

A Review Report

by Prof. Dr. Sci. Ivan Ganchev Ivanov,
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of the materials submitted for participation in the competition
for the academic position of "Professor"
at Plovdiv University "Paisii Hilendarski"

in:field of higher education: 3. Social, economic and legal sciences
professional field 3.7. Administration and Management (Quantitative Methods and Modeling
in Management)

In the competition for "professor", announced in the State Gazette, issue 96 of 11.11.2025, and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Department of "Management and Quantitative Methods in Economics" at the Faculty of Economic and Social Sciences, Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova from the Faculty of Economics and Social Sciences of Plovdiv University "Paisii Hilendarski" participated as a candidate.

1.General description of the materials presented

By order No. PD-22-45 of 09.01.2026 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury in a competition for the academic position of "professor" at PU in the field of higher education 3. Social, economic and legal sciences, professional field 3. 7. Administration and management (Quantitative methods and modeling in management), announced for the needs of the Department of Management and Quantitative Methods in Economics at the Faculty of Economic and Social Sciences.

Only one candidate has submitted documents for participation in the announced competition: Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova from the Faculty of Economics and Management of Plovdiv University "Paisii Hilendarski".

The set of materials on paper submitted by Assoc. Prof. Tanya Yankova is in accordance with the Regulations for the Development of the Academic Staff of the University of Sofia and includes the following documents:

- Application to the Rector for admission to participate in the competition;
- CV in European format;

- Copy of a higher education diploma with registration number 1451-M for the specialty Mathematics, issued in July 1994 by the University of Sofia “Paisiy Hilendarski”;
- Copy of a diploma for the educational and scientific degree “Doctor” with number 31958 of 07.01.2008 for the scientific specialty 02.21.06 “Automation of engineering work and automated design systems”, issued by the Higher Attestation Commission;
- Copy of a certificate for the academic position of “associate professor” in the FISN of the “Paisii Hilendarski” University in the field of higher education 3. Social, economic and legal sciences, professional field: 3.8. Economics (Quantitative methods and modeling), based on the order of the Rector No. R 34-126/12 of April 2016;
- List of scientific works, divided into three groups : for the acquisition of the educational and scientific degree “Doctor”, for the competition for “associate professor” and for participation in the current competition for “professor”;
- Copies of 22 scientific works with which he/she participates in the competition for “professor”;
- Certificate of fulfillment of the minimum national requirements under Art. 2b of the ZRASRB and of the additional faculty requirements in the FISN of the “Paisii Hilendarski” University;
- Declaration by the candidate for the originality and authenticity of the attached documents;
- Annotations of the materials under Art. 76. of the PRASPU (in Bulgarian and English);
- Self-assessment of the candidate for contributions (in Bulgarian and English);
- List of citations of the candidate;
- 5 pcs. separation protocols for the articles in co-authorship, indicated in the list with numbers from 2 to 6;
- Certificate No. RD-38-279 / 16.12.2025 for work experience, issued by the PAISIY HILENDARSKY PU;
- Certificate from FISN for academic work, including workload during the current 2025/2026 academic year and the list of curricula developed by the candidate;
- Certificate from FISN for the candidate’s classroom and extracurricular employment at the faculty over the past 5 years;
- A set of curricula developed by the candidate according to an internal template to ensure the educational process at FISN;
- Certificate from the candidate for his work with doctoral students;
- List of textbooks and teaching aids issued by the candidate;
- Official note with issue No. 392 / 27.11.2025 from the National Research Council at the Paisii Hilendarski University for the candidate’s participation in 10 research projects;
- Declaration from the candidate for participation in 3 research projects;
- Reference from the candidate, according to the criteria adopted by the FISN of the FS No. 143 / 29.05.2020 for the evaluation of participants in the competition for "professor";
- Copy of a certificate from October 2025 for the candidate's participation as a guest editor of the special edition "Modeling in the Era of Generative AI" of the scientific journal Information, MDPI.

The candidate Tanya Petrova Yankova-Lilova has submitted a total of 22 scientific works: 6 articles, 14 studies, one monograph and one textbook and declared participation in

13 projects. The scientific works are divided into groups: Group B – 1 pc.; G6 – 3 pcs.; G7 – 3 pcs.; G8 – 14 pcs.; E21 – 1 pc.

The reviewer accepts all submitted scientific works - articles, studies, a monograph and one textbook.

2. Short biographical details of the applicant

Tanya Yankova completed her secondary education at the Model Mathematical High School "Acad. Kiril Popov" in 1989. In 1994, she graduated from the P. Hilendarski University with a degree in Mathematics. She received her PhD in 2007 from the Institute of Management and Systems Research of the Bulgarian Academy of Sciences.

