

Annotations of the materials under Art. 67 of the PRASPU

of Assoc. Prof. Dr. Tanya Petrova Yankova-Lilova
for participation in a competition for the academic position of "professor"

I. Compliance with the conditions for holding the academic position of "professor" – Art. 76, (1), items 1, 2, 3 of the PRASPU

1. I defended my educational and scientific degree "Doctor" before the Higher Attestation Commission in November 2007 (diploma No. 31958 of 07.01.2008).
2. Since April 2016, I have been appointed to the Faculty of Economic and Social Sciences in the academic position of "Associate Professor" (certificate No. 300082 / April 25, 2016), i.e. I have held this position for 9 years and 8 months.
3. I have been a lecturer at the Faculty of Economic and Social Sciences since October 2009, and my part-time teaching activity began and has not been interrupted since 1994. In addition, before entering the university, during the period 2000-2009, I was on an employment contract with the Institute of Management and Systems Research of the Bulgarian Academy of Sciences and was engaged in scientific research activity.

II. Summary – self-assessment of the scientific production and publications in the specialized scientific journals with which I participate in this competition – Art. 76, (1), items 4, 5 of the PRASPU

4. Among the scientific works with which I participate in the announced competition for "professor" is the monograph:

(1) Tania Yankova. ***Mathematical modeling in economic research - selected methods and approaches***. University Publishing House "Paisiy Hilendarski", ISBN: 978-619-281-010-8, 2025, 216 pages.

The monographic work is a personal development in the volume of 216 pages and is structured by an introduction, seven chapters, conclusion, applications and bibliography. It is aimed at a systematized presentation and analytical study of modern quantitative methods and models applicable in economics and management.

The object of research is economic processes, objects and phenomena (for example, markets, company activities, production systems, management decisions, consumer behavior, etc.), which can be studied through mathematical modeling.

The object of research is the various mathematical methods and techniques for modeling and optimization, with the focus on their application to solving specific economic problems.

The main goal is to offer a theoretical and practical field in which key models for optimization, forecasting and decision-making are analyzed, adapted and applied to real management and economic problems. As a result of the set goals and objectives of the work, it is expected that the work will not only summarize and enrich knowledge in the field of economic mathematics and applied methods but also contribute to improving the tools of management sciences.

The content is as follows:

In "INTRODUCTION" the importance of mathematical modeling for contemporary economic research is examined, the main goals and objectives of the monograph are outlined and a brief overview of the content is presented.

In "CHAPTER 1. THEORETICAL OVERVIEW OF EXISTING DIRECTIONS AND APPROACHES" an overview of some basic methods and approaches for mathematical modeling in economics is made. With the support of prominent literary sources, classical and established research directions are presented, after a selection from which the framework of the monograph is formed.

In "CHAPTER 2. MODELING OF AN ECONOMIC OBJECT" a dynamic model of a product market is developed and presented. The demonstration examines the main stages through which the modeling process goes.

In "CHAPTER 3. MODELING AN ECONOMIC PROCESS THROUGH APPROXIMATION" the necessary tools for the research in the following chapters are briefly described. The basic principles related to the approximation of functions are presented, formulas are derived and a practical example is considered, demonstrating the use of approximation in the analysis of economic data.

In "CHAPTER 4. LINEAR OPTIMIZATION MODELS" the methods for solving linear optimization problems are considered. It is divided into four sections, each of which contains a description and general information, an algorithm of the method and illustrations with its implementation, examples of application in an economic context.

"CHAPTER 5. TRANSPORTATION PROBLEM" presents the formulation of the transport problem as a special case of a linear optimization problem. The algorithms for finding an initial support plan and the algorithm of potentials for iteratively reaching the optimal transportation plan are described. The cases of blocked transportation and the servicing of a participant with priority are considered. The description is supported by numerous solved examples.

"CHAPTER 6. MODELING OF A TRANSPORTATION PROBLEM THROUGH FUZZY SET THEORY" consists of seven sections. The first of them is an overview. The second presents the basic concepts and principles of fuzzy set theory. The third section describes an identified research problem, and the development of a model for its solution is presented in the next two sections. The application of the model is illustrated with a specific example.

"CHAPTER 7. MODELING OF A FUZZY MEMBERSHIP FUNCTION THROUGH BÉZIER CURVES" provides an introduction, describes the problem, and presents previous developments related to it. Approximation of a sequence of points by a Bézier curve is discussed in the third section, and the necessary formulas are derived. The construction of the new membership function is discussed in the fourth section. The final fifth section comments on the qualities of the model after comparing it with another solution approach.

