

## Review

from Acad. Ivan P. Popchev – BAS  
 thesis to acquiring the educational and scientific degree  
**"Doctor"**  
 in professional field 4.6. "Informatics and Computer Sciences"  
 Doctoral Program "Informatics"  
 Titled " PERSONALIITY AND DECIISIION-MAKIING MODELS IN INTERNET"  
 by **Rumen Rumenov Ketipov**

By order No 129/27.05.2021 of Prof. G. Angelova, DSc - the Director of IICT – BAS in accordance with Art. 4, para. 2 of the Act on Development of the Academic Staff in the Republic of Bulgaria and by decision of the Scientific Council of IICT (Protocol No 5/26.05. 2021) in connection with the procedure for acquiring the educational and scientific degree "Doctor" in professional field 4.6. "Informatics and Computer Sciences", Doctoral Program "Informatics", by Rumen Rumenov Ketipov with a PhD thesis on "Personality and decision-making models in Internet" I am appointed a member of the Scientific panel.

In the evaluation of the thesis, the conditions of the Act on Development of Academic Staff in the Republic of Bulgaria (ADASRB), the Regulation on the Implementation of the Development of Academic Staff in Republic of Bulgaria Act (RIDASRBA) (Decree No 202 of 10.09.2010, amend and suppl. SG 15/19 February 2019) and the Regulations on the specific conditions in the IICT for implementation of the law are defined and will therefore be accurately transmitted:

1. Pursuant to Art. 27 (1) of the RIDASRBA "The dissertation paper should contain scientific and applied science results representing an original contribution to science. The dissertation paper should make it evident that the candidate has profound theoretical knowledge of the respective subject and the capability for independent scientific research."
2. According to Art. 27 (2) of the RIDASRBA "The dissertation paper shall be presented in a form and volume meeting the specific requirements of the primary unit. The dissertation paper shall contain: a title page, contents, introduction, exposition, conclusion – summary of the obtained results with declaration for originality, literature references."

According to the RIDASRBA and the Rules of Specific Conditions in IICT, minimum required points by groups of indicators for the educational and scientific degree "Doctor" of 4.6. "Informatics and Computer Sciences" are:

Group of indicators	Contents	Number of points
A	Indicator 1	50
D	Sum of indicators from 5 to 10	30

The scientific supervisor of the thesis is **Assoc. Prof. Vera Angelova, PhD.**

The aim of the thesis, formulated on page 3 is to investigate the presence of significant relationships between personality and some of the basic e-commerce features. Based on the obtained results, it also aims to create models for reliable prediction of consumer preferences and behavior in the purchasing decision-making process based on their personality profile.

Concerning the aim of the study, the objectives are defined as follows:

- To study the existing various theories and concepts for personality measurement and to choose an appropriate psychometric model for the study.

- To choose a set of e-commerce functionalities that are typical and applicable to most of them.
- To create a research strategy and design, respecting basic standards of ethics and neutrality; to translate the research into three languages - Bulgarian, English, and German to ensure its wider scope and validity; the aspect of risk averseness to be considered as additional personality determinant; to analyze the study's results and to establish if there is a relationship between chosen independent and dependent variables.
- To propose and implement two (or more) Machine Learning (ML) models to be achieved a reliable prediction for the dependent variables in the existing significant correlations and to analyze the achieved results; to choose an appropriate ML model and to propose and implement optimization.
- Based on the achieved results of the conducted study to be developed and determined the consumer behavior models in the process of decision-making in the field of e-commerce.

The thesis is in a volume of 242 pages, 36 figures, 27 tables, 273 quoted sources and includes:

- ❖ Introduction (1 – 5);
- ❖ Individuality as a factor in decision-making on the Internet (**Chapter 1, 6 –74**);
- ❖ Empirical study methodology (**Chapter 2, 75–86**);
- ❖ Research. Predicting consumer behavior on the Internet (**Chapter 3, 87–149**);
- ❖ Conclusion – summary of the results obtained (150 – 153);
- ❖ Publications (154–155)
- ❖ Scientific and applied results (156–157)
- ❖ Declaration of originality of results (158)
- ❖ Bibliography (159–181)
- ❖ Appendix A – Questionnaire (182–227)
- ❖ Appendix B – Machine learning models (228–242);

9 publications published in the period of 2018 - 2021 are on the thesis.

- ❖ 3 publications are in **journals with SJR (No 5 – Q<sub>3</sub>, 6 – Q<sub>2</sub>, and 7 – Q<sub>4</sub>)**;
- ❖ 1 publication is in a journal (No. 8);
- ❖ 5 publications are in conference proceedings (No. 1, 2, 3, 4, and 9);
- ❖ all publications are **co-authored**.

