Artificial Intelligence in Tourism: Croatian Consumers' Perception and Attitudes

Pisker, Barbara; Radman-Funarić, Mirjana; Kukina, Hrvoje

Source / Izvornik: **Economic and Social Development 112th International Scientific Conference on Economic and Social Development – "Creating a unified foundation for Sustainable Development: Interdisciplinarity in Research and Education" Book of Proceedings, 2024, 117 - 125**

Conference paper / Rad u zborniku

Publication status / Verzija rada: **Published version / Objavljena verzija rada (izdavačev PDF)**

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:277:037421

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Download date / Datum preuzimanja: **2025-03-06**

Repository / Repozitorij:

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Economic and Social Development

112th International Scientific Conference on Economic and Social Development –
"Creating a unified foundation for Sustainable Development: Interdisciplinarity in Research and Education"

Book of Proceedings

Editors:
Bordin Rassameethes, Sasivimol Meeampol, Pornlapas Suwannarat

ISSN 1849-7535

Varazdin, 4-5 June, 2024

In Memoriam of Marijan Cingula, 04.06.2024.

Varazdin Development and Entrepreneurship Agency and **University North**
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Editors:
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Sasivimol Meeampol, Kasetsart University, Thailand
Pornlapas Suwannarat, Kasetsart University, Thailand

Economic and Social Development

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Title ■ Economic and Social Development (Book of Proceedings), 112th International Scientific Conference on Economic and Social Development - "Creating a unified foundation for Sustainable Development: Interdisciplinarity in Research and Education"

Editors ■ Bordin Rassameethes, Sasivimol Meeampol, Pornlapas Suwannarat

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Publishing Editor ■ Spomenko Kesina, Domagoj Cingula

Publisher ■ **Design** ■ **Print** ■ Varazdin Development and Entrepreneurship Agency, Varazdin, Croatia / University North, Koprivnica, Croatia / Faculty of Management University of Warsaw, Warsaw, Poland / Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco / ENCGT - Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University, Tangier, Morocco / HAZU - Institute for Scientific Work in Varazdin, Varazdin, Croatia / GOVCOPP - University of Aveiro, Aveiro, Portugal

Printing ■ Online Edition

ISSN 1849-7535
The Book is open access and double-blind peer reviewed.
Our past Books are indexed and abstracted by ProQuest, EconBIZ, CPCI (Web of Science) and EconLit databases and available for download in a PDF format from the Economic and Social Development Conference website: http://www.esd-conference.com

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CONTENTS

INTERNATIONAL COMPETITIVENESS OF EU IN THE AGE OF THE FOURTH INDUSTRIAL REVOLUTION 1
Tomislav Galovic, Petar Misevic, Davorin Balaz

THE RIGHT OF USUFRUCT IN CONTEMPORARY BUSINESS ACTIVITIES 12
Maja Proso, Sara Lozancic

THE EUROPEAN SUSTAINABLE FINANCE MARKET – DEVELOPMENTS AND TRENDS 20
Silvia Kirova, Svetlana Aleksandrova-Zlatanska, Stefan Petrov

BUILDING SUSTAINABLE DEVELOPMENT OF THE METALLURGICAL COMPANIES IN SLOVAKIA 30
Patrik Richnak, Eva Hanulakova, Peter Drabik, Robert Rehak

CREATING VALUE AND UTILITY FOR USERS OF DIGITAL PUBLIC SERVICES - ATTITUDES AND PERCEPTION OF CITIZENS 39
Marina Guzovski

MARKETING STRATEGY IN TOURISM PRESENTED ON THE CROATIAN HOTEL INDUSTRY MODEL 49
Petar Misevic, Marina Peric Kaselj, Andreja Rudancic

THE UNMENTIONABLES OF DEPRIVATION MEASUREMENT: THE CASE OF AFRICA 62
Abdelhamid Nechad, Mohammed Rhalma

COMPARATIVE ANALYSIS OF HEALTH FINANCING MECHANISMS IN SELECTED EUROPEAN UNION MEMBER STATES 74
Orlin Tsvetkov, Nikolay Ninov

CULTURAL CORRIDORS AND LITERARY TOURISM 95
Venelin Terziev, Silva Vasileva

FINANCIAL ANALYSIS OF E-COMMERCE COMPANIES: APPLYING HARVARD BUSINESS SCHOOL FRAMEWORK 103
Albertina Monteiro, Amelia Ferreira da Silva, Andreia Alves, Humberto Nuno Rito Ribeiro

