

REVIEW

from Prof. Dr. Chavdar Mladenov
at the National Institute of Geophysics, Geodesy and Geography (NIGGG – BAS),
member of the Scientific Jury,

approved by of the NIGGG Scientific Council Minutes № 29 / 29.12.2020 and Order of the Director of NIGGG № 01-266 / 29.12.2020 on the announced competition for the academic position "professor" in the field of higher education 4. "Natural sciences, Mathematics and Informatics", professional field 4.4. Earth Sciences, scientific specialty "Economic and Social Geography", published in the State Gazette No. 93 / 30.10.2020 for the needs of the Department of Geography at the National Institute of Geophysics, Geodesy and Geography at the Bulgarian Academy of Sciences (NIGGG) - BAS) with a single candidate - Assoc. Prof. Dr. Boian Koulov.

Dr. Koulov has been admitted to participate in the competition by a Commission specially appointed by the Director of NIGGG-BAS, in accordance with the Regulations on the terms and conditions for obtaining scientific degrees and holding academic positions in BAS and NIGGG-BAS. The submitted documents for participation in the competition meet the requirements of ZRASRB, the Regulations for the conditions and procedures for obtaining scientific degrees and holding academic positions at the Bulgarian Academy of Sciences and the Regulations for application of ZRASRB of the National Institute of Geophysics, Geodesy and Geography (NIGGG) at BAS.

I. Brief biographical data about the candidate.

Assoc. Prof. Dr. Boian Koulov was born in 1957 in the city of Plovdiv. He graduated in "Geography of Tourism" at Geography and Geology Faculty at Sofia University "St. Kl. Ohridski" in 1983. He was a full-time doctoral student at the Institute of Geography and received the degree "Candidate of Sciences" (equivalent to a doctor) in 1988. His dissertation was on "ECONOMIC GEOGRAPHY FORECASTING OF THE BURGAS INDUSTRIAL TERRITORIAL SYSTEM" (Diploma no. 17520 of 25.03.1988 from the Higher Attestation Commission). He has worked as a guest researcher at West Virginia University, Morgantown, West Virginia, USA (February 1, 1990-August 1, 1990), visiting professor at West Virginia University, Morgantown, West Virginia, USA (August 10, 1990-May 1, 1991), Assistant Professor at the American University, Washington, DC, USA (May 1, 1991 - August 1, 1998), Visiting Professor at George Mason University, Fairfax, Virginia, USA (August 1, 1998 - August 1, 2000), Assistant Professor at George Washington University, Washington, DC, USA (01.08.2000–01.06.2007), geographer, Institute of Geography at BAS (15.10.2007–01.01.2008), Senior Research Fellow II degree at Geographical Institute at BAS (01.01.2008–07.03.2008), Senior Research Fellow II degree and Scientific Secretary of the Geographical Institute at BAS (07.03.2008–12.10.2010), Associate Professor (Senior Research Fellow II degree) and Scientific Secretary of the National Institute of Geophysics, Geodesy and Geography at BAS (12.10.2010 - 14.10.2014) and associate professor (14.10.2014 – till now).

According to a reference from NACID, Koulov has over 60 publications in the country and abroad, of which 25 are presented for habilitation as an associate professor (senior researcher II degree). He has led or participated in the work of Bulgarian and international projects. According to the documents, he has significant teaching activity in the country and abroad.

II. Criteria for participation in the competition.

To participate in the competition, the candidate has submitted a signed list of publications and copies of them. List of citations signed by the candidate and Information on the implementation of the minimum requirements for holding the academic position of "professor", in accordance with the regulations. In the analysis of the mentioned documents I found the following:

The requirements for holding the academic position of "professor" are met, in accordance with Art. 21 item 4.3. of the Regulations for the conditions and the order for acquiring scientific degrees and for holding academic positions in BAS and Appendix № 1 to it. The candidate has presented the number of required and scored points by groups of indicators for holding the academic position of "professor", in the following table:

Table 1. Quantitative evaluation of the documents submitted by Assoc. Prof. Dr. Boian Koulov in accordance with the minimum points by groups of indicators required for the academic position of "professor", according to the Regulations of NIGGG-BAS.

