Exploring Key Determinants in the Adoption of Unmanned Retail Stores

Pin-Ju Juan[*]

Department of International Tourism Management, Tamkang University,
New Taipei 251, Taiwan, ROC
pj@mail.tku.edu.tw

Abstract. Automation in retail, particularly in unmanned convenience stores, represents a significant shift in the way consumers interact with businesses. Technology advancements have made it possible for this evolution by enabling customers to scan purchases, complete transactions, and receive receipts without the assistance of human cashiers. Understanding consumer attitudes towards these unmanned convenience stores and the factors influencing their adoption is crucial for businesses looking to capitalize on this trend. By examining these factors through empirical research and consumer surveys, businesses can gain insights into consumer attitudes towards unmanned convenience stores and tailor their strategies accordingly. Additionally, ongoing monitoring and adaptation to evolving consumer preferences will be crucial for the long-term success of unmanned retail ventures.

Keywords: unmanned convenience stores, technology adoption, consumer behavior

1 Introduction

In recent years, automation has emerged as a transformative force reshaping industries across the globe. With its ability to optimize operations, enhance productivity and precision, cut expenses, and improve communication, automation has become a cornerstone of modern business strategy [1]. Traditionally, automation involves integrating systems, controlling workflows, and standardizing assembly lines [2]. However, the landscape of automation has evolved dramatically, with businesses now venturing into innovative territory such as unmanned stores.

Unmanned stores represent a pinnacle of automation, leveraging cutting-edge technologies like Artificial Intelligence (AI) to revolutionize the retail experience [3]. These establishments forego traditional cashier systems, instead relying on advanced sensor networks, computer vision, and AI algorithms to enable seamless transactions. By eliminating the need for human intervention in the purchasing process, unmanned stores offer unparalleled efficiency, convenience, and cost-effectiveness.

Self-Checkout counters are not widely used in Taiwan. It is crucial to thoroughly evaluate and identify the factors that can impact the acceptance and adoption of these systems to successfully operate an unmanned store [4]. This paper aims to explore the evolution of automation in various industries, with a particular focus on the emergence and implications of unmanned stores. Through an analysis of scholarly research, industry reports, and case studies, this study seeks to elucidate the drivers behind the rise of unmanned stores, their impact on traditional retail paradigms, and the challenges and opportunities they present for businesses and consumers alike. By examining the multifaceted dimensions of this phenomenon, we can gain insights into the future trajectory of automation and its transformative potential in shaping the retail landscape.

2 Literature Review

2.1 Technology Readiness Index

The theoretical foundation of the Technology Readiness Index (TRI) is rooted in consumer psychology and technology acceptance theory [5]. The TRI assessment is specifically designed to evaluate an individual's level of

---

preparedness and willingness to embrace new technologies. It considers factors such as the perceived ease of use, usefulness, trust, and any potential anxiety associated with the technology. These indicators demonstrate how adept someone is at embracing and utilizing new technologies, which directly impacts the successful implementation of said technologies [6].

The development history of TRI dates to the early 1990s when it was initially proposed by A. Parasuraman in his article titled "Technology Readiness Index (TRI): A Multiple-Item Scale to Measure Readiness to Embrace New Technologies" [7]. The original version consisted of four dimensions: attitude, uncertainty, usefulness, and ease of use. Later, Parasuraman et al. made various adjustments and expansions to TRI to enhance its precision and usefulness, resulting in the creation of TRI version 2.0 [8].

TRI has been extensively utilized in research and practice across a range of industries, including retail, medical, finance, and more [9]. In various industries, TRI is utilized to gauge the level of acceptance and attitudes towards different technologies. For instance, in the medical field, it is employed to assess doctors' and patients' acceptance of health information technology [10]. Similarly, in the retail sector, TRI is utilized to understand consumers' attitudes towards emerging payment technologies or unmanned stores [6, 11]. These application cases assist organizations in gaining insights into the attitudes and acceptance of new technologies among target groups. This enables them to develop market strategies and product designs that are more effective.

2.2 Facilitating Conditions

Facilitating conditions refer to the objective factors in the environment that are widely recognized as making an act easy to accomplish [12]. Facilitating conditions refer to the factors that support and maintain a service or technology's adoption and usage behavior [13]. Triandis [14] emphasized the importance of a conducive environment for behavior to be effectively carried out. The occurrence of the behavior may be influenced by the presence or absence of unavoidable environmental conditions [15]. In this study, the factors considered regarding the attitude and intention to use unmanned convenience stores were promotion, perceived security, and perceived privacy.