The "CONCLUSION" summarizes the main results and conclusions of the study. The importance of mathematical modeling for economic research is emphasized and the existence of an inseparable connection between the development of economic science and the improvement of analytical and optimization methods is highlighted.

The "APPENDICES" include supporting materials that clarify, supplement or support the presentation.

The "BIBLIOGRAPHY" lists all 94 sources and references used in the preparation of the monograph.

As a summary, it can be stated that the monograph examines different classes of models and presents their specifics, advantages and limitations related to solving specific practical problems. In the course of the presentation, the development of a dynamic market model, mathematical techniques for approximation and regression analysis, linear optimization models and methods for solving them, modeling using fuzzy sets, etc. are discussed. By examining them, the monograph demonstrates the need to use mathematical tools in the context of modern economic challenges. The connection between theoretical approaches and their practical significance for making managerial decisions is emphasized.

- To participate in the competition for the academic position of "professor", I submit 20 research articles and reports (No. 2–21), which do not repeat those listed in the list for acquiring the educational and scientific degree of "doctor" and in the list for "associate professor".

Among the presented publications, one is independent and one is in Bulgarian, while all the remaining 19 are in English. Their distribution by groups is as follows:

Scientific publications	Kind	Number
Indexed in Scopus and WoS	Articles	3
	Studies	14
Non-refereed publications with scientific review	Reports	3

Additional information about the specialized scientific publishing houses where the 17 publications indexed in Scopus and WoS were published, and their distribution by publisher, are listed in the table:

Scientific publications indexed in Scopus and WoS	Journal Rank	Impact Factor	Number
TEM Journal	SJR – Q3 Computer Science (miscellaneous)	2.2 (2024) Cite Score	3
Information	JCR - Q2 (Computer Science, Information Systems) / CiteScore - Q2 (Information Systems)	2.9 (2024); 5-Year Impact Factor: 3.0 (2024)	6
Computers	JCR - Q2 (Computer Science, Interdisciplinary Applications) / CiteScore - Q1 (Computer Science (miscellaneous))	4.2 (2024); 5-Year Impact Factor: 3.5 (2024)	1
Sensors	JCR - Q2 (Instruments and Instrumentation) / CiteScore - Q1 (Instrumentation)	3.5 (2024); 5-Year Impact Factor: 3.7 (2024)	1
Mathematics	JCR - Q1 (Mathematics) / CiteScore - Q1 (General Mathematics)	2.2 (2024); 5-Year Impact Factor: 2.0 (2024)	1
Systems	JCR - Q1 (Social Sciences, Interdisciplinary) / CiteScore - Q2 (Modeling and Simulation)	3.1 (2024); 5-Year Impact Factor: 3.1 (2024)	2

Administrative Sciences	JCR - Q2 (Management) / CiteScore - Q2 (General Business, Management and Accounting)	3.1 (2024); 5-Year Impact Factor: 3.1 (2024)	1
Applied Sciences	JCR - Q2 (Engineering, Multidisciplinary) / CiteScore - Q1 (General Engineering)	2.5 (2024); 5-Year Impact Factor: 2.7 (2024)	1
Electronics	JCR - Q2 (Engineering, Electrical and Electronic) / CiteScore - Q1 (Electrical and Electronic Engineering)	2.6 (2024); 5-Year Impact Factor: 2.6 (2024)	1

Annotation of the research publications

- (2) Galina Ilieva, Tania Yankova. **Early Multi-criteria Detection of Students at Risk of Failure**. TEM Journal, UIKTEN, ISSN: 2217-8309, e-ISSN: 2217-8333, 2020, Volume 9, Issue 1, p. 344-350, <https://doi.org/10.18421/TEM91-47>.

In this paper, we present a new fuzzy methodology for early students' failure detection. High school background, subjects studied in the university and activities in learning management systems were determined to be the factors influencing students' performance. After selection of the impact factors of students' assessment, we convert linguistic evaluations into fuzzy numbers and employ multi-criteria methods for educational data processing. In two practical examples, the aggregate students' scores were calculated by using fuzzy multi-criteria algorithms. The obtained students' ranking helps instructors during the semester to detect students who will drop out the course and to plan additional learning activities for these students. In the future, we plan on analyzing students' data from different university's courses and majors and mining several academic years in order to create a reliable assessment index for early prediction of students' failure.