ARTIFICIAL INTELLIGENCE IN TOURISM: CROATIAN CONSUMERS' PERCEPTION AND ATTITUDES 117
Barbara Pisker, Mirjana Radman-Funaric, Hrvoje Kukina

THE IMPACT OF EMPLOYEE SATISFACTION ON ORGANIZATIONAL PRODUCTIVITY 126
Dora Kolaric, Biljana Markovic

THE ROLE OF THE ISLAMIC DIGITAL ECONOMY IN THE DEVELOPMENT OF THE HALAL INDUSTRY 138
Mustafa Goktug Kaya, Perihan Hazel Kaya

HYBRIDIZATION IN EDUCATION, OPPORTUNITIES & LIMITATIONS..... 149
Khalid Lahlou

BASIC STAGES OF DIGITAL TRANSFORMATION 155
Josko Lozic, Katerina Fotova Cikovic, Ines Lozic

IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN MANAGERIAL ACCOUNTING 167
Sandra Sokcevic, Hrvoje Volarevic, Romana Milenkovic

THE RESISTANCE CAPACITY OF THE EUROPEAN MONETARY UNION TO SYMMETRY SHOCKS AND THE POSSIBILITY OF ESTABLISHING AN OPTIMUM CURRENCY AREA..... 179
Sergej Simpraga, Petar Kurecic, Filip Kokotovic

ASSERTIVE COMMUNICATION OF HEALTHCARE PROFESSIONALS EMPLOYED IN THE REPUBLIC OF CROATIA..... 190
Marko Antic, Ana Globocnik Zunac, Ivana Perkusic

THE GEOECONOMY OF INTERNATIONAL AID IN AFRICA 198
Abdelhamid Nechad, Mohammed Rhalma

SOCIAL DEVELOPMENT AND THE CONTRIBUTION OF SCIENCE 209
Venelin Terziev, Marin Georgiev

LOCAL COMMUNITY PERSPECTIVES ON TOURISM AND MUSIC FESTIVALS: THE CASE OF THE SEA STAR MUSIC FESTIVAL 232
Mauro Dujmovic, Aljosa Vitasovic, Branko Bogunovic

DIGITAL TRANSFORMATION IN ACCOUNTING: THE PERCEPTION OF PORTUGUESE ACCOUNTANTS 238
Amelia Ferreira da Silva, Maria Jose Goncalves, Joao Pedro Teixeira Duarte, Adriana Oliveira, Humberto Nuno Rito Ribeiro

SOCIAL TRANSFORMATIONS AND SOCIAL PROGRAMMING 251
Venelin Terziev, Marin Georgiev

ENVIRONMENT QUALITY AND ECONOMIC GROWTH IN MOROCCO..... 257
Badr Machrafi, Mustapha Machrafi

DIGITIZATION AS A TOOL OF STRATEGIC DEVELOPMENT OF COMPANIES IN THE FUNCTION OF CREATING SOCIAL RESPONSIBILITY..... 265
Dijana Vukovic, Damira Kecek, Damira Tkalec

PREPAREDNESS OF THE GLOBAL HEALTH SYSTEM FOR NEW DISASTERS RELATED TO NATURAL HAZZARDS..... 277
Nikica Darabos, Anica Hunjet, Nevena Ladic

CONSUMER PERSONAL CHARACTERISTICS AS PREDICTORS OF INTERNET BANKING ADOPTION 290
Sandra Pepur, Mario Pepur, Rea Tvrdic

SOCIAL ASSISTANCE SYSTEM SETTINGS TO SUPPORT FLOOD VICTIMS IN BULGARIA 299
Nikolay Ninov, Valentina Ninova

NEW SOCIAL TRANSFORMATIONS AND CHANGES IN SOCIETIES 311
Venelin Terziev, Marin Georgiev

LEGAL REGULATION OF CORPORATE PROTECTION OF LABOR RIGHTS - FROM SOFT LAW INSTRUMENTS, THROUGH NATIONAL LEGISLATION TO THE DUE DILIGENCE DIRECTIVE 330
Zlatko Cesic, Valentina Vinsalek Stipic, Lucija Petrovcic

IMPACT OF INTELLECTUAL PROPERTY RIGHTS PROTECTION ON ECONOMIC GROWTH 345
David Bernetic, Petra Karanikic

TEAM EFFECTIVENESS OF VIRTUAL AND FACE-TO-FACE STUDENT TEAMS: THE ROLE OF TEAM CONFLICT 355
Nikolina Posaric, Lorena Pikl