Group of indicators	Contents	Acquired by Assoc. Prof. Dr. B.Koulov	Regulations of NIGGG – BAS: Points required
A	Indicator 1. Dissertation work for awarding "doctor" degree	50	50
B	Indicator 3. Habilitation work - monograph	100	100
D	Indicator 7. Scientific publication in publications that are referenced and indexed in world-famous databases with scientific information	81,7	
	Indicator 8. Scientific publication in non-referenced journals with scientific review or in edited collective volumes	151,6	
	Total number of points on indicators 7 and 8	233,3	220
E	Indicator 10. Citations or reviews in scientific journals, referenced and indexed in world-famous databases of scientific information or in monographs and collective volumes.	125	
	Indicator 12. Citations or reviews in non-referenced journals with scientific review	6	
	Total number of points by indicators 10 and 12	131	120
F	Indicator 14. Guidance of a successfully defended PhD student thesis	40	
	Indicator 17. Management of a national scientific or educational project	120	
	18. Management of an international scientific or educational project	80	

	Sum of indicators from 14 to 18	240	150
Total	Total number of points by groups of indicators A, B, D, E and F	754,3	640

According to the attached reference from the applicant for compliance with the minimum requirements, their fulfillment is established according to the indicators from group A and group B. The candidate has "Doctor" degree (group "A"), for which 50 points are awarded. In the "B" group of indicators Assoc. Prof. Koulov presented an independent habilitation thesis, for which 100 points are awarded - Koulov, B. (2020) Europe's Core-Periphery Relations and Horizontal Disparities (Relationships "core-periphery" and horizontal inequalities in Europe) . Az-Buki National Publishing House for Education and Science at the Ministry of Education and Science. ISBN 9876197065305. ISSN 9876197065312.

The habilitation work of Assoc. Prof. Dr. B. Koulov is in the field of economic geography. It focuses on "horizontal" (regional) inequalities in living standards in Europe, which pose risks to integration, cohesion and social stability. The work developed effective policy tools to help achieve a more socially acceptable geospatial balance on the continent. The study applied the innovative holistic approach to the European socio-economic geospace, identifying, localizing, classifying and analyzing the elements, geospatial structures and boundaries in statics and dynamics that lead to transformations at different scales in the period 2007-2017. The newly formed structures, their geographical distribution and their classification according to socio-economic status and trends are revealed. The subsystems "core" and "periphery" are analyzed. The scale of horizontal inequalities and their dynamics are calculated using the indicator of "inequality ratio" , which measures the differences between geospatial elements with the highest and respectively the lowest values in the European core, in the periphery, as well as between them, at the beginning and the end of the considered period. It has been established that as a result of geospatial transformations in Europe, three macro-regions have emerged, each with its own specific characteristics (Western European, Eastern European and South-Eastern Europe). The research is of interest to scientists, as well as to politicians and experts in the field of strategic planning. Special attention is paid to the process of peripheralization and the emergence of areas with specific geographical characteristics and the resulting conclusions about policies and tools for their improvement and overcoming.

In the **group of indicators from "D"** are presented 18 scientific publications, of which in D7 are 6 publications (81.7 points), and in D8 are 12 publications (151.6 points). The points collected by the candidate on the indicator D exceed the minimum required for the academic position "professor".

The research interests of Assoc. Prof. Dr. B. Koulov are in the field of socio-economic geography: transformation of territorial-economic systems, zoning, center-periphery, geographical boundaries, ecosystem services, geostrategies and policies.

The publications proposed for review by Assoc. Prof. Koulov are in the field of two thematic areas - 1) geospatial inequalities and sustainable regional development and 2) a relatively new and little developed in our country area of ecosystem research.