Promotion plays a crucial role in shaping consumers' attitudes toward using unmanned convenience stores by raising awareness and highlighting the benefits of this new technology [16, 17]. Effective promotional strategies can ease potential users' apprehensions and encourage them to try out the service. Perceived security is another critical factor, as customers need to feel confident that their transactions and personal information are protected from potential threats [18]. If users believe that the technology is secure, they are more likely to adopt and continue using it. Lastly, perceived privacy concerns must be addressed, as users need assurance that their personal data will not be misused. Ensuring that strong privacy measures are in place can significantly influence users' intentions to engage with unmanned convenience stores. Overall, a supportive environment that addresses these facilitating conditions is essential for fostering positive attitudes and intentions towards the adoption of unmanned convenience stores.

2.3 Social Influence

Social Influence is defined as the extent to which a person considers that important or significant others believe he or she should use a technological advancement [19]. This factor is an external determinant in [20]'s model and is one of the four variables preceding Behavioral Intention in the UTAUT model by [21]. Social influence, also known as normative pressure or subjective norm, can be classified into two distinct categories: interpersonal influence and external influence. Interpersonal influence refers to reviews and feedback from referents, including friends, colleagues, superiors, and knowledgeable acquaintances, which can create peer pressure to adopt a technology [22]. This type of influence underscores how interpersonal recommendations about the benefits of an innovation impact its adoption and use [23].

The second category, external influence, encompasses non-personal referents such as mass media reports and technological specialists [24]. López-Nicolas et al. [25] describes media influence as the extent to which social media reports encourage the adoption of new technology. According to the Diffusion of Innovation Theory, mass media influence is particularly significant during the early stages of innovation adoption due to the limited number of pioneer adopters who share their experiences and opinions with others [26]. LINE has become Taiwan's most popular social media platform, surpassing Facebook in 2018. Most Taiwanese still use Facebook,

but younger generations prefer platforms like TikTok, Xiaohongshu, and Dcard for trends. It is worth noting that PTT is the most popular forum in Taiwan [27]. In this study, social influence will be examined to determine whether interpersonal and external influences affect potential customers' attitudes towards shopping at unmanned convenience stores.

2.4 Attitude

According to Fishbein and Ajzen [28], attitude refers to an individual's positive or negative emotions towards engaging in the target behavior. In the model of diffusion of technological innovations, attitude is determined by how a person evaluates the process. Therefore, attitude is regarded as a crucial element in different technology adoption strategies [29]. In a similar vein, the Theory of Reasoned Action suggests that attitude can be influenced by the likelihood of a particular outcome and how individuals perceive that outcome as either favorable or unfavorable. Several researchers have included attitude as a factor in the Technological Acceptance Model [20]. Based on research by Magsamen-Conrad and Dillon [30], attitude is formed by perceptions about the device or service and the significance placed on different attributes during the adoption process. These attributes can include security, social influence, behavioral control, or any other characteristic of the innovation [31].

Lancaster [32] asserts that attitude plays a crucial role in users' engagement and interaction with the innovation. Triandis [14] described attitude as a negative or optimistic mindset towards embracing a new change. In the context of this study, attitude is classified based on users' personal predisposition, readiness for technology, conditions that facilitate usage, and social influence [33]. In this study, attitude will be defined as individuals' perception of shopping at unmanned convenience stores. This covers users' assessments of the environment's suitability, their willingness to adopt new technology, and the impact of social factors on their decision-making.

2.5 Behavioral Intention

The behavioral intention of adoption refers to a consumer's intention to engage with or use a future product or service. This concept plays a crucial role in understanding consumer behavior, especially in the context of innovative products and services. Ajzen [28] elaborates on intention as a person's inclination to determine whether to embrace a particular behavior and subsequently carry out the associated action. In consumer behavior, behavioral intention is a precursor to actual behavior, often a reliable predictor of whether a consumer will adopt a new product or service.