- (3) Galina Ilieva, Tania Yankova, Vera Hadjieva, Rositsa Doneva, George Totkov. **Cloud Service Selection as a Fuzzy Multi-criteria Problem**. TEM Journal, UIKTEN, ISSN: 2217-8309, e-ISSN: 2217-8333, 2020, Volume 9, Issue 2, p. 484-495, <https://doi.org/10.18421/TEM92-09>.

Cloud adoption is an attractive technological innovation due to the capital cost reduction and fast quality improvements it provides. In this paper, we present a new fuzzy methodology for cloud service selection. Product features and functionalities, customer support, customer rating, and security options are just a few of the factors influencing cloud platforms evaluation. A practical example for ordering cloud storage systems is calculated by using fuzzy measurement of alternatives and ranking according to the compromise solution (MARCOS) method. After establishing the relevant indicators for cloud technologies' assessment and their relative weights, crisp values and linguistic terms are transformed into triangular fuzzy numbers and then multi-criteria analysis is employed. The obtained

ranking helps managers make an informed and wellgrounded decision for cloud platform selection.

- (4) Galina Ilieva, Tania Yankova. ***IoT in Distance Learning during the COVID-19 Pandemic***. TEM Journal, UIKTEN, ISSN: 2217-8309, e-ISSN: 2217-8333, 2020, Volume 9, Issue 4, p. 1669-1674, <https://doi.org/10.18421/TEM94-45>.

Despite the worldwide physical closing of educational institutions due to the pandemic of COVID-19 in the spring of 2020, the learning process was not interrupted. Learning management systems and digital tools for online collaboration ensured a safe distance and continuity of educational activities. However, the rapid transition to remote learning in electronic environment has created a number of challenges in higher education. In order to derive longterm benefits from the changes in the way of teaching and examining, the paper explores the possibilities of IoT technology for continuous monitoring and flexible management of the learning process. The proposed framework for IoT application in educational activities will facilitate the adaptation of studying process at universities to the new circumstances.

- (5) Stefan Georgiev, Tania Yankova. ***Waste Products from Wine Production and Possible Paths to a Green Economy***. In Proc. of The International Conference Economic, Regional and Social Challenges in the Transition Towards a Green Economy'2021, 30th September 2021, Plovdiv, Bulgaria, ISBN (print): 978-619-7663-08-2, ISBN (online): 978-619-7663-07-5, p. 233-248.

The components of the environment (air, water, soil) are subject to the impact of the technological activity of wineries. The main pollutants (carbon dioxide, alcohol vapours, wastewater, solid waste from the used raw materials) that they emit during their production process are described. The material balance of the production of a newly designed wine enterprise with medium capacity is considered. The quantities of pollutants, released during its technological activity, are analyzed. The obtained results are summarized on the basis of quantities of industrially produced wines in the country for the last five years and more precisely for the period 2016 – 2020. On this basis, an estimate is made of the total amounts of pollutants released into nature from industrial wine production in the country. In line with the transition to a green economy, new concepts have been proposed for the recovery of waste products from the activities of enterprises.

- (6) Galina Ilieva, Tania Yankova. ***Geospatial Approach to Analysis of Greenhouse Gas Emissions***. In Proc. of The International Conference Economic, Regional and Social Challenges in the Transition Towards a Green Economy'2021, 30th September 2021, Plovdiv, Bulgaria, ISBN (print): 978-619-7663-08-2, ISBN (online): 978-619-7663-07-5, p. 249-262.

The inability of the Earth's biosphere to neutralize carbon dioxide is a clear indication of a disturbed natural balance. This study aims to examine the current situation and emerging trends in greenhouse gas (GHG) emissions in the European Union (EU) and Bulgaria through the application of a combined framework of statistical and machine learning

methods. Spatial autocorrelation and cluster analysis reveal the presence of statistically significant dependencies in the geospatial distribution of GHG emissions. An analysis of GHG emissions by economic sectors in the EU and Bulgaria identifies the energy production sector as the largest contributor to carbon emissions. Furthermore, correlation analysis determines the key factors that exert the strongest influence on GHG emissions from this sector in Bulgaria. To support Bulgaria in meeting the stringent targets for substantial reductions in harmful GHG emissions, a set of policy-oriented and sector-specific measures is proposed.