EUROPEAN APPROACHES TO THE DEVELOPMENT OF CONCEPTUAL FRAMEWORKS FOR ESG POLICY 363
Tatiana Chernysheva

MAPPING THE NEEDS OF THE TOURISM DESTINATION FROM BUSINESSES` PERSPECTIVES - VLORA REGION DESTINATION 371
Enida Pulaj, Xhiliola Agaraj

EFFICIENCY OF MOTOR HULL INSURANCE IN CROATIA INSURANCE INDUSTRY 385
Ticijan Perusko

EUROPEAN PUBLIC POLICY AND E-INCLUSION: A QUALITATIVE COMPARATIVE ANALYSIS 395
Robertina Zdjelar, Ravi S. Sharma, Nikolina Zajdela Hrustek

DETERMINATION OF THE REAL ESTATE TRANSFER TAX BASIS IN RELATION TO DATABASE FORMATION 409
Melita Bestvina

MEASURING ENTREPRENURIAL TRAITS OF OWNERS OF SMALL FAMILY HOTELS 426
Ivana Bujan Katanec

THE CONTRIBUTION OF BUSINESS INTELLIGENCE TO DIGITAL STRATEGIC COMMUNICATION: A CASE STUDY 439
Celia Talma Goncalves, Maria Jose Angelico Goncalves, Juliana Rodrigues, Humberto Ribeiro

EXPERIENCES AS A PART OF EXPERIENCE ECONOMY 453
Aljosa Vitasovic

ETHICS IN ADVERTISING: PERCEPTION OF CROATIAN CONSUMERS..... 466
Diana Plantic Tadic

ECONOMIC AND SOCIAL ASPECTS OF UNACCOMPANIED CHILDREN MIGRATION IN EUROPE 477
Marta Takahashi, Josip Poljak

A PROPOSED MODEL FOR EVALUATING THE EXPLANATORY VALUE OF BANKS' QUANTITATIVE CREDIT-RISK DISCLOSURES UNDER IFRS-9..... 487
Ronald Nhleko, Daniel Schutte

ENHANCING LANGUAGE LEARNING THROUGH INSTITUTIONALIZED TRANSMEDIA STORYTELLING: INNOVATIONS IN EDUCATION AND KNOWLEDGE MANAGEMENT..... 499
Jelena Skoda, Nikolaj Lazic

RASPBERRY PI APPLICATIONS IN TEACHING PRACTICES: A SYSTEMATIC REVIEW 509
Melani Kitic, Durdica Vukic, Nikola Radelja

THE ROLE OF INTERPERSONAL SKILLS IN EFFECTIVE MANAGEMENT 521
Petra Modric, Jasminka Samardzija, Vanja Vejzagic

KNOWLEDGE TRANSFER THROUGH DIGITAL EDUCATIONAL CONTENTS IN MODERN EDUCATION 530
Ivan Sabic, Dajana Maria Horvat, Matija Kikelj

THE INFLUENCE OF BUSINESS INTELLIGENCE ON THE QUALITY OF BUSINESS DECISION-MAKING 540
Sanja Juric

WORKPLACE MOTIVATION ACROSS X, Y, AND Z GENERATIONS: AN ORGANIZATIONAL BEHAVIOR PERSPECTIVE 550
Leonela Krajac, Jasminka Samardzija

IMPACT OF DENTISTRY AND AESTHETIC SURGERY ON SUSTAINABLE HEALTH TOURISM IN RURAL AREAS: A THEORETICAL MODEL 559
Romina Alkier, Vedran Milojica, Vasja Roblek

CYBERSECURITY IN THE DIGITAL AGE: REGULATORY FRAMEWORK BASED ON THE IMPLEMENTATION OF THE NIS2 DIRECTIVE..... 570
Marija Boban

CONTRIBUTION TO INTRODUCING A CARBON TAX IN THE REPUBLIC OF CROATIA..... 583
Vice Mihanovic

REVISION OF THE GOVERNANCE MODEL FOR PORTS OF REGIONAL SIGNIFICANCE IN CROATIA - PORT OF HVAR 594
Luka Vukic, Ivan Peronja, Alen Jugovic

STRATEGIC DECISIONS IN THE FUNCTION OF STRATEGIC RISK MANAGEMENT, CASE STUDY OF MARINAS 604
Ivan Peronja, Tihomir Lukovic, Damir Piplica

THE IMPACT OF EDUCATION ON STUDENT POPULATION'S AWARENESS AND PERCEPTION OF CYBER SECURITY RISKS 618
Vlatka Ruzic, Branislav Sutic, Matea Pavletic

