REVIEW

on the competition for the academic position of "Professor" in the scientific field: 4. Natural Sciences, Mathematics and Informatics, professional field: 4.6. Informatics and Computer Science, scientific specialty: Informatics (Distributed systems and applications), for the needs of Faculty of Economics and Social Sciences (FESS), Plovdiv University "Paisii Hilendarski" (PU), announced in State Gazette (SG) no. 94 of 12.11.2021

This review has been prepared by Prof. Boyan Paskalev Bontchev, PhD – Department of Software Technologies, Faculty of Mathematics and Informatics (FMI) at Sofia University "St. Kliment Ohridski" (SU), as a member of the scientific jury for the competition according to Order No. RD-21-37/10.01.2022 r. of the Rector of the Plovdiv University "Paisii Hilendarski" (PU).

For participation in the announced competition, documents were submitted by **only one** candidate, namely Assoc. Prof. Olga Dobreva Rahneva, PhD, from the Department of Management and Quantitative Methods in Economics at the Faculty of Economics and Social Sciences (FESS) at the University of Plovdiv.

I. GENERAL DESCRIPTION OF THE PROCEDURE AND SUBMITTED DOCUMENTS

1. Details of the procedure and documents

The documents submitted by the candidate in accordance with the competition comply with the requirements of the Act for the Development of the Academic Personnel of Republic of Bulgaria (ADAPRB), the Rules for Implementation of the Act for the Development of the Academic Personnel of Republic of Bulgaria (RIADAPRB), and the Regulations for the Development of the Academic Staff of Plovdiv University "Paisii Hilendarski" (RDASPU).

For participation in the competition, the candidate Assoc. Prof. Dr. Olga Rahneva presented a list of documents, including an application for admission to the competition, resume, diploma of higher education (specialty Mathematics - block "D") and the appendix to it, diploma for educational and scientific degree "Doctor", document for the scientific title "Associate Professor", a list of all publications and publications submitted for participation in the competition; reference for compliance with the minimum national requirements with attached evidence; reference for compliance with the additional requirements of FMI at PU; summaries of scientific contributions in the scientific works for participation in the competition; documents proving the fulfillment of the requirements under Art. 115, para. 1, item 2 (reference for classroom and extracurricular educational employment, list of published textbooks and manuals, and reference for work with graduates and doctoral students), documents for research activity (general reference, reference for participation with reports at national and international scientific forums, reference for participation in research and educational projects, official note from the division "Scientific and project activity" at

the University of Plovdiv and certificate from the Center for Research Projects and Technology Transfer at the University of Food Technology - UFT), certificate of work experience in the specialty, reference to citations full bibliographic description of the cited and cited publications; scientific papers submitted for participation in the competition, declaration of originality and authenticity of the attached documents, assignment letter to the Dean of FMI, order of the Dean of FMI to determine the department of competence, and a separation protocol.

For participation in the competition for the academic position "Professor" in the professional field 4.6. Informatics and Computer Science (Informatics - Distributed Systems and Applications) 22 scientific publications, two monographs in English and one monograph in Bulgarian, as well as two textbooks were presented. The list of 22 publications includes 12 articles in peer-reviewed scientific journals and 8 publications in proceedings of international conferences. Of these, 11 are referenced in Scopus (nine of which are in SCImago Journal Rank or SJR editions), four are referenced in the Web of Science, and one is in the IEEE Xplore Digital Library. The number of works submitted to the competition exceeds the minimum requirements for different types of works. All papers were not submitted for the acquisition of educational and scientific degree "Doctor" and for the academic positions of "Chief Assistant" and "Associate Professor". In addition, the candidate presented a list of all her scientific publications (78 in number) and a list of 3 monographs and 9 textbooks.