Tanya Yankova has been teaching since 1994 and has taught as a part-time assistant at several higher education institutions. She works under an employment contract at the Institute of Management and Systems Research - Bulgarian Academy of Sciences (from 2000 to 2009) and at the Faculty of Economic and Social Sciences (FISN) of the P. Hilendarski University (from 2009 to the present). Since 2011, she has held the position of Chief Assistant Professor at the Department of Management and Quantitative Methods in Economics of the FISN.). Since April 2016, she has held the position of Associate Professor at the Department of Management and Quantitative Methods in Economics at FISN. Currently, Tanya Yankova teaches the subjects "Applied Mathematics" and "Financial Mathematics" and "Quantitative Methods in Management" to students of the "Finance" and "Accounting" majors at FISN. In the master's degree program, Assoc. Prof. Yankova teaches "Mathematics" and "Operations Research in Economics". She has an annual classroom workload of 225 hours of lectures and 150 hours of exercises. All courses she teaches are developed in electronic form, which creates convenience in the learning process. She effectively uses modern technologies in her teaching activities. One doctoral student has defended his thesis under her supervision.

3. General characteristics of the candidate's activities

Assoc. Prof. Tanya Yankova is actively involved in teaching. She has presented lecture courses at both undergraduate and graduate levels.

Evaluation of the candidate's scientific and applied scientific activities.

Publications can be classified by type (articles – 17; reports – 3; popular publications – 0), by importance (articles in publications with impact factor – 17; plenary reports – 3; awarded publications – 0), by place of publication (articles in refereed international journals – 17, reports in proceedings of international scientific conferences abroad – 0; articles in national journals – 0; reports in proceedings of international scientific conferences in Bulgaria – 3; reports in proceedings of national scientific conferences, sessions and seminars – 0; reports in scientific papers of universities – 0); by language in which they are written (in English – 19;

in Bulgarian – 1), by number of co-authors (independent – 1; with one co-author – 7; with two co-authors – 1; with three or more co-authors – 11).

Contributions (scientific, applied science, applied) and citations

The record of Assoc. Prof. Yankova's scientific works in the Scopus scientific database is at <https://www.scopus.com/authid/detail.uri?authorId=14008494800> and contains 17 scientific publications after 2020, for which 432 citations are reflected. For 2025 alone, the citations reflected in Scopus for 199. All citations are after the competition for associate professor. In the scientific production database, the candidate's Hirsch index has a value of 14, according to the Scopus scientific publications database.

The candidate has presented 17 publications with an impact factor, 14 of which were published in the MDPI publishing house, in which she has open access to all her publications. The publications are of a scientific and applied nature. New methodologies for decision-making in various applied areas have been published, based on the fuzzy logic approach, which allows decision-making under uncertainty. Methodology for selecting cloud services based on fuzzy logic [3, 27 citations in Scopus] and multi-criteria analysis. Methodology for group multi-criteria selection of blockchain software based on fuzzy logic [9, 25 citations in Scopus] . The robustness of the proposed methodology is proven through comparative analysis and sensitivity analysis. Methodology for selecting an IoT system in a fuzzy environment [10, 19 citations in Scopus] with applications in agriculture. The methodology includes a modification of the method for comparing areas with approximation of multiple attributes. Methodology for optimizing the evaluation of influencers based on their key characteristics [20]. A modified approach built in an interval-estimated fuzzy Fermat environment is included.

The publications are of an applied-methodological nature. Several articles [4, 8, 11, 12, 13] modeling the effects of COVID-19 can be distinguished. A methodology for evaluating vaccines against COVID-19 based on their main clinical characteristics and efficacy has been proposed –[11], a methodology for assessing factors in e-commerce in the context of COVID-19 [12], a methodology for assessing the attitude and intention of customers to use digital wallets [13], a methodology for assessing the effects on education in higher education institutions – [4, 8]. Basic scientific tools in analyzing the effects of COVID-19, such as IoT technology, fuzzy logic, data analysis models.

The publication (Effects of Generative Chatbots in Higher Education - number 14) has the most citations to date (131) and a large author team (6 co-authors), in which several Generative Chatbots are analyzed through comparative characteristics. The article serves as a useful starting point for other researchers and practitioners working with them.

Publications [17,19] propose new methodologies with elements of generative artificial intelligence that support decision-making in the tourism business [17] and in the management of the educational process in higher education [19], affecting teachers, students and supervisory authorities.

The presented monograph and textbook assure the in-depth knowledge of Assoc. Prof. Yankova and her skills to shape her knowledge and present it to her students in a form and

form that is understandable to them. The monograph is a scientific and theoretical publication with applied value. The monograph includes innovative models developed by the author, which distinguish the proposed work from similar ones in the field. In this sense, I can point out the model in section 2.2 of the monograph. The monograph should clearly and unambiguously emphasize the author's personal contribution, since the emphasis of the monograph is that it "presents original research and the author's own scientific results" (quote from AI). To prove that the monograph presents its own scientific results, it would be appropriate for the author to include his own significant scientific publications in the bibliography of the monograph. And these publications should not have participated as such in previous or current competitions.