- (7) Tania Yankova. ***Simulation modeling of the impact of digitalization on the productivity and competitiveness of SMEs***. Collection of reports from the Jubilee International Scientific Conference "The Interdisciplinary Approach in the Field of Application of Economic and Social Sciences", Plovdiv University Publishing House, 2025, ISBN: 978-619-7768-46-6 (print), ISBN: 978-619-7768-47-3 (on-line), p. 494-505.

The report aims to present a conceptual model for simulation modeling, through which to track the interrelationships between investments in digitalization, productivity and competitiveness of SMEs. The study is limited to basic key indicators that are sufficient to form a basic quantitative assessment through simulation methods. The expected results of the model are related to a deeper understanding of the mechanisms through which digitalization affects the efficiency of enterprises, as well as to the formulation of guidelines for management decisions and policies in support of their sustainable growth.

- (8) Galina Ilieva, Tania Yankova, Stanislava Klisarova-Belcheva, Svetlana Ivanova. ***Effects of COVID-19 Pandemic on University Students' Learning***. Information, MDPI, ISSN: 2078-2489, 2021, Volume 12, Issue 4, 21 pages, <https://doi.org/10.3390/info12040163>.

The risk of COVID-19 in higher education has affected all its degrees and forms of training. To assess the impact of the pandemic on the learning of university students, a new reference framework for educational data processing was proposed. The framework unifies the steps of analysis of COVID-19 effects on the higher education institutions in different countries and periods of the pandemic. It comprises both classical statistical methods and modern intelligent methods: machine learning, multi-criteria decision making and big data with symmetric and asymmetric information. The new framework has been tested to analyse a dataset collected from a university students' survey, which was conducted during the second wave of COVID-19 at the end of 2020. The main tasks of this research are as follows: (1) evaluate the attitude and the readiness of students in regard to distance learning during the lockdown; (2) clarify the difficulties, the possible changes and the future expectations from distance learning in the next few months; (3) propose recommendations and measures for improving the higher education environment. After data analysis, the conclusions are drawn and recommendations are made for enhancement of the quality of distance learning of university students.

- (9) Galina Ilieva, Tania Yankova, Irina Radeva, Ivan Popchev. **Blockchain Software Selection as a Fuzzy Multi-Criteria Problem**. Computers, MDPI, ISSN: 2073-431X, 2021, Volume 10, Issue 10, 120, 24 pages, <https://doi.org/10.3390/computers10100120>.

Increased consumer requirements for quality, safety and traceability of goods in supply chains has accelerated the implementation of blockchain during the COVID-19 pandemic. The right choice of blockchain software is a complicated task and an important prerequisite for successful deployment. In this study, we propose a conceptual framework for group multi-criteria selection of blockchain software in fuzzy environment according to organization needs and experts' judgements. The applicability of the new framework has been verified through an illustrative example for ranking blockchain systems. The evaluations of compared alternatives were calculated by using measurement of alternatives and ranking according to the compromise solution (MARCOS) method. The robustness of the new framework was proven by sensitivity analysis in which two (crisp and fuzzy) MARCOS models with two different sets of weighting coefficients were compared.

- (10) Galina Ilieva, Tania Yankova. **IoT System Selection as a Fuzzy Multi-Criteria Problem**. Sensor, MDPI, ISSN: 1424-8220, 2022, Volume 22, Issue 11, 4110, 26 pages, <https://doi.org/10.3390/s22114110>.

This research aims to analyze the applications of IoT in agriculture and to compare the most widely used IoT platforms. The problem of determining the most appropriate IoT system depends on many factors, often expressed by incomplete and uncertain estimates. In order to find a feasible decision, this study develops a multi-criteria framework for IoT solution selection in a fuzzy environment. In the proposed framework, a new modification of the Multi-Attribute Border approximation Area Comparison (MABAC) method with a specific distance measure via intuitionistic fuzzy values has been presented as a decision analysis method. The new technique is more precise than existing crisp and fuzzy analogues, as it includes the three components of intuitionistic numbers (degree of membership, degree of non-membership and hesitancy degree) and the relationships between them. The effectiveness of the new decision-making framework has been verified through an illustrative example of ranking IoT platforms.

- (11) Galina Ilieva, Tania Yankova. **Extension of Interval-Valued Fermatean Fuzzy TOPSIS for Evaluating and Benchmarking COVID-19 Vaccines**. Mathematics, MDPI, ISSN: 2227-7390, 2022, Volume 10, Issue 19, 3514, 22 pages, <https://doi.org/10.3390/math10193514>.