The candidate has presented numerous documents testifying to her pedagogical and research activities at UFT and PU. From 1986 to 2014, she lectured at the University of Fine Arts (formerly known as Higher Institute of Food Industry) in 10 disciplines in the field of IT. As an Associate Professor at FESS since 01.09.2014 she has lectured in the bachelor's programs in informatics, information systems and technologies, and e-commerce in over 20 specialties. In addition, Assoc. Prof. Rahneva develops very active extracurricular activities with her students and as a research supervisor of three successfully defended graduates and four doctoral students (two of whom have already acquired educational and scientific degree "Doctor"). She has participated in over 15 research and educational projects, being a regional coordinator of one international and one national projects (at UFT and PU). She has been a speaker at 35 national and international scientific conferences, 16 of which as an Associate Professor.

2. Short presentation of the applicant

Olga Rahneva graduated from the "Ivan Vazov" Secondary School in Dobrich in 1976, after which she graduated from the Faculty of Mathematics and Informatics (FMI) at the University of Plovdiv as a mathematiciancalculator. In 1995 she graduated with a master's degree in Finance and Accounting from the University of National and World Economy – Sofia (Plovdiv branch). In 2006 she defended his doctoral dissertation at the Faculty of Science at the University of Plovdiv in the scientific specialty 01.01.12: Informatics. Since 2014 she has been an Associate Professor in the Department of Management and Quantitative Methods in Economics at the Faculty of Economics and Social Sciences (FESS) at the University of Plovdiv. She speaks English and Russian.

The research interests of Assoc. Prof. Dr. Olga Rahneva include the development and application of distributed software systems and platforms for e-learning, specialized research on sigmoidal, cumulative and adaptive functions and their application in the field of population dynamics, theory of testing and distribution of computer viruses, as well as the design and use of software tools and applications for technology-assisted learning. Since 1986 so far, she has participated in 20 research and development projects in the field of e-learning and distance learning, being the regional coordinator or leader of three of them. In order to test the results, she has participated with reports in 35 scientific forums – 30 international conferences (of which 6 abroad) and 5 national conferences. She is a member of the Union of Mathematicians in Bulgaria. On the other hand, the candidate successfully combines her scientific work with the practical implementation and use of Web-based information systems in the field of education. She is one of the organizers of the creation of the distributed e-testing cluster (DeTC) at the inter-faculty distributed e-learning center (DeLC) within the PU.

3. General characteristics of the applicant's scientific work and achievements

The candidate submits for participation in the competition for the academic position of "Professor" 25 original research papers from a list of a total of 78 scientific publications and three monographs. The presented 22 publications and three monographs are in specialized scientific publications in the field of the competition and do not repeat the competitions presented in previous for the candidate for the educational and scientific degree "Doctor" and for the academic position "Associate Professor". All publications prove convincingly significant and significant scientific and applied contributions of the candidate in three areas:

- 1. development and application of distributed software systems and platforms for e-learning;
- 2. design and use of software tools and applications for technology-assisted training;
- 3. specialized studies of the properties of some classes of sigmoidal, cumulative and adaptive functions and their application in different fields, e.g. dynamics of biological populations, theory of testing and spread of computer viruses.

From the inspection of the reference for the fulfillment of the minimum national requirements under art. 2b of the Law on Scientific Research "Natural Sciences, Mathematics and Informatics", professional field 4.6 Informatics and Computer Science, it is clear that the points for group of indicators A are 50 (with a minimum of 50), for group B - 100 (with a minimum of 100), for group D - 402 (with a minimum of 200), for group D - 408 (with a minimum of 100) and for group E - 216.67 (with a minimum of 100). The total number of points for all indicators is **1176.67** with a minimum total number of points equal to **550**, which exceeds the minimum sum of points **2.14** times. Hence, motivated and definitely the reviewer declares that:

- the scientific works meet the minimum national requirements (under Art. 2b, par. 2 and 3 of ADAPRB) and respectively the additional requirements of FMI at the University of Plovdiv "Paisij Hilendarski" for holding the academic position of "professor" competition, in addition to exceeding them;
- the scientific papers submitted by the candidate do not repeat those of previous procedures for acquiring a scientific title and academic position;
- there is no legally proven plagiarism in the scientific papers submitted at the competition.