OFFICE MANAGEMENT OF LEGAL ENTITIES WITH PUBLIC AUTHORITY – A CROATIAN EXAMPLE 624
Goran Vojkovic

APPLICATION OF BLOCKCHAIN TECHNOLOGY IN SUSTAINABLE BUSINESS 632
Ivan Norsic, Mislav Ante Omazic, Patricia Uroic

HOW TO ASSESS DIGITAL TRANSFORMATION READINESS 643
Tomislav Rados

FOREIGN FINANCIAL INVESTMENTS (FDI) AND CRIMINAL LAW PROTECTION OF INVESTORS 652
Mirko Smoljic, Zdenko Konjic

ANALYSIS OF THE IMPACT OF INFORMATION TECHNOLOGY FACTORS ON THE SUPPLY CHAIN EFFECTIVENESS OF THE WORLD'S LEADING OUTDOOR EQUIPMENT MANUFACTURER 662
Luka Samarzija, Nikolina Dukic Samarzija, Andrea Arbula Blecich

THE ROLE OF ARTIFICIAL INTELLIGENCE IN ACCOUNTING AND FINANCE 674
Simay Sezen Saral, Ivana Martincevic, Vesna Sesar

THE IMPACT OF THE ORGANIZATIONAL FACTORS ON THE MATURITY OF DIGITAL BUSINESS MODELS FOR CHARTER IN THE NAUTICAL TOURISM 683
Daniela Gracan, Helena Zentner, Nikolina Seric Honovic

APPLICATION OF PUBLIC RELATIONS MODELS IN THE CROATIAN HIGHER EDUCATION SYSTEM 691
Petra Kuhar, Darijo Cerepinko

EXPLORING THE EFFECTIVE MECHANISMS TO OVERCOME OBSTACLES IN THE TRANSFER OF KNOWLEDGE BETWEEN UNIVERSITIES AND INDUSTRY 703
Marko Malenica

THE IMPACT OF GENDER AND AGE ON PERCEIVED ETHICAL STANDARDS AND THE TRUTHFULNESS OF ONLINE INFORMATION 709
Doroteja Mandaric, Ivana Benjak, Anica Hunjet

CROATIAN BANKS A YEAR AFTER EURO INTRODUCTION 726
Lidija Devoic

CAN THE EMBEDMENT OF THE EUROPEAN UNION LEGAL ORDER BE A SOCIAL MARKET ECONOMY? 733
Dominik Vuletic

ANALYSIS OF THE SATISFACTION OF BUSINESS ENTITIES OF THE REPUBLIC OF CROATIA WITH THE USE OF PUBLIC ADMINISTRATION E-SERVICES... 741
Valentina Vinsalek Stipic, Zlatko Cesic, Ivana Arbanas

INTRODUCTION TO BLOCKCHAIN TECHNOLOGY 748
Milan Hrga, Tea Livaic

DIGITAL TRANSFORMATION AND ARTIFICIAL INTELLIGENCE IN TEACHING FOREIGN LANGUAGE FOR SPECIFIC PURPOSES: A PROPOSAL OF A CULTURE TEACHING STRATEGY MODEL 758
Marijana Drinovac Topalovic, Marija Valcic, Jadranka Herceg

THE STEALTH LEADERS: UNVEILING THE COMPETITIVE EDGE OF CROATIAN HIDDEN CHAMPIONS 769
Mislav Ante Omazic, Patricia Uroic, Marin Galic

SOCIAL NETWORKS ACTIVITIES OF YOUNG PEOPLE AND ITS IMPACT ON CYBERCRIME IN THE REPUBLIC OF CROATIA 780
Branislav Sutic, Vlatka Ruzic

UNVEILING IMPULSIVE PATTERNS: CONSUMER CHARACTERISTICS IN ONLINE AND BRICK-AND-MORTAR SHOPPING 785
Helena Stimac

ARTIFICIAL INTELLIGENCE IN TOURISM: CROATIAN CONSUMERS' PERCEPTION AND ATTITUDES

Barbara Pisker
Josip Juraj Strossmayer University of Osijek,
Faculty of Tourism and Rural Development in Pozega, Croatia
bpisker@ftrr.hr

Mirjana Radman-Funaric
Josip Juraj Strossmayer University of Osijek,
Faculty of Tourism and Rural Development in Pozega, Croatia
mradmanfunaric@ftrr.hr

Hrvoje Kukina
AI Center Lipik, Croatia
hkukina@outlook.com

ABSTRACT

This paper focuses on applying artificial intelligence (AI) systems in tourism, especially in accommodation and hospitality services, and the Croatian consumer's perceptions and attitudes. Various technology acceptance model theories and previous research in AI development and application in the tourism sector have been cross-examined and presented in the theoretical part of the paper, contributing to the topic elaboration and deeper understanding of crucial influential factors regarding consumer perception and attitudes towards AI in tourism deployment. The research part of the paper presents methods used to collect primary data and outlines, validates and discusses the results obtained. The research data collection method was an online questionnaire using the snowball method created with a series of qualitative and quantitative questions conducted during the 2024 year in Croatia on a representative sample. The research results reveal noticeable differences regarding the specific characteristics in respondents' demographic and socio-economic profiles within their perception and attitudes towards artificial intelligence use and application in the tourism sector.