The first direction covers the theory, tools and policies for overcoming them, respectively, achieving. The differences between Europe's rich core and its much poorer periphery are significant and sustainable over time. Identified and mapped are the boundaries of the geospatial core and periphery of the European socio-economic system and their dynamics in the period 2007-2017 (D.7.3). The categories "Super Core" (with the highest

potential to generate growth) and "Deep Periphery" belonging to the macro-region "Southeast Europe" (D.7.3, D.7.4) have been identified. A theory, based on the "periphery overlap" effect, is proposed, which can be used as a tool to identify declining regions or so-called regions with special geographical features: mountainous, borderline (especially at the EU's external borders), ethno-political and others. To support the geospatial linkages, adequate to the scale, it is proposed to integrate territorial policies, which will contribute to maintaining a socially acceptable balance at EU and national level. (D.7.3, D.7.4, D.8.1, D.8.2, D.8.4, D.8.6, D.8.7, D.8.9). It is proposed to increase the importance of regional monitoring by ensuring the availability and access to necessary and sufficient data at regional and local level, and especially for peripheral regions for the purposes of strategic spatial planning and transparency of territorial unit management (D.7.3, D.7.4, D.8-2, D.8.3, D.8.4, D.8.11).

The second direction focuses on the application of the concept of ecosystem services, and the use of geographic information technologies for sustainable environmental management and regional development. Based on the EU Biodiversity Strategy, the need to map and assess the state of ecosystems in national territories is justified by improving ecosystem services. The proposed publications review the activities in Bulgaria related to ecosystem services and the methods chosen so far for their mapping and assessment, which have been tested in Bulgaria. The methodological framework of MAES (Mapping and Assessment of Ecosystem Services) is applied on the administrative-territorial units of the country (D.7.1, D.7.2, D.7.5, D.7.6). The introduction of the term "dysergy" of ecosystem services has been defined and proposed in order to develop the theory and practice. At the local level in mountain regions are proposed recommendations for improving the use of municipality ecosystem services, which include identification, analysis and visualization of "hot points" and areas of dysergy (D.7.2, D.7.6, D.8.3, D.8.8, D.8.11). GIS-based approaches, database and cartographic products have been developed to help reduce the risk of hazardous natural phenomena and technological hazards in connection with the protection of natural and cultural heritage. The basic principles of a theoretical model of GIS for hazard reduction are formulated, together with its elements, structure and the most important necessary functions (D.8.3, D.8.5, D. 8.8, D.8.12).

In the **indicators from the "E" group** are provided 28 citations of 14 publications, which form 131 points with the minimum required 120 points. The cited publications of the group 10. Citations or reviews scientific publications which are refereed and indexed in world renown data bases of science information or in monographs and collective volumes "are 12 and collect 125 items and 2 publications from group 12." Citation or review in non-refereed journals with scientific review "- 6 points.

In group F Assoc. Prof. Koulov has collected 240 points out of the required 150. There is a successfully defended doctoral student (40 points), 17. Management of a national scientific or educational project - 6 projects (120 points), 18. Management of an international scientific or educational project - 2 projects (80 points).

The publications are the work of the candidate and his co-authors. In the presented publications I have not noticed illegal use of other people's works and plagiarism.

III. Scientific contributions of the candidate

According to the submitted publications, the candidate's scientific contributions are divided into two thematic areas - 1) geospatial inequalities and sustainable regional development - theory, tools and policies and 2) application of the concept of ecosystem

services and geoinformation technologies, sustainable environmental management and regional development.

The first thematic area is related to the development of the methodology for studying geospatial inequalities and the sustainability of regional development in the context of "horizontal inequality". The scientific contributions in this thematic area are the habilitation work ("B") and most of the candidate's publications. The main contributing publication is the habilitation paper, which is a methodological approach developed by the candidate to study inequalities in living standards, which are considered as risks to integration, cohesion and social stability. In my opinion, the main scientific methodological and applied contributions in this direction are:

- introduction of the categories "super core" and "deep periphery" and the methodology for identifying the regions of these categories (B.3.1, D.7.3, D.7.4);
- identification and delimitation of the geospatial core and periphery in the European socio-economic system (B.3.1, D.7.3);
- the process of socio-economic peripheralization and marginalization in certain areas (identified as declining regions) is proved and the effect of "overlapping peripheries" is substantiated (D.8.2, D.8.4, D.8.6, D.8.7, D.8.9);
- the regions in Bulgaria are classified at different levels according to the living standard of the population and transformations, which support the geographical forecasting and the socio-economic and territorial planning (B.3.1);
- proposed for use is a "horizontal inequality index" to measure the dynamics and differences in the average standard of living between regions at all levels (B.3.1);
- the concept for sustainable development and its management has been further developed on the case study of mountain regions (D.8.4, D.8.6, D.8.7, D.8.9, D.8.12);
- the importance of regional monitoring for the purposes of the strategic territorial planning and the transparency of territorial units' management is substantiated (B.3.1, D.7.3, D.7.4, D.8.2, D.8.3, D.8.4, D.8.11).