4. Description and evaluation of the candidate's teaching experience

For the period 1986-2014 Olga Rahneva is an Assistant Professor, Senior Assistant Professor (since 1989), Chief Assistant Professor (since 1993) and Associate Professor (since 2008) at the UFT (former Higher Institute of Food Industry) - Plovdiv. During this time she lectured on the disciplines "Databases", "Programming in Pascal", "Computer Systems and Communications", "Programming and Use of Computing Systems", "Economic Informatics" and others.

Since 2014, as an Associate Professor in the Department of Management and Quantitative Methods in Economics at FESS at PU, she continues to develop very intensive teaching activities, leading various lecture courses in FISN bachelor's programs, regularly exceeding its annual standard by more than 50%::

- in "Informatics" for the specialties "Political Science" and "Marketing";
- in "Information Systems and Technologies" for the specialties "Political Science", "Marketing", "Business Administration", "Public Administration", "Tourism Business Management", "Macroeconomics" and "National Security";
- in "E-Commerce" for the specialties "Marketing", "Business Administration", "International Economic Relations", "Finance", "Macroeconomics", "Accounting", "Tourism Business Management" and "Business Management", as well as for the specialty "Chemistry" at the Faculty of Chemistry of the University of Plovdiv.

The study materials for the lectures and exercises of the above disciplines are updated annually by Assoc. Prof. Dr. Olga Rahneva since 2014 and are published in electronic format in the FESS systems. For the last seven years,

Assoc. Prof. Dr. Olga Rahneva has presented an official report showing active extracurricular work with students, scientific supervision of three defended graduates and four doctoral students, two of whom successfully defended their PhD dissertations in 2020. She is a representative of FESS at the University Center for Work with Young Scientists, Doctoral Students and Postdoctoral Students at the University of Plovdiv. She has repeatedly been the leader of the student team of UFT in the Republican Student Programming Olympiads.

Additionally, Assoc. Prof. Rahneva presented for the competition two textbooks (out of 6 textbooks and 3 textbooks) - on the development of business web applications and insurance information systems, specially created for the master's program "Business Software Technologies". The textbooks are available in the DisPeL platform, with the possibility to change the test tasks.

5. Detailed analysis of the scientific and applied achievements of the candidate contained in the materials submitted for participation in the competition

In this competition, the candidate presents 22 scientific publications, of which eight articles are in specialized journals – one in the International Journal of Pure and Applied Mathematics – IJPAM, and seven in the International Journal of Differential Equations and Applications, plus 14 publications in peer-reviewed scientific conferences – 11 international and three national conferences. In addition, she presents three monographs - two in English and one in Bulgarian, as well as two textbooks. The presented papers contain significant scientific and applied scientific contributions, which can be summarized in three main areas.:

- A. Development and implementation of distributed software systems and platforms for e-learning, which include:
 - development and experimental implementation of a Distributed e-Testing Cluster (DeTC) in articles [1], [2], [3] and [4];
 - design and testing of a Distributed Platform for e-Learning (DisPeL) in articles [6], [7] and [9];
 - design of distributed architecture of the regional data center for intelligent agriculture of Plovdiv region in article [19];
 - software framework for the development of distributed applications for business and education others in a monograph [27].
- B. Design and use of software tools and applications for technology-assisted learning these may include:
 - applications of the DisPeL platform for adaptive learning (articles [8], [10] and [21]);
 - plagiarism detection software (article [5]);
 - tools for teaching music to children with special educational needs (article [14]).
- C. Specialized studies of the properties of certain classes of sigmoidal, cumulative and adaptive functions with respect to:
 - upper and lower estimates for the one-sided Hausdorff approximation of the stepwise Heaviside function in works [11] and [25];
 - studies on the degree of "saturation" in the sense of Hausdorff of cumulative distribution functions to the horizontal asymptote in works [12], [13], [15], [16] and [20];
 - studies on the degree of "saturation" in the sense of Hausdorff's adaptive distribution function in works [17], [18], [22] and [26].