In order to help curb the spread of the COVID-19 pandemic, this paper develops a multi-attribute decision-making framework for COVID-19 vaccine evaluation based on their major clinical characteristics and efficacy. Firstly, a new multi-criteria Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) modification has been constructed in

an interval-valued Fermatean fuzzy (IVFF) environment, improving the shortcomings of traditional TOPSIS. Secondly, a new conceptual framework for static and dynamic evaluation of COVID-19 vaccines has been built. The proposed methodology incorporates a variety of crisp and fuzzy MCDM methods. The analysis of the results of two practical examples shows that the new framework for vaccine comparison is feasible and effective, and finally, some recommendations for enhancement of government anti-COVID-19 strategies are suggested.

(12) Galina Ilieva, Tania Yankova, Stanislava Klisarova, Yulia Dzhabarova. **Customer Satisfaction in e-Commerce during the COVID-19 Pandemic**. Systems, MDPI, ISSN: 2079-8954, 2022, Volume 10, Issue 6, 213, 23 pages, <https://doi.org/10.3390/systems10060213>.

The declared state of emergency and the measures taken against the spread of coronavirus by governments have increased Internet shopping. All companies, regardless of size and type of business activity, had to adapt their business models to the new circumstances through transformation of their business processes and offering products or services tailored to the changing customer behavior. This study aims to analyze the peculiarities of online sales during the COVID-19 health crisis via the integration of classic and modern data analysis methods. The purpose of the paper is to identify the main factors determining user behavior and examine their impact on customer satisfaction in e-commerce. The survey method and structural equation modeling (SEM) were used to recognize the dependencies between variables from the online users' perspective. The satisfaction determinants indicated and described in the paper affect differently the perceived value for the customers. As this value is subjective and dynamic, this study developed a reliable system for e-commerce factor evaluation. Using the proposed methodology, companies can constantly monitor and assess indicators influencing customer satisfaction and gain awareness of consumer behavior's dynamics in online shopping. e-commerce marketers can employ the obtained results to decide how to organize order execution and optimize supply chains. Identifying the most important components of the e-commerce value, managers of online retailers can better run online sales platforms, increase customer loyalty, and thus, improve company's online performance.

(13) Galina Ilieva, Tania Yankova, Yulia Dzhabarova, Margarita Ruseva, Delian Angelov, Stanislava Klisarova-Belcheva. **Customer Attitude toward Digital Wallet Services**. Systems, MDPI, ISSN: 2079-8954, 2023, Volume 11, Issue 4, 185, 29 pages, <https://doi.org/10.3390/systems11040185>.

The goal of this study is to examine and identify the factors influencing customer attitude toward and intention to use digital wallets (electronic wallets, e-wallets) during and after the COVID-19 pandemic. A total of 257 correctly fulfilled questionnaires from an online survey were summarized. The main features of e-wallet payment systems were

classified with a focus on consumer satisfaction via the integration of classic and modern data analysis methods. Structural Equation Modeling (SEM) was preferred to reveal the dependencies between the variables from e-wallets users' perspective. The designed model can discover and explain the underlying relationships that determine the e-wallets' adoption mechanism. The obtained results lead to specific recommendations to stakeholders in the value chain of payment processing. Financial regulatory authorities could employ the presented results in planning the development of payment systems. E-commerce marketers could utilize the proposed methodology to assess, compare and select an alternative way for order payment. E-wallet service providers could establish a reliable multi-criteria system for the evaluation of digital wallet adoption. Being aware of the most important components of e-wallets value, managers can more effectively run and control payment platforms, enhance customer experience, and thus improve the company's competitiveness. As the perceived value of customer satisfaction is subjective and dynamic, measurements and data analysis should be conducted periodically.

(14) Galina Ilieva, Tania Yankova, Stanislava Klisarova-Belcheva, Angel Dimitrov, Marin Bratkov, Delian Angelov. ***Effects of Generative Chatbots in Higher Education***. *Information*, MDPI, ISSN: 2078-2489, 2023, Volume 14, Issue 9, 492, 26 pages, <https://doi.org/10.3390/info14090492>.