Keywords: *artificial intelligence, tourism, hospitality, technology acceptance, consumer, perception*

1. INTRODUCTION

Artificial intelligence (AI) has rapidly revolutionized our lives and experiences in a contemporary, technology-driven society. It is defined as "a machine-based system designed to operate with varying levels of autonomy, and that may exhibit adaptiveness after deployment and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments" (EU Artificial Intelligence Act 2024). AI's omnipresence is comprehensive and inevitable throughout our socio-economic landscape. The term AI in this paper refers to humanoid robots: modern, high-tech devices that use AI to perform different tasks in tourism and hospitality services. An extensive AI socio-economic shift has consequently overflowed the tourism industry, shaping it into a new AI-enriched and supplemented form through different applications and embedded systems, changing traditional practices and established business conduct. Nowadays, we find different AI systems already embedded in the tourism sector, including recommend systems, personalization systems and techniques, conversational systems (chatbots and voice assistants), forecasting tools,

autonomous agents, language translation applications, intelligent tourism destinations, and humanoid robots (Bulchand-Gidumal, 2022). This paper primarily focuses on presenting Croatian consumers' perceptions and attitudes concerning AI in tourism and hospitality services. The research question was: How do Croatian consumers' demographic and socio-economic profiles influence their perception and attitudes towards AI usage and application in tourism and hospitality services, aiming to benefit service providers and users while contributing to broader frame policy recommendations? The paper comprises five main parts: introduction, literature review, method, sample and data collection, results and discussion. Finally, the conclusion follows, involving research limitations and further research recommendations.

2. LITERATURE REVIEW

Thorstein Veblen's (1899) theory of technological determinism is not a novelty. It leans towards the idea that technological advancements play a crucial driving force and a primary role in shaping socio-economic structures, seeing technological innovations as a critical driver of societal evolution. Changes in technology lead to a broad domino effect shift in the overall societal organization, including its values, norms and institutions. In contemporary society, individuals often engage in extravagant consumption not primarily for practical purposes but to display their social status and wealth. According to Veblen (1899), this behaviour is influenced by the prevailing technological and socio-economic conditions attributed equally towards consumer motives in tourism from its early stage of development (Christou, 2022). In support of the thesis on technological determinism (Veblen, 1899), it is expected by the year 2030 that humanoid robots will make up about 25% of the hotel industry's labour force, performing tasks that were previously performed solely by humans (Bowen & Morosan, 2018). Therefore, predicting and understanding consumer perceptions and attitudes towards implementing technological AI innovation in tourism and hospitality services is highly relevant. The importance of the research topic is additionally emphasized from the aspect of the Croatian tourism and hospitality sector's significant labour force shortage (Gašparović, 2022). Fred Davis (1987), Fred Davis and Richard Bagozzi (1989) developed Technology Accepted Models (TAM), and Venkatesh et al. (2003) advanced a model towards a Unified Theory of Acceptance and Use of Technology (UTAUT). Both theories provide insights into the factors influencing technology adoption, categorized as perceived ease of use, usefulness, behavioural intention, actual system usage, social influence, and facilitating conditions. These models have been influential in shaping research and guiding the development and implementation of new technologies in various domains, including tourism and hospitality service novelties. AI services and humanoid robots are already used throughout tourism and hospitality services, interacting simply and clearly with customers to perform specific tasks. However, the acceptance of AI systems and humanoid robots in the service industry is strongly influenced by customers' perceptions of their similarities with humans (Anthropomorphism theory). Van Pinxteren et al. (2019) show that anthropomorphism drives consumer trust, intention to use, and enjoyment of AI and humanoid robots in the enhanced service sector. It is a practical complementary dimension to the future of tourism and hospitality. It makes it more straightforward for customers to arrange travel and use automated, customized and insightful services available (Samala et al., 2020). Ivanov et al. (2018) reveal in their customer preferences research how consumers' attitudes towards having services performed for them by robots are primarily driven by general attitudes towards robots, a recognition of the advantages of robots compared to humans, experience with robots, and their social skills as defined by TAM and UTAUT theories as well as theory of anthropomorphism. Similar findings confirming anthropomorphism theory as favourable in customer service performance are proven by Christou et al. (2020).