11 of the publications submitted for the competition are referred to in Scopus, and 9 of them are in editions with SJR. Four of the publications are referenced in the Web of Science, and one is referenced by the IEEE Xplore Digital Library. Six of the presented publications are in Bulgarian and the remaining 16 - in English. All submitted

works (publications, monographs and textbooks) are co-authored, as in 3 works the candidate is the first co-author, second co-author – in 14, third co-author – in 7 works, and fourth – in 3 works. In addition, the candidate submitted a list of all his publications (78 in number), 30 of which were referred to Scopus with SCImago Journal Rank or SJR.

There is a proven reflection of the candidate's results in the works of other authors. The citations presented at the competition are **366** and do not include self-citations and hidden citations. Of these, **30** citations are in articles referenced and indexed in **Scopus**, **28** in **Web of Science**, **2** in **IEEE** and **2** in **Zbl**. Of all the citations presented, **15** are by foreign authors. These citations form in Google Scholar an h-index of **12** and an i10-index of **15**. The ResearchGate candidate index is **13.56**.

6. Critical notes and recommendations

I have no significant critical remarks on the works presented in the competition and on the entire documentation, which has been prepared very carefully and described in detail and accurately. All publications are at a high technological level and contain in-depth analyzes of the current situation in the scientific field, problem statement, accuracy and completeness of the proposed solutions and the analysis of results, as well as adequate summaries and guidelines for future work. In all presented publications the candidate shows a high level of professionalism and excellent literary awareness.

All 27 works submitted for participation in the competition were co-authored. On the other hand, out of all 78 scientific articles of Assoc. Prof. Rahneva, only 7 were published independently, until 2006. In this sense, I would recommend the candidate to work in the future to create more independent articles and publish them in prestigious specialized journals. On the other hand, it would increase the visibility of her work among foreign scholars.

7. Personal impression of the applicant

I have known Olga Rakhneva for over 20 years and I can definitely say that she is a very thorough researcher, highly valued teacher, excellent professional and principled and correct colleague. All colleagues who have worked with her, with whom I have been in contact, have shared excellent impressions of their joint work on scientific and educational projects. It is very significant that the documents submitted in the competition **exceed** the minimum national requirements set by Art. 2b of ADAPRB in the respective scientific field and professional field, as well as the additional requirements of FMI at PU. From the presented list of all her scientific works it is clear that she could present more publications in the competition, which would increase this difference.

In addition, I would like to point out that she has always exceeded the norm for academic workload in FESS at the University of Plovdiv and has found time both to participate in research projects and to prepare students for computer science Olympiads. I am convinced that FESS at PU wins many of these colleagues who do not spare time and effort to raise the team to an even higher academic and scientific level.

8. Conclusion on the application

After getting acquainted with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific, scientific-applied and applied contributions contained in them, I confidently **confirm** that the academic achievements of Assoc. Prof. Dr. Olga Rahneva meet the requirements of ADAPRB, the Regulations for its application and the relevant Regulations of PU "P. Hilendarski for holding the candidate for the academic position "Professor" in the scientific field and professional direction of the competition. In particular, the applicant meets the minimum national requirements in the professional field, significantly exceeding them. No plagiarism was found in the scientific papers submitted at the competition.

I give definitively my **positive** evaluation to the application.

II. GENERAL CONCLUSION

On the basis of the above said, I am convinced to strongly **recommend** to the distinguished scientific jury of the competition to propose to the Faculty Council of the Faculty of Mathematics and Informatics at "Paisii Hilendarski" University to choose Assoc. Prof. Dr. Olga Dobreva Rahneva to hold the academic position of "Professor" in a professional field 4.6 Informatics and Computer Science (Informatics - Distributed Systems and Applications).

25/02/2022

Sofia, Bulgaria

Signature:

(Prof. Boyan Bontchev, PhD)