However, the intention-behavior gap is a significant phenomenon that has been the subject of considerable research. Conner and Norman [34] delve into this gap, focusing on the moderators influencing the relationship between intention and behavior. Despite strong intentions often leading to better predictions of actual behavior, various factors can affect the degree to which intentions translate into actions. These factors, or moderators, are critical in determining the likelihood of consumers following through on their intentions. Thus, understanding these moderators can provide valuable insights into consumer behavior, particularly in the context of new and emerging technologies.

Two key factors commonly considered when predicting the likelihood of product adoption are: first, the level of interest potential customers have in using the innovation if available, and second, the anticipated usage once they have access to the innovation [35]. A higher level of interest generally correlates with a greater likelihood of adoption, as consumers who express strong interest are more inclined to engage with the product or service. Additionally, anticipated usage patterns can provide further insights into the consumer's intention to adopt, offering a clearer picture of how often and how the product might be used.

In this study, we will focus specifically on the level of interest potential customers in Taiwan would have if unmanned convenience stores were made available. This research aims to analyze the likelihood of customers utilizing these stores and to predict their expected usage patterns. By thoroughly examining these factors, the study assesses the general interest and possibility of consumers in Taiwan embracing unmanned convenience stores. Understanding these behavioral intentions is essential for forecasting the potential success of unmanned convenience stores in the Taiwanese market and informing strategic decisions regarding their implementation and marketing.

3 Methodology

A survey will be developed to analyze the influence of user attitude and intentional behavior, with a particular emphasis on the concept of unmanned convenience stores. This questionnaire will be distributed to individuals in Taiwan who are 18-50 years old and above, and it will be collected from a sample of 400 systematically chosen respondents. Online survey tools will be utilized to enhance efficiency and precision. During the survey period, which runs from March 1st, 2024, to March 30th, 2024, a total of 320 valid responses will be gathered. This study aims to gain a comprehensive understanding of consumers' motivations for using unmanned convenience stores through a questionnaire survey.

4 Results

4.1 Respondents' Description

Regarding the personal information of all participants, the majority are female (accounting for 62.8%). In terms of education, nearly half of the respondents have a university degree (accounting for 58.4%). Approximately 65% of the age group falls between 19 and 25 years old, with 13.1% being in the 26-30 age range and 9.4% being 31-35 years old. In terms of occupation, students make up the majority (49.7%), followed by the full-time worker (27.8%) and then the military and part-time worker (14.4%). As for marital status, the majority are single (accounting for 73.1%).

4.2 The Description of Optimism Technology Readiness

The respondents provided their feedback on the level of confidence in machines following instructions (Table 1), with the highest score being 5.04. The second highest score was for the freedom of mobility that technology provides, with a score of 5.02. Lastly, the respondents found learning about technology to be as rewarding as the technology itself, with a score of 4.99. The lowest score is "You prefer to use the most advanced technology available" (M=3.86), "Technology empowers individuals to have greater control over their daily lives" (M=3.90), "You appreciate computer programs that offer customization options to suit your specific requirements" (M=4.06).

Table 1. The list of descriptive of optimism technology readiness

Item	Mean	S.D.
You prefer to use the most advance technology available.	3.86	2.049
Technology gives people more control over their daily lives.	3.90	2.242
You like computer programs that allow you to tailor things to fit your own needs.	4.06	2.123
Products and services that use the newest technologies are much more convenient to use.	4.19	1.993
You like the idea of doing business via computers because you're not limited to regular business hours.	4.20	1.799
You find new technologies to be mentally stimulating.	4.62	1.865
Technology makes you more efficient in your occupation.	4.90	2.032
Learning about technology can be as rewarding as the technology itself.	4.99	1.799
Technology gives you more freedom of mobility.	5.02	1.816
You feel confident that machines will follow through with what you instructed them to do.	5.04	1.555

4.3 The Description of Innovativeness Technology Readiness

The respondents give feedback on innovativeness technology readiness in machines based on instructions (Table 2), with the highest score being "In general, you are among the first in your circle of friends to acquire new technology when it appears" (M=4.97). The second highest score is for the category where people seek your advice on new technologies (M=4.96), followed by your ability to understand new high-tech products and services without assistance (M=4.83). The statement with the lowest score is "You find you have fewer problems than other people in making technology work for you" (M=4.54). It is followed by "It seems your friends are learning more about the newest technologies than you are" (M=4.57), and "You enjoy the challenge of figuring out high-tech gadgets" (M=4.78).