A conceptual model of service robotics in hospitality, including customer experience and feedback, service intelligence, data security, responsibility allocation, and human-robot interaction, brings a systematic review of topics primarily related to future service developments (Yang & Chew, 2021). Proving the positive aspects of AI-enhanced services in tourism was also shown through the analysis of the perceptions of future tourism and hospitality, revealing a significantly positive impact on the willingness of participants to work in a partial robot environment in the future (Palrão et al., 2023). Cheriyan et al. (2022) revealed how AI solutions still do not fully fulfil the tasks given: the need to be more intelligent and keep learning about the various scenarios is advised. Belanche Gracia et al. (2022) reveal how attributions mediate the relationships between affinity toward the robot and customer behavioral intentions to use and recommend service robots. Specifically, a customer's affinity toward the service robot positively affects service improvement attribution, influencing customer behavioural intentions. In contrast, affinity negatively affects cost reduction attribution, which harms behavioural intentions. Finally, human likeness has a positive influence on affinity. Striking the right balance in combining human-supplemented AI services is the ultimate value of the future tourism and hospitality sector. Adoption and implementation of AI, humanoid robots, and automated services in the tourism and hospitality sector are dependent on labour and technology costs, customers' readiness and willingness to adapt to AI-enhanced environments, and cross-cultural characteristics of both consumers and service providers aligned with technological advancements and characteristics (Ivanov & Webster, 2017). We are entering a brave new world of robonomics in all aspects of socio-economic realities, including tourism and hospitality services. With the rapidly declining value of human labour in the tourism and hospitality industry and the rapidly increasing capabilities of AI services and humanoid robots, business models and taxation models must be altered to deal with this new reality (Ivanov & Webster, 2020).

3. METHOD, SAMPLE AND DATA COLLECTION

The research data collection method was an online questionnaire using the snowball method, created with a series of qualitative and quantitative questions conducted during the 2024 year in Croatia on a representative sample. The overall questionnaire construction aligns with Roopa and Rani's (2012) recommendations. It comprises 34 questions, eight related to socio-demographic characteristics, 16 scaling respondents' attitudes (Likert, 1932) towards AI services in tourism and hospitality, and the rest related to the respondent's previous tourism and hospitality experience and future AI technology-supplemented service expectations. The data was collected in March 2024 using a convenient sample of 550 respondents who filled out online Google Forms. Google service data collection enabled direct entry of respondents' answers and sample control. Data are collected according to the principle of snowball (Goodman, 1961). This type of sample does not guarantee the representativeness of the population, but it provides a more representative sample of the general population compared to traditional methods of data collection (LeBlanc et al., 2023). In this case, the sample made it possible to determine the differences in certain socio-demographic groups of respondents. The statistical software SPSS version 21 was used for data analysis. Frequencies were calculated for all variables, and when they were adequate, data distribution tests were performed, most often to test the normality of the distribution. In data analysis, the Chi-square test, Kendall tau-b, t-test, and analysis of variance (ANOVA-test) were performed depending on the types of variables. The paper highlights the results when statistically significant differences at the $p< 0.05$ level were determined.

4. RESULTS AND DISCUSSION

The analysis of the frequency of use in tourist accommodation and hospitality services showed that about a third of respondents use these services on average five or more times a year, representing the largest share. More than half of the respondents use accommodation services more than three times a year. In contrast, only 5.5% of the research participants do not use such services for tourism or business purposes.

	Frequency of usage of the service						Total
Number of services	0	1	2	3	4	5 or >	
Number of respondents	30	105	120	76	41	178	550
% respondents	5,5%	19,1%	21,8%	13,8%	7,5%	32,4%	100,0%

Table 1: Frequency of respondents' usage of tourist accommodation and hospitality services (Source: authors primary data research)

