

REVIEW

by **Prof. Dr. Radoslav Dakov Yoshinov**

Laboratories of Telematics – Bulgarian Academy of Sciences,
on a dissertation on the award of educational and scientific degree
"Doctor" in a scientific field: 5. Technical sciences, professional field: 5.2

Electrical engineering, electronics and automation,
Doctoral Program: "Application of the Principles and Methods of
Cybernetics in Various Fields of Science"

Author of the dissertation: Ekaterina Spasova Tsopanova

Scientific sdviser: Acad. Vasil Stoyanov Sgurev.

Thesis topic:

"Influence of the subjective factor in decision-making systems"

1. Under the procedure

I was appointed by Order No 26 of January 29, 2024 of the Director of the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences, as a member of the Scientific Jury for the defense of the dissertation of **Ekaterina Spasova Tsopanova**, for the award of the educational and scientific degree **"Doctor" with a newhead** of the dissertation Acad. Vasil Stoyanov Sgurev.

As a member of the Scientific Jury, I have received:

1. Order No 26 of 29 January 2024 of the Director of the Institute of Information and Communication Technologies,
2. Dissertation for awarding educational and scientific degree "Doctor".
3. Dissertation autorefer.
4. Copies of the articles included in the dissertation.
5. Supporting documents for the procedure for the protection of the dissertation.

In forming the final evaluation of the dissertation, the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation are taken into account, as well as the Regulations on the terms and conditions for acquiring scientific degrees at IICT-BAS Table certifying the fulfillment of the minimum requirements of IICT for the educational and scientific degree "Doctor" of Ekaterina Spasova Tsopanova

Гр. пок.	Indicators	Data of the scientist	Number of points	Number of points per scientist
A	1. Dissertation for awarding educational and scientific degree "Doctor"	Influence of the subjective factor in decision-making systems	50	50
Г	Sum of indicators 7 to 9	Full bibliographic data	Min. 30	
D7. Scientific publications in editions that are referenced and indexed in world-famous databases of scientific information			40/n or distributed in a ratio based on a contribution protocol	
D8. Scientific publication in non-refereed journals with scientific review or in edited collective volumes		<p>1. Tsopanova, E., Motivation in Decision-Making Systems. Problems of Engineering Cybernetics and Robotics, 79, Prof. Marin Drinov Academic Publishing House, 2023, ISSN:2738-7356, DOI:10.7546/PECR.79.23.04, pp. 67-74.</p> <p>2. Tsopanova, E., The Role of Emotions in Decision-Making Systems. Problems of Engineering Cybernetics and Robotics, 80, Prof. Marin Drinov Academic Publishing House, 2023, ISSN:2738-7356, DOI:10.7546/PECR.80.23.04, pp. 33-40.</p>	20/n or distributed in a ratio based on a contribution protocol	40

2. Short autobiographical data

Ekaterina Spasova Tsopanova graduated:

2003 - "Social Pedagogy", Sophisk University "St. Kliment Ohridski". Kliment Ohridski",

2011 - "Management of Social Work Institutions", Sophisk University "St. Kliment Ohridski". Kliment Ohridski",

2017 -Positive Psychology, Plovdiv University "Paisii Hilendarski"

2021 "Social Pedagogy", Sofika University "St. Kliment Ohridski",

On January 2021 and is currently in the doctoral program "Application of the principles and methods of cybernetics in various fields of science", BAS

3. Actuality of the dissertation

In modern informatics, there is a need for the combination of psychological and mathematical methods, which will create greater efficiency of combined methods of decision-making compared to their separate use. And this, in turn, leads to the emergence of new research tasks in decision-making processes. The Theme with the Motivepeople occupy an increasingly significant place in today's complex and changing economic environment. The topicality of the dissertation comes from the formal description of discrete decision-making systems taking into account motivation. Concepts of sets, graphs and network flows are discussed, which are tools for the construction of mathematical models. Based on the analysis, it has been found that discrete decision-making systems based on network flows allow for relatively accurate and accurate reporting of motivation behavior.

4. Degree of knowledge of the state of the problem and general characteristics of the work

The subject of the study in the dissertation is the possibility of building a human-machine system for decision-making with due regard to motivation.

The object of the study is the influence of the subjective factor in the decision-making systems and in particular the motivation in the human-machine systems for decision-making.

The aim of the dissertation is to study the influence of the subjective factor and in particular the motivation in the decision-making systems.

The dissertation is in a volume of 154 pages and with a bibliography including 151 literary sources. A good impression is made by the presence of Bulgarian authors in it. Its structure includes an introduction, four chapters, conclusion, declaration of originality and bibliography.

5. Compliance of the proposed methodology of research and the set objective and tasks of the dissertation

In the introduction, a review analysis is made and the purpose and tasks of the dissertation are formulated.

The main objective of the dissertation study is formulated to investigate the influence of the subjective factor and in particular the motivation in the decision-making systems.