All 17 publications were published by only one publisher, MDPI, and were funded by a corresponding scientific project, which explains the large number of co-authors and teamwork. MDPI journals use quantitative methods to increase their significance.

4. Assessment of the candidate's personal contribution

For the publications presented in this competition for presented separation protocols, which show an equal contribution of all co-authors in the contributions of the respective publications. For me, there is no doubt in the personal merits of Assoc. Prof. Tanya Yankova for the leading participation in the relevant scientific research.

To distinguish the personal contribution of Assoc. Prof. Yankova, I could make the following division:

The formulation and justification of new conceptual models within existing theoretical directions, such as conceptual models for integrating generative AI in education [14, 19] and tourism [17]; models for static and dynamic evaluation of vaccines [11], of influencers [20].

Proving the applicability and expansion of the analytical toolkit through new environments and hybrid methodological solutions. This can be attributed to: fuzziness in the transport problem - in chapter 6 of [1]; extensions of MCDM methods in Fermatean fuzzy environment [11, 20]; new modifications of MABAC, EDAS, TOPSIS, MARCOS [3, 9, 10, 11, 20]; integration of SEM, ML and MCDM in the analysis of consumer behavior [12, 13, 15, 16, 18]; geospatial analysis of emissions [6].

Development of new modifications, methodologies and models oriented to applications. Such as:

- new or modified methods: use of Bezier curves for modeling fuzzy membership functions - in chapter 7 of [1]; IVFF-TOPSIS extension [11]; IVFF-EDAS [20]; Intuitionistic fuzzy MABAC modification [10]; Fuzzy MARCOS [3, 9];

- new methodologies: for early detection of risk for students [2]; for analysis of the effects of the COVID-19 pandemic in education [8]; for industrial digitalization [21]; for the evaluation of e-commerce [12], e-wallets [13], e-government [15], influencers [16], ultra-processed foods [18];

- new classifications: factor systems for satisfaction, digital behavior, e-services [12, 13, 15, 16, 18].

Implementation activity

There is no evidence of implementation activity by Assoc. Prof. Tanya Yankova.

5. Critical remarks and recommendations

Regarding the documents for the participation of Assoc. Prof. Tanya Yankova in this competition, I will note the following:

1. There are no independent publications in the competition by Assoc. Prof. Yankova, indexed in Scopus. All 17 publications indexed in Scopus are co-authored, and some of them in a team of more than three co-authors (10 pieces). Participation in a scientific team shows teamwork skills. At the same time, the authorship of independent significant publications shows the creative and innovative potential of the author. I recommend Assoc. Prof. Yankova to publish independent articles in other scientific publishing houses and journals indexed in Scopus.
2. In future monographic works, the author's personal contribution should be clearly and categorically emphasized.
3. To increase the number of research projects in which she participates as a supervisor.

6. Personal impressions

I know the candidate from the competition for associate professor, in which I also participated as a reviewer. My impressions of the scientific research presented are very good both then and in the current competition for professor in direction 3.7. The contributions are appropriate for the direction in which the competition was announced, i.e. in the publications Assoc. Prof. Yankova and co-authors offer methodologies for decision-making in various applied areas, which could become good practices.

7. Conclusion

The documents and materials presented by Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), the Regulations for the Implementation of the ADSRB and the relevant Regulations of the University of Paisiy Hilendarski.

The candidate in the competition has presented enough scientific works published after the materials used in the defense of the ONS "doctor" and the competition for associate professor. The candidate's works contain original scientific and applied contributions that have received international recognition, with a representative part of them being published in journals and in scientific collections published by international academic publishing houses. His theoretical developments have practical applicability, with some of them being directly oriented towards academic work. The scientific and teaching qualifications of Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova are undoubted.

The results achieved by Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova in academic and research activities fully comply with the minimum national and additional requirements of the Faculty of Economic and Social Sciences, adopted in connection with the Regulations of the University for the implementation of the ZRASRB.

After reviewing the materials and scientific works presented in the competition and in view of the analysis of their significance and the scientific, applied and applied contributions contained in them, I find it reasonable to give my positive assessment and to recommend to the Scientific Jury to prepare a report proposal to the Faculty Council of the Faculty of Economic and Social Sciences for the election of Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova to the academic position of "professor" at the University "Paisiy Hilendarski" in: field of higher education 3. Social, economic and legal sciences, professional field 3. 7. Administration and management (Quantitative methods and modeling in management).

1 March 2026

Scientific Jury's member

Prof. Ivan Ivanov