The respondents' answers differ significantly according to age. Kendall's tau-b coefficient (0.206) is statistically significant ($p<0.05$), which indicates the existence of a correlation, assuming that age is an independent variable. The difference is visible in respondents who travelled at least three times in one year. There are less than 30% of such respondents aged 18-25, while the share in all age categories is more significant than 50%. Respondents' preferences regarding the frequency of use do not differ according to place of residence (urban or rural population). Men use these services slightly more than women ($\chi2=17.718$, $p<0.05$), but this difference is mainly seen in the frequency of 5 or more journey times. Overall, 41.7% of men and 26.3% of women travel five or more times yearly for tourism or business purposes. As expected, monthly net income is correlated with the frequency of travel and respondents' usage of tourist accommodation and hospitality services. (Kendall's tau-b 0.297, $p<0.05$). 51.2% of people with monthly income above 1,901 EUR, 45.8% with income from 1,601 to 1,900 EUR, and 29.2% of respondents with income from 1,001 to 1,300 EUR use tourism and hospitality services at least five times a year. 14% of respondents with a monthly income lower than EUR 680 do not travel even once a year, and only 1.6% of respondents with an income higher than EUR 1,901 do not travel. Work status was also an essential factor ($\chi2=68.955$, $p<0.05$) in the respondents' travel and service usage frequency, which was certainly expected. 63.1% of unemployed people travel less than three times a year (0, 1 and 2 times a year), 75.7% of students, 48.8% of pensioners and 36.7% of employed people. 36.9% of unemployed people travel three or more times a year, 24.3% of students, 51.2% of pensioners and 63.3% of employed people. Positive student relations towards a partially AI-enhanced working environment are also revealed by Palrão et al. (2023). The situation is expected to differ regarding tourist or business trips abroad or using accommodation and hospitality services. The largest share of respondents travel abroad once a year (31.8%) or twice (21.5%), making up about half of the respondents together. 16.7% of respondents do not travel abroad. Age is a variable by which the respondents differ significantly ($\chi2=33.721$, $p<0.05$). 13.1% of respondents aged 18-25 travel abroad three or more times a year, and 20.8% have not travelled even once. 43.1% of students travel once a year, while less than 30% of other age groups travel once a year. Respondents aged 55-64 (37.7%) travel three or more times a year, followed by those aged 26-34 (36.7%) and 34.8% aged 35-54. Kendall's tau-b is 0.131 ($p<0.05$), which confirms a specific connection between the number of trips abroad and the age of the respondents.

	Frequency of trips abroad						Total
Number of trips	0	1	2	3	4	5 or >	
Number of respondents	92	175	118	68	26	71	550
% respondents	16,7%	31,8%	21,5%	12,4%	4,7%	12,9%	100,0%

Table 2: Frequency of respondents' trips travelled abroad (Source: authors primary data research)

It is also expected that people with higher incomes travel abroad more. In the group of respondents with the highest income (above EUR 1,901), 24% travel abroad five or more times, and 46.4% travel at least three times a year. A similar percentage of respondents (45.9%) also applies to the following income category (1,601-1,900 EUR per month). Questions designed to determine existing attitudes about artificial intelligence followed. Respondents were asked to indicate their degree of agreement with the following statements about AI, with a mark of "1" indicating "strongly disagree" and a mark of "5" indicating "strongly agree."

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	x	SD
Interacting with the AI is exciting and fun.	11,1	10,7	38,4	32,0	7,8	3,15	1,079
Interacting with the AI is pleasant	9,6	15,3	38,9	29,5	6,7	3,08	1,047
AI has its own will and emotions	38,9	28,5	23,8	6,4	2,4	2,05	1,046
People who use AI have a higher social status	23,6	27,6	30,9	14,9	2,9	2,46	1,094
I believe that the widespread use of AI will reduce inequalities in society	22,2	27,5	34,9	12,5	2,9	2,47	1,058

Table 3: Respondents' views on AI application and usage in accommodation and hospitality service (Source: authors primary data research)

Respondents have a slightly positive attitude about the fun and excitement of AIs' pleasance in usage. On the contrary, respondents mostly disagree that AI has its own will and emotions, and most of them do not think that people who use AI have a higher social status or that the spread of AI use will lead to a reduction of social inequalities. However, the analysis of variance (ANOVA-test) ($F=6.368$, $p<0.05$) found that there are specific differences when looking at particular groups of respondents regarding these statements. The ANOVA test revealed a statistically significant difference between the age groups and the post-hoc Tukey $B^{a,b}$ analysis found that the youngest respondents still have a significantly more positive attitude towards the excitement and fun of interacting with AI than all other groups (for them, the arithmetic mean of this variable is 3.55, and for all others around 3.00). Such differences between the groups were also found in terms of comfort. The 26-34 age group is on the borderline but also significantly different.

	Interacting with the AI is exciting and fun			Interacting with the AI is pleasant		
Age categories	N	Subset for alpha = 0.05		N	Subset for alpha = 0.05	
		1	2		1	2
55-64	101	3,00		233	2,94	
35-54	233	3,01		101	2,97	
65+	37	3,08		37	3,00	
26-34	49	3,08		49	3,10	3,10
18-25	130		3,55	130		3,45
Means for groups in homogeneous subsets are displayed. a. Uses Harmonic Mean Sample Size = 72,129. b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.						