In **the second thematic area**, the scientific contributions are on the application of the concept of ecosystem services and the use of geographic information technologies:

- proposed for use and defined is the content of the term "dysergy of ecosystem services" for the needs of geospatial planning and sustainable development of territorial units at the local level in mountain regions, including identification, analysis and visualization of "hot spots" and zoning of dysergy (D.7.2, D.7.6, D.8.3, D.8.8, D.8.11);
- the term "technological hazard" is defined from a geographical point of view, formulating the basic principles and structure of a GIS-based theoretical model for hazard reduction (D.8.3, D.8.5, D.8.8, D.8.12);
- the methodological framework of MAES (Mapping and Assessment of Ecosystem Services) in the administrative-territorial units of the country is applied and on this basis methodological guidelines are proposed, regarding the mapping of ecosystems and the economic evaluation of the services they provide at local level in Bulgaria (D. 7.1, D.7.2, D.7.5, D.7.6).

I accept all contributions of the candidate indicated in the report.

IV. Critical remarks and recommendations. I have no critical remarks on the materials presented in the competition as a whole.

There independent publications are few.

The opinion of the candidate is not visible in some of the publications.

Synthesizing, predictive, and applied publications should be emphasized in the future. There is no scientific school of followers developed (very few doctoral students), but there are objective reasons for this.

The possibilities for geographical modeling are little used in the scientific activity of the candidate.

These critical remarks do not in any way change the candidate's coverage of the requirements of the competition for the academic position of "professor", but are aimed at a clearer distinction of his research profile in economic and social geography.

V. Conclusion:

1. The scientific production, the participation in scientific forums and projects and other types of scientific activity of Assoc. Prof. Dr. B. Koulov exceed the requirements for holding the scientific position "Professor".

2. The scientific contributions in the publications and the habilitation work are up-to-date, original and significant and represent novelty and enrich the geographical science, as with new means significant aspects of the socio-economic processes are proved, which is done with confirmatory and new facts. All this is acknowledged by the citations of his publications abroad.

3. The candidate has also carried out significant teaching activity through which he has transferred academic research results and knowledge to higher schools in the country and abroad;

4. He enjoys the respect, not only of his Bulgarian colleagues, but is highly valued abroad, as evidenced by the leadership and participation in a number of national and international projects.

From all that has been said so far, it is clear that the candidate for the scientific title "Professor" - Assoc. Prof. Dr. Boian Koulov - is an established, proven and recognized authoritative scientist in Bulgaria and abroad in the field of Economic and Social Geography and related scientific fields. By taking the academic position "Professor" in the scientific specialty "Economic and Social Geography, Assoc. Prof. Dr. Boian Koulov will respond to the needs of the Department of Geography at NIGGG-BAS and expand and enrich the scope of research in the Section "Economic and social geography".

After getting acquainted with the materials and scientific papers presented in the competition, analysis of their significance and the contained in them theoretical and applied contributions, I have every reason to conclude that the scientific activity of the candidate Assoc. Prof. Dr. Boian Koulov meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the relevant regulations, and gives me grounds to express a completely positive attitude (YES) for him holding the academic position of "professor".

In view of the above, I would like to propose to the members of the Honorable Scientific Jury to decide the following:

- 1. The candidate Assoc. Prof. Dr. Boian Yordanov Koulov meets all the requirements of the regulations for holding the academic position "PROFESSOR";**
- 2. I propose to the members the esteemed Scientific Jury to vote for the proposal to the Scientific Council of NIGGG - BAS, to make a decision to grant Assoc. Prof. Dr. Boian Yordanov Koulov the academic position of "Professor" in Science 4. Natural Sciences, Mathematics and Informatics, Professional field - 4.4. Earth sciences, Scientific specialty - Social and economic geography.**

Sofia, January 24, 2021

Reviewer:
(Prof. Dr. Chavdar Mladenov)