According to data in the journal "Problems of Technical Cybernetics and Robotics", Proceedings of the Annual University Scientific Conference 28 - 29 May 2020, NMU "V. Levski", Veliko Tarnovo and Scopus have noticed three citations of publications No 2, 4, and 6. No list with participation in projects has been submitted.

The PhD student has been awarded a diploma by the Director of IICT for very good scientific achievements in 2019 in the category "PhD students".

The scientific indicators compared with the minimum requirements for the educational and scientific degree "Doctor" according to the Regulations on the specific conditions for acquiring scientific degrees and for holding academic positions in IICT - BAS are as follows: Group D - 60 points with minimum requirements 30, including:  $D7 = 3 * 20 ([4,5,6]) = 60$  points. The indicators significantly exceed the minimum specific requirements of IICT - BAS for the acquisition of the educational and scientific degree "Doctor".

**The conditions of the RIDASRBA and the Specific Conditions Regulations of IICT – BAS are fulfilled.**

Pursuant to Art. 27(1) of the RIDASRBA, "The dissertation paper should contain scientific and applied science results representing an original contribution to science". In the thesis (p. 156–157) are formulated five **scientific and applied science results**, for which it is not determined whether they constitute an original contribution to science.

In **short**, the results in the thesis can be systematized as follows:

1. Designed, organized, and conducted with the Google Forms empirical study application with the TIPI (Ten Item Personality Inventory) test in three languages (Bulgarian, English, and German) with 226 participants from 30 August to 15 September 2020, correlations between individual personal determinants and consumer preferences in online commerce have been found.
2. There were implemented with Python version 3.8 three machine learning models (linear regression, decision trees, and random forests) to predict user preferences as a result of their personality, which were evaluated with three appropriate Metrics - Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and Mean Percentage Error (MAPE).
3. An optimization of random forests with cross-validation is proposed using the Grid Search CV application of the Scikit-learn Library, as well as optimization through the TPOT (Tree-based Pipeline Optimization Tool), which uses genetic programming.
4. Models of online decision-making behavior have been identified for the more extroverted, more agreeable, more conscientious, emotionally stable, and regarding the risk-taking attitude.
5. Limitations of research and guidelines for future research have been systematized.

### Critical Notes

1. More precisely, the title of Chapter 2 could be replaced by "design" instead of "methodology", which is "an exercise in the basic principles of the scientific method of knowledge of the world established by philosophy".
2. In the References there are sources given incomplete, for example without pages, year of publication, publishing, etc.

### Questions on the thesis

1. On page 152 are limitations of the study. Can these restrictions be overcome? Do they have to get over it? Isn't it better to "intensify" restrictions, that is, to "narrow"?
2. Why haven't be included neural networks in the machine learning?
3. How, according to page 153, implicit methods can be supplemented and controlled by explicit, with the TIPI test presenting one such possibility?
4. Recommended on page 152, for the results to be considered as valid, check them by other methods. What other methods are considered to meet truthfulness? Have such checks been carried out and can the results be commented on?
5. The development of artificial intelligence then, when each person can be considered separately, how will patterns of behavior in online commerce change?
6. Where is there a trend (p. 46) towards only three types of potential risk? Is it possible to include other risks? For example: risk of amendment of the legislation, crisis risk, risk of confidentiality of personal data, etc.

7. Is there evidence of similar empirical surveys by e-commerce companies, such as Amazon or Alibaba?
8. Can the results obtained in the dissertation be applied as a commercial product of e-commerce companies?
9. What resources will be needed for future research? How can these resources be deployed over time?

As a summarized "**quantitative scientific image**" of PhD student Rumen Ketipov, the world scientific databases show the following:

- **Scopus:** 3 documents by author, 1 citation by 1 document, h-index 1.
- **Web of Science:** All years (1950 – 2021) your search found no records.

The three publications in Scopus, are No 5, 6, and 7, and the referenced publication is No 6.

**The quantitative scientific image** must be subject to mandatory self-analysis, new research guidelines and further independent audience activity in IF and SJR editions.

**The Abstracts are** in Bulgarian and English, respectively 54 p. and 48 p. and present the thesis.

### CONCLUSION

The thesis meets the conditions of the ASRBA, the RIDASRBA and the specific requirements in the IICT.

I give a **positive conclusion** for acquisition of the educational and scientific degree "Doctor" of **Rumen Rumenov Ketipov**.

I propose to the Scientific panel to vote unanimously for Rumen Rumenov Ketipov the educational and scientific degree "Doctor" on 4.6. "Informatics and Computer Sciences", Doctoral Program "Informatics".

11.06.2021

Signature: ...

**NOT FOR  
PUBLIC RELEASE**

/Acad. Ivan P. Popchev/