Table 4: Tukey $B^{a,b}$ analysis of differences in respondents' attitudes about AI (Source: authors primary data research)

Respondents are very homogeneous in their attitudes regarding these issues when looking at the variable frequency of travel in general, especially travel abroad. In other words, respondents who travel very often and those who do not travel at all agree with all these statements. More than half of the respondents (56.4%) have used services that included AI when booking accommodation, talking to chatbots, and using Skyscanner. 31.6% of participants gave a negative answer to this question, and the answer was "No, I do not know, I am not sure", the remaining 12.0%. It was found that respondents older than 65 years significantly reduced these positive responses; namely, only 29.7% of them gave a positive answer to this question ($\chi2=20.979$, $p<0.05$), which makes them much different from other age groups. It was found that women who used the mentioned services slightly more included some form of AI ($\chi2=9.257$, $p<0.05$), unlike as reported by Ivanov et al. (2018), where no demographic variables explored played a role in shaping attitudes towards service in hotels by AI humanoid robots. As expected, these services were used more by those who needed accommodation services in general and even more so by those who often travel abroad. People who travel abroad more often need services like Google Translator, which are based precisely on the use of AI. The research also revealed that respondents see that some traditional functions in tourism (such as the receptionist at the front desk of hotels) could even disappear, as in the case of Bowen and Morosan (2018). However, as Sigala (2018) mentions, it is not the case that machines and technologies cannot perform the tasks that humans are currently best at: AI is still more expensive to perform such tasks. Future developments of AI in the service industry can thus augment their contemporary capacities in AI augmentation and hybridization (Benckendorff et al., 2019). In this regard, one of the main challenges of the tourism industry is that it could lose its tangible sense of hospitality (Bowen & Morosan, 2018), which is one of the industry's fundamental features. Consumers' lack of trust (Van Pinxteren, 2019), potential discomfort of using AI-enhanced services, and cost savings will remain untapped (Allmendinger & Lombreglia, 2005; Bitner, 2001), while successfully integrating AI-enhanced service interactions have the potential to benefit both service consumers and providers (Allmendinger & Lombreglia, 2005; Meuter et al., 2000). When humans perceive interaction comfort as high, they tend to anthropomorphize robots with more human-like appearance (Van Pinxteren et al., 2019) and embrace technology solutions in line with the theory of techno determinism (Veblen, 1899).

An additional notion needs to be enclosed, as revealed by Hou et al. (2021), confirming how a destination that is more (vs less) crowded generally motivates tourists to favour robot-provided services rather than those from human staff. Furthermore, their findings reveal that this pattern manifests because more (vs. less) social crowding reduces tourists' motivation to interact with others, as evidenced by the social withdrawal tendency. Regarding this, it is relevant to balance the sustainability and absorption capacities of the destination, especially in premium, high-quality streaming tourism services, keeping the human labour force service as a critical element of top-brand tourist and hospitality service and destination features.

5. CONCLUSION

Technological change's influential role in shaping social structures, patterns of consumption, and the distribution of wealth and power within society has always been a driving socio-economic force, in line with techno-determinist theory. Technology is a driving force behind societal evolution, with economic and social institutions adapting in response to technological innovations and imperatives. While AI revolutionizes all aspects of our experience, the tourism and hospitality industry cannot stand aside. Service providers are to fit consumers' expectations into their services while improving various aspects of traveller experiences and business operations. Widespread adoption of AI potentially raises legal, ethical, social and transhuman issues, cross-cultural and economic challenges and new research that must be carefully addressed to ensure a balanced and equitable approach to AI integration in tourism and hospitality services, an assignment task in our future research challenges. Additionally, responsibility, inclusiveness and collaborative human-robot design and implementation are essential principles to guide future research and practice in this area (Fusté-Forné & Jamal, 2021). Although this research paper is narrowed down to Croatian consumers' attitudes and experiences, we emphasize AI certainty in enhanced tourism experience throughout future developments of experiential services. Its current technological outreach, however, still needs to reach the human touch, which is an essential determinant of experiential tourism, as the results of this research have also confirmed.

ACKNOWLEDGEMENT: *This paper is a result of the primary scientific research funded by University Josip Juraj Strossmayer of Osijek, Faculty of Tourism and Rural Development in Pozega, throughout the Internal Scientific Research Project Fund in the Academic year 2023/24, on the topic of Socio-economic Aspects of AI Application in the Tourism Sector.*

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