Learning technologies often do not meet the university requirements for learner engagement via interactivity and real-time feedback. In addition to the challenge of providing personalized learning experiences for students, these technologies can increase the workload of instructors due to the maintenance and updates required to keep the courses up-to-date. Intelligent chatbots based on generative artificial intelligence (AI) technology can help overcome these disadvantages by transforming pedagogical activities and guiding both students and instructors interactively. In this study, we explore and compare the main characteristics of existing educational chatbots. Then, we propose a new theoretical framework for blended learning with intelligent chatbots integration enabling students to interact online and instructors to create and manage their courses using generative AI tools. The advantages of the proposed framework are as follows: (1) it provides a comprehensive understanding of the transformative potential of AI chatbots in education and facilitates their effective implementation; (2) it offers a holistic methodology to enhance the overall educational experience; and (3) it unifies the applications of intelligent chatbots in teaching-learning activities within universities.

(15) Galina Ilieva, Tania Yankova, Margarita Ruseva, Yulia Dzhabarova, Veselina Zhekova, Stanislava Klisarova-Belcheva, Tanya Mollova, Angel Dimitrov. **Factors Influencing User Perception and Adoption of E-Government Services**. Administrative Sciences, MDPI, ISSN: 2076-3387, 2024, Volume 14, Issue 3, 54, 30 pages, <https://doi.org/10.3390/admsci14030054>.

The objective of this study is to investigate and determine factors influencing user perception and acceptance of electronic government services in the context of technological advancements. The research focuses on classifying the main features of e-administrative systems with an emphasis on user satisfaction by integrating both traditional and modern data analysis techniques. Structural Equation Modelling (SEM), machine learning (ML) techniques, and multi-criteria decision-making (MCDM) methods have been applied to survey data to uncover the interdependencies between variables from the perspective of online users. The developed models discover and explain the underlying relationships in user attitudes towards e-government services. As the perception of customer satisfaction is subjective and dynamic, stakeholders should conduct regular measurements and data analysis to ensure continuous improvement of e-public services.

(16) Galina Ilieva, Tania Yankova, Margarita Ruseva, Yulia Dzhabarova, Stanislava Klisarova-Belcheva, Marin Bratkov. **Social Media Influencers: Customer Attitudes and Impact on Purchase Behaviour**. Information, MDPI, ISSN: 2078-2489, 2024, Volume 15, Issue 6, 359, 26 pages, <https://doi.org/10.3390/info15060359>.

Social media marketing has become a crucial component of contemporary business strategies, significantly influencing brand visibility, customer engagement, and sales growth. The aim of this study is to investigate and determine the key factors guiding customer attitudes towards social media influencers, and, on that basis, to explore their effects on purchase intentions regarding advertised products or services. A total of 376 filled-in questionnaires from an online survey were analyzed. The main characteristics of digital influencers' behavior that affect consumer perceptions have been systematized and categorized through a combination of both traditional and advanced data analysis methods. Structural equation modelling (SEM), machine learning and multi-criteria decision-making (MCDM) methods were selected to uncover the hidden dependencies between variables from the perspective of social media users. The developed models elucidate the underlying relationships that shape the acceptance mechanism of influencers' messages. The obtained results provide specific recommendations for stakeholders across the social media marketing value chain. Marketers can make informed decisions and optimize influencer marketing strategies to enhance user experience and increase conversion rates. Working collaboratively, marketers and influencers can create impactful and successful marketing campaigns that resonate with the target audience and drive meaningful results. Customers

benefit from more tailored and engaging influencer content that aligns with their interests and preferences, fostering a stronger connection with brands and potentially affecting their purchase decisions. As the perception of customer satisfaction is an individual and evolving process, stakeholders should organize regular evaluations of influencer marketing data and explore the possibilities to ensure the continuous improvement of this e-marketing channel.

(17) Galina Ilieva, Tania Yankova, Stanislava Klisarova-Belcheva. ***Effects of Generative AI in Tourism Industry***. Information, MDPI, ISSN: 2078-2489, 2024, Volume 15, Issue 11, 671, 22 pages, <https://doi.org/10.3390/info15110671>.

In the dynamic and evolving tourism industry, engaging with stakeholders is essential for fostering innovation and improving service quality. However, tourism companies often struggle to meet expectations for customer satisfaction through interactivity and real-time feedback. While new digital technologies can address the challenge of providing personalized travel experiences, they can also increase the workload for travel agencies due to the maintenance and updates required to keep travel details current. Intelligent chatbots and other generative artificial intelligence (GAI) tools can help mitigate these obstacles by transforming tourism and travel-related services, offering interactive guidance for both tourism companies and travelers. In this study, we explore and compare the main characteristics of existing responsive AI instruments applicable in tourism and hospitality scenarios. Then, we propose a new theoretical framework for decision making in the tourism industry, integrating GAI technologies to enable agencies to create and manage itineraries, and tourists to interact online with these innovative instruments. The advantages of the proposed framework are as follows: (1) providing a comprehensive understanding of the transformative potential of new generation AI tools in tourism and facilitating their effective implementation; (2) offering a holistic methodology to enhance the tourist experience; (3) unifying the applications of contemporary AI instruments in tourism activities and paving the way for their further development. The study contributes to the expanding literature on tourism modernization and offers recommendations for industry practitioners, consumers, and local, regional, and national tourism bodies to adopt a more user-centric approach to enhancing travel services.