Table 2. The list of the description of innovativeness technology readiness

Item	Mean	S.D.
You find you have fewer problems than other people in making technology work for you.	4.54	1.571
It seems your friends are learning more about the newest technologies than you are. (reverse scored)	4.57	1.615
You enjoy the challenge of figuring out high-tech gadgets.	4.78	1.620
You keep up with the latest technological developments in your areas of interest.	4.78	1.637
You can usually figure out new high-tech products and services without help from others.	4.83	1.595
Other people come to you for advice on new technologies.	4.96	1.567
In general, you are among the first in your circle of friends to acquire new technology when it appears.	4.97	1.592

4.4 The Description of Innovativeness Technology Readiness

The respondents provide feedback on the readiness of machines to handle discomfort technology based on instructions (Table 3). The highest score indicates a cautious approach towards replacing important tasks with technology, as there is a possibility of breakdown or disconnection (M=4.66). The category has the second highest score. It can be quite embarrassing when you encounter difficulties with a sophisticated gadget in front of an audience. Additionally, the advancements in technology have made it alarmingly simple for both governments and companies to engage in surveillance activities, posing a significant concern for individuals' privacy. The statement with the lowest score is "Technical support lines are not helpful because they don't explain things in terms you understand" (M=4.11). It is accompanied by the statement "Technology always seems to fail at the worst possible time" (M=4.31), and "Sometimes, it feels like technology systems are not user-friendly for ordinary individuals" (M=4.37).

Table 3. The list of the description discomfort technology readiness

Item	Mean	S.D.
Technical support lines are not helpful because they don't explain things in terms you understand.	4.11	1.653
Technology always seems to fail at the worst possible time.	4.31	1.691
Sometimes, you think that technology systems are not designed for use by ordinary people.	4.37	1.667
There is no such thing as a manual for a high-tech product or service that's written in plain language.	4.40	1.596

If you buy a high-tech product or service, you prefer to have the basic model over one with a lot of extra features.	4.41	1.668
Many new technologies have health or safety risks that are not discovered until after people have used them.	4.46	1.718
When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do.	4.53	1.689
New technology makes it too easy for governments and companies to spy on people.	4.53	1.862
It is embarrassing when you have trouble with a high-tech gadget while people are watching.	4.64	1.702
There should be caution in replacing important people-takes with technology because new technology can breakdown or get disconnected.	4.66	1.720

4.5   The Description of Insecurity Technology Readiness

The respondents shared their feedback on the level of preparedness in using the technology (Table 4). The highest score suggests that there may be uncertainty in ensuring that information provided to a machine or over the internet reaches its intended destination. The second highest score was "When you call a business, you prefer to speak with a human rather than an automated system" (M=4.73). Lastly, the respondents expressed concern about the privacy of their online information, with a mean score of 4.73. The statement with the lowest score is "You do not feel confident doing business with a place that can only be reached online" (M=4.42). The statement "You do not consider it safe to do any kind of financial business online" (M=4.44) is included, along with "You do not consider it safe giving out a credit card number over a computer" (M=4.51).

Table 4. The list of the description of insecurity technology readiness

Item	Mean	S.D.
You do not feel confident doing business with a place that can only be reached online.	4.42	1.792
You do not consider it safe to do any kind of financial business online.	4.44	1.641
You do not consider it safe giving out a credit card number over a computer.	4.51	1.802
Any business transaction you do electronically should be confirmed later with something in writing.	4.52	1.760
Whenever something gets automated, you need to check carefully that the machine or computer is not making mistakes.	4.64	1.983
The human touch is very important when doing business with a company.	4.64	2.078
You worry that information you send over the internet will be seen by other people.	4.73	1.782
When you call a business, you prefer to talk in person rather than a machine.	4.73	1.927
If you provide information to a machine or over the internet, you can never be sure it really gets to the right place.	4.74	1.740

4.6   The Description of Promotion Technology Readiness

The respondents shared their feedback on the readiness of machines to promote technology (Table 5). They were asked if receiving free mobile content, such as stickers, apps, and wallpapers, would encourage them to shop at

unmanned convenience stores. The highest score recorded was 4.81. Receiving special discounts on my phone would greatly incentivize me to shop at unnamed convenience stores, as it scored an impressive 4.76. Finally, the respondents indicated that receiving rewards and participating in a mobile point system would be motivating factors for shopping at unmanned convenience stores, scoring 4.46.

