in logistics (Inventory Management)"**:

1. Some theoretical results have been achieved in terms of enriching the theory related to the classification of inventory nomenclature, as well as the models and methods for inventory management in deterministic and stochastic inventory consumption. A method for classifying inventory nomenclature is proposed, taking into account two factors essential for the activity - total inventory value and time for making deliveries from inventory. A method for classifying the nomenclature of stocks with an integral indicator has been constructed. An algorithm has been proposed that allows for the precise determination of the boundaries between individual groups of stocks.

2. A modification of Wilson's model has been constructed, which takes into account the possibility of a variable rate of consumption. An analytical method for its solution has been derived. The model has been developed in two versions and a modification of Wilson's model is presented, which takes into account opportunity costs. This leads to a decrease in the level of inventories, an increase in their turnover and the release of financial resources.

3. The theory of economic and mathematical modeling related to inventory management has been enriched through the proposed nonlinear economic and mathematical model for inventory management with an objective function.

4. Research has been carried out on inventory management models for random demand. Possibilities for constructing a law for the distribution of demand for a stock with a random nature of consumption have been derived, taking into account specific features of the environment. A possibility for applying a matrix game model to inventory management with random demand and lack of information about the probability distribution of this demand has been proposed.

5. Theoretically, the mathematical foundations of the three-index transport problem are derived, serving as a basis for constructing multi-product models. A statement is formulated and proven, contributing to confirming the existence of a solution to the three-index transport problem. A multi-product production and transport model is constructed, expressing the compilation of such a program for the production and distribution of different types of products, which takes into account the financial capabilities of producers and consumers and guarantees non-violation of the throughput capacity of the logistics network at minimal total costs for the production and transportation of finished products. A methodology is proposed for analytically solving the thus constructed production and transport problem.

6. Additions and extensions of a number of economic-mathematical models have been proposed, which formalize the variety of possibilities for effective positioning of the units of a logistics system, both through the selection of optimality criteria and through the direct inclusion of the technical and economic features of the logistics activities in the studied systems. Fundamentally new approaches for optimal positioning of units in logistics systems, based on the famous Heron problem, have been derived.

7. Possibilities for optimizing resource allocation are investigated by proposing modifications to the well-known multi-stage resource allocation problem and demonstrating them with practical numerical examples in various fields. Appropriate adapted methods for solving the resource allocation problem are proposed.

8. Adequate models have been developed, complementing the theory of quantitative methods in logistics, related to the optimal implementation of transport activities, taking into account various specific features of the specific situation. The possibilities for their practical application have been revealed.

II. In the field of scientific interests **"Financial Mathematics"**:

1. Based on known mathematical methods, various options have been proposed for preparing repayment plans and calculating annuities, in view of the need for financial institutions to offer diverse and attractive lending conditions to potential consumers.

2. Various features are presented in the selection of an appropriate mathematical apparatus for evaluating and comparing investments as a means of increasing available cash capital. A specific possibility for accepting an investment with a negative NPV in recessionary conditions is derived.

3. Theoretical and applied results have been achieved in terms of constructing formulas and ready-made solutions for various specific conditions of deposits with simple and compound interest. The classical formulas for simple and compound interest with constant parameters are upgraded, taking into account the possibility of changing the principal amount and the interest rate.

4. Author's math practice problems have been compiled for national financial literacy competitions, as well as math practice problems published in a specialized column "M+ math practice problems " of Mathematics Plus magazine.

III. In the field of scientific interests "**Problems of mathematics education and mathematical competitions**":

1. Results have been achieved in terms of enriching the content of textbooks and teaching aids in the direction of applying different approaches in the presentation of theoretical teaching material, with a view to its better comprehension by students. As a result, a number of theoretical statements have been demonstrated with appropriate examples of great practical significance. Part of the proposed math practice problems in the textbooks and teaching aids are the work of the author.

2. Various methodological approaches and generalizations have been proposed, presenting algorithms and rules for solving certain classes of mathematical problems.

3. The need for studying various mathematical and statistical disciplines is argued, some specific features in teaching and in choosing a specific method for calculating certain elements are highlighted, and a number of possibilities for applying the acquired knowledge are presented.

4. Participation in the compilation, adaptation and editing of math problems and solutions included in the competition topics in various mathematical olympiads and competitions at the national and international level, which could assist students in the process of their preparation in mathematics for exams and olympiads.

3. Critical notes and recommendations

I have no critical remarks or questions to the candidate.

I recommend Assoc. Prof. Milkova to continue and deepen her research work in the field of quantitative methods and logistics, financial mathematics and the training of students and young mathematicians, including preparation for mathematical competitions.

In the field of quantitative methods in logistics, I propose to Assoc. Prof. Milkova and the team she works with, cooperation with Medical University - Varna on topics of distribution and logistics of pharmaceutical products.

4. Conclusion

The presented scientific production and the teaching work of the candidate meet the requirements of Act on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the regulatory documents of University of Economics - Varna for holding the academic position of "Professor" in professional field 3.8 Economics.

In this regard, I recommend that the esteemed scientific jury propose to the Scientific Council of University of Economics - Varna to elect **Assoc. Prof. Dr. Tanka Vasileva Milkova** for the academic position of "Professor" in PF 3.8. Economics.

31.03.2025 **Author of the statement of opinion:**

Varna /Prof. T. Kostadinova, PhD/