(18) Galina Ilieva, Tania Yankova, Margarita Ruseva, Yulia Dzhabarova, Stanislava Klisarova-Belcheva, Angel Dimitrov. ***Consumer Perceptions and Attitudes Towards Ultra-Processed Foods***. Applied Sciences, MDPI, ISSN: 2076-3417, 2025, Volume 15, Issue 7, 3739, 27 pages, <https://doi.org/10.3390/app15073739>.

The consumption of ultra-processed foods (UPFs) has become a central topic in discussions surrounding public health, nutrition, and consumer behavior. This study aimed to investigate the key factors shaping customer perceptions and attitudes towards UPFs and

explore their impact on purchase decisions. A total of 290 completed questionnaires from an online survey were analyzed to identify the drivers influencing consumer actions and habits. Users' opinions were systematized based on their attitudes towards UPFs, considering factors such as health consciousness, knowledge, subjective norms, and environmental concerns. Participants were then categorized using both traditional and advanced data analysis methods. Structural equation modelling (SEM), machine learning (ML), and multi-criteria decision-making (MCDM) techniques were applied to identify hidden dependencies between variables from the perspective of UPF consumers. The developed models reveal the underlying relationships that influence acceptance or rejection mechanisms for UPFs. The results provide specific recommendations for stakeholders across the food production and marketing value chain. Public health authorities can use these insights the findings to design targeted interventions that promote healthier food choices. Manufacturers and marketers can leverage the findings to optimize product offerings and communication strategies with a focus on less harmful options, aligning more closely with consumer expectations and health considerations. Consumers benefit from enhanced product transparency and tailored information that reflects their preferences and concerns, fostering informed and balanced decision-making. As attitudes toward UPFs evolve alongside changing nutrition and consumption patterns, stakeholders should regularly assess consumer feedback to mitigate the impact of these harmful foods on public health.

(19) Galina Ilieva, Tania Yankova, Margarita Ruseva, Stanimir Kabaivanov. ***A Framework for Generative AI-Driven Assessment in Higher Education***. Information, MDPI, ISSN: 2078-2489, 2025, Volume 16, Issue 6, 472, 22 pages, <https://doi.org/10.3390/info16060472>.

The rapid integration of generative artificial intelligence (AI) into educational environments raises both opportunities and concerns regarding assessment design, academic integrity, and quality assurance. While new generation AI tools offer new modes of interactivity, feedback, and content generation, their use in assessment remains insufficiently pedagogically framed and regulated. In this study, we propose a new framework for generative AI-supported assessment in higher education, structured around the needs and responsibilities of three key stakeholders (branches): instructors, students, and control authorities. The framework outlines how teaching staff can design adaptive and AI-informed tasks and provide feedback, how learners can engage with these tools transparently, and how institutional bodies can ensure accountability through compliance standards, policies, and audits. This three-branch multi-level model contributes to the emerging discourse on responsible AI adoption in higher education by offering a holistic approach for integrating AI-based systems into assessment practices while safeguarding academic values and quality.

(20) Galina Ilieva, Tania Yankova. ***Interval-Valued Fermatean Fuzzy EDAS for Social Media Influencer Evaluation and Benchmarking***. Electronics, MDPI, ISSN: 2079-9292, 2025, Volume 14, Issue 16, 3161, 24 pages, <https://doi.org/10.3390/electronics14163161>.

To assist stakeholders in selecting appropriate social media influencers (SMIs), this study proposes a multi-attribute decision-making framework for influencer evaluation based on their key performance metrics and engagement characteristics. This study introduces a new modification of the Evaluation Based on Distance from Average Solution (EDAS) under an interval-valued Fermatean fuzzy (IVFF) environment, addressing the limitations of the conventional EDAS method. In addition, a conceptual framework for the static and dynamic evaluation of SMIs is developed, integrating various crisp and fuzzy multi-criteria decision-making (MCDM) approaches. Empirical validation through two practical case studies demonstrates the effectiveness and applicability of the proposed framework, resulting in recommendations for marketers seeking to optimize their influencer-based marketing strategies.