To achieve the set goal, the following tasks are defined:

To analyze the types of motivation and the main motivational modalities.

To analyse the systems for supporting the decision process.

To analyze discrete decision-making systems with motivation.

To realize a numerical example of a discrete system for taking relements into account motivation.

Chapter 1 discusses motivation in theoretical terms. Nature of motivation. Types of motivation. Motivational processes. Factors influencing motivational Content theories of motivation. Types of motivation models.

In chapter 2, a theoretical aspect of decision theory is given. Basic concepts related to decision making are defined. The security aspects of the results resulting from the solved ones are discussed. Decision support systems are discussed. Mathematical modelling in decision making- static and dynamic models, semi-structured models, unstructured models, official models. A classification of mathematical models has been made. Problems of multilevel modelling in decision making are discussed.

In Chapter 3, a formal description of discrete decision-making systems with consideration of motivation is made. Using the mathematical apparatus of sets, graphs and network streams. Features of decision-making systems based on network-flow are discussed.

In chapter 4, a numerical example is given of a discrete decision system with motivation accounting.

The methods and models that are created and used meet the target task by providing concepts for solutions and guidelines are given for future research.

I have not noticed any errors in either the specific or conceptual models. I also find that the strategies proposed are well founded

6. Characterisation of the nature and assessment of the reliability of the material on which the contributions of the dissertation work are built

I find that the set goal and the formulated tasks reflect the relevance and significance of the dissertation presented, as well as the opportunity to apply the results obtained in practice.

I accept that the formulated contributions of the dissertation could be considered as scientific-applied and applied. This division would allow to detail the results obtained according to the specifics of their significance.

7. Degree of personal involvement of the dissertant in contributions

The personal participation of the doctoral student is judged by the publication activity of the doctoral student reflected in the materials published on the dissertation. The PhD student convincingly presents the achieved results with a very good and thorough argumentation, as well as uses professional graphic design of the materials.

The nature of the study implies a very good and broad preparation in the field of research the influence of the subjective factor and in particular the motivation in the decision-making systems.

I accept that the formulated contributions of the dissertation, which are visible but not sufficiently well arranged and verbalized, could be regarded as scientific-applied and applied. This division would allow to detail the results obtained according to the specifics of their significance.

I believe that the PhD student has done well and I do not question his personal involvement in the development of the dissertation material. and the contributions thereto .

8. Assessment of publications on the dissertation

The presented list of publications on the dissertation includes two independent publications in the journal "Problems of Engineering Cybernetics and Robotics", which is open access.

9. Compliance of the autorefer with the requirements for its preparation and adequacy of reflection of the main points and contributions of the dissertation

The autoreferree has a volume of 55 pages. It faithfully reflects the essence and content of the dissertation, including the purpose and tasks of the dissertation study and the ways of their realization.

Reflects the results achieved as well as the contributions of the author. It is graphically shaped very well and includes the necessary information describing in summary the dissertation.

10. Opinions, recommendations and remarks

In the dissertation a very complex, dynamically developing and promising field is developed - to study the influence of the subjective factor and in particular the motivation in the decision-making systems. This implies sufficient in-depth knowledge, the possibility of interpretation and formulation of strategies for effective development of the field. Meaningfully and graphically, the material is developed

very well. This material is of interest to a wide range of readers and if it is published after processing it will have a multi-applicative effect.

The main advantage of this work is that the right questions have been asked, and an attempt has been made to provide a variant of answers to these questions.

In general, the dissertation paper contains scientific and applied results that represent an original contribution and is presented in a form and volume corresponding to the specific requirements of the primary unit with which the work of Ekaterina Spasova Tsopanova meets the conditions of Art. 6 (3) of which the ZRASRBi of art. 27 (2) of the RPPI

I recommend to Master Ekaterina Spasova Tsopanova a to continue her active publication activity in scientific journals with impact factor.

11. Conclusion

A significant amount of research has been carried out, models for quality assessment in higher education have been proposed, software tools have been designed and developed, and experiments with the proposed solutions have been conducted. The content and contributions of the dissertation of Master Ekaterina Spasova Tsopanova fully meet the requirements of the Law on the Development of the Academic Staff of Republic Bulgaria, the Regulations for its application and the Regulations for the acquisition of scientific degrees at IICT-BAS. There is a sufficient number of scientific and applied contributions. A sufficient number of dissertation publications published at prestigious scientific forums have been presented. It is undeniable that the personal participation of the author in the development and contributions received. This gives me reason to confidently recommend to the Honorable Scientific Jury to award to Master Ekaterina Spasova Tsopanova the educational and scientific degree "Doctor" in scientific field 5. Technical scienceand, professional field 5.2 Electrical Engineering, Electronics and Automation, PhD Program: "Application of the principles and methods of cybernetics in various fields of science".

05.03.2024`
Sofia