(21) Galina Ilieva, Tania Yankova, Peyo Staribratov, Galina Ruseva, Yuliy Iliev. ***Industrial Digitalization: Systematic Literature Review and Bibliometric Analysis***. Information, MDPI, ISSN: 2078-2489, 2025, Volume 16, Issue 12, 1080, 26 pages, <https://doi.org/10.3390/info16121080>.

This article reviews the state of the art, implementation barriers, and emerging trends in industrial digitalization, drawing on studies published between 2020 and July 2025. It analyzes how classical Industry 4.0 technologies, simulation and modeling, and Industry 5.0 priorities are transforming production processes in smart factories, yielding higher productivity, reduced downtime, and improved quality. At the same time, the literature documents persistent obstacles, including system integration and interoperability, security and data-privacy risk, and financial constraints, especially for SMEs. Looking ahead, future directions point to a gradual shift towards sustainable intelligent manufacturing with human–robot collaboration and data-centric operations. In addition, the article proposes and validates a conceptual framework for the digitalization of manufacturing companies and provides practical recommendations for stakeholders seeking to leverage digital technologies for operational excellence and sustainable value creation.

Summary of Scientific Results in Accordance with Art. 76 of PRASPU

In accordance with the requirements of Art. 76 of the PRASPU, the presented publications are grouped by main research areas, and their main scientific results are summarized below.

1. Scientific Results in the Field of Multi-Criteria Decision-Making and Fuzzy Modeling (Publications No. 2, 3, 9, 10, 11, 20)

Within this research direction, new decision-making frameworks and methodological extensions of established multi-criteria decision-making (MCDM) methods have been developed and applied in fuzzy and interval-valued environments. Original modifications of TOPSIS, MARCOS, MABAC and EDAS methods are proposed, including interval-valued and Fermatean fuzzy representations, addressing uncertainty, subjectivity and incomplete information in complex decision problems. The developed models demonstrate improved robustness, precision and interpretability and are validated through real-world applications in cloud services, IoT systems, blockchain software selection, vaccine evaluation and social media influencer benchmarking.

2. Scientific Results Related to Digital Transformation, Industry 4.0 and Industry 5.0 (Publications No. 7, 17, 21)

This research direction focuses on the impact of digitalization, intelligent technologies and generative artificial intelligence on industrial systems, tourism and small and medium-sized enterprises. Conceptual and simulation-based models are proposed to analyse the relationships between digital investments, productivity and competitiveness. The studies identify key implementation barriers and outline future trends towards sustainable, human-centric and data-driven industrial systems. The results provide scientifically grounded recommendations for digital transformation strategies and policy measures supporting innovation and sustainable growth.

3. Scientific Results in Education Analytics and Intelligent Learning Environments (Publications No. 2, 4, 8, 14, 19)

The publications in this group contribute to the development of analytical and intelligent frameworks for improving educational processes and quality assurance in higher education. New models for early detection of students at risk, IoT-supported distance learning, generative AI chatbots and AI-driven assessment are proposed and validated. The results support personalized learning, enhanced student engagement, responsible use of AI technologies and compliance with academic integrity standards.

4. Scientific Results on User Behavior, Satisfaction and Adoption of Digital Services (Publications No. 12, 13, 15, 16, 20)

This research direction examines user attitudes, satisfaction and adoption mechanisms in e-commerce, digital payment systems, e-government services and social media platforms. By integrating structural equation modelling, machine learning and multi-criteria decision-making methods, the studies reveal latent dependencies in user perceptions and behavioral intentions. The obtained results support evidence-based managerial and policy decisions aimed at improving digital service quality, user experience and system acceptance.

5. Scientific Results Related to Sustainability, Environmental Impact and Public Health (Publications No. 5, 6, 18)

The publications in this thematic group address key societal challenges related to environmental sustainability and public health. Advanced statistical, geospatial and analytical methods are applied to analyze greenhouse gas emissions, industrial waste recovery and consumer attitudes towards ultra-processed foods. The studies contribute to the formulation of data-driven recommendations supporting sustainable economic development, environmental protection and public health policies.

The results obtained contribute to the enrichment of existing research by introducing new analytical and methodological perspectives. At the same time, they form a reliable starting point for future studies with both academic and applied orientation in the field of modeling, decision-making, preparation of recommendations and strategies.

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