Table 5. The list of the description of promotion technology readiness

Item	Mean	S.D.
Receiving rewards and participating in mobile point system would encourage me to shop at unmanned convenience stores.	4.46	1.877
Receiving special discounts on my phone would encourage me to shop at unnamed convenience stores.	4.76	1.939
Receiving free mobile content, such as stickers, apps, and wallpapers, would encourage me to shop at unmanned convenience stores.	4.81	1.770

4.7 The Description of Security Technology Readiness

The respondents provided their input on the readiness of security technology (Table 6). I believe the highest score recorded was that unmanned convenience stores will prioritize the privacy and confidentiality of my personal information. Finally, the respondents expressed confidence in the security of using mobile payment at unmanned convenience stores, giving it a score of 4.35.

Table 6. The list of the description of security readiness

Item	Mean	S.D.
I believe using mobile payment when shopping at unmanned convenience stores can be secure.	4.35	1.673
I believe unmanned convenience stores will keep my personal information private and confidential.	4.58	1.629

4.8 The Description of Privacy Technology Readiness

The respondents shared their insights on the preparedness of privacy technology (Table 7). The highest score recorded was "I would consider shopping at unmanned convenience stores to be secure" with an average rating of 4.51. Finally, the respondents expressed their confidence in the safety of their personal information when shopping at unmanned convenience stores, giving it a score of 4.42.

Table 7. The list of the description of privacy technology readiness

Item	Mean	S.D.
I believe will be kept personal information safe when shopping at unmanned convenience stores.	4.42	1.623
I would consider shopping at unmanned convenience stores to be secure.	4.51	1.548

4.9 The Description of Interpersonal Influences Technology Readiness

The respondents provide feedback on their readiness to use interpersonal influence technology in machines (Table 8), based on given instructions. The highest score recorded was "My peers/colleagues/friends would think that I should shop at unmanned convenience stores" with a score of 4.93. The second highest score is for the statement "People I know would influence me to try out shopping at unmanned convenience stores" with an

average rating of 4.72. This is closely followed by the statement "People I know would think that shopping at unmanned convenience stores is a good idea" with an average rating of 4.58.

Table 8. The list of the description of privacy technology readiness

Item	Mean	S.D.
People I know would think that shopping at unmanned convenience stores is a good idea.	4.58	1.475
People I know would influence me to try out shopping at unmanned convenience stores.	4.72	1.589
My peers/colleagues/friends would think that I should shop at unmanned convenience stores.	4.93	1.554

4.10 The Description of External Influences Technology Readiness

The respondents offer feedback on their preparedness to utilize external influence technology in machines, following the provided instructions (Table 9). The highest score recorded was "I would highly consider shopping at unmanned convenience stores if mass media reports recommended me to try out this service" with a score of 4.70. The statement "I would strongly consider shopping at unmanned convenience stores if popular press depicted a positive sentiment towards this service" received the second highest score, with an average rating of 4.66. This is closely followed by the statement "I would highly consider shopping at unmanned convenience stores if news reported these stores as a reputable place to do shopping" with an average rating of 4.54.

Table 9. The list of the description of privacy technology readiness

Item	Mean	S.D.
I would strongly consider shopping at unmanned convenience stores if news reported these stores as a good place to do shopping.	4.54	1.745
I would strongly consider shopping at unmanned convenience stores if popular press depicted a positive sentiment towards this service.	4.66	1.705
I would strongly consider shopping at unmanned convenience stores if mass media reports recommended me to try out this service.	4.70	1.701

4.11 The Description of Attitude Technology Readiness

The respondents provide feedback on their level of preparedness and attitude towards technology readiness in machines (Table 10), in accordance with the given instructions. The top score achieved was "Shopping at an unmanned convenience store would be a good idea" with a score of 4.51. The statement "Shopping at an unmanned convenience store would be unwise" received the second highest score, with an average rating of 4.42. Additionally, shopping at an unmanned convenience store would be highly advantageous for me, as indicated by a rating of 4.31. This is closely followed by the statement "Shopping at an unmanned convenience store would be a positive experience" with an average rating of 4.21.

Table 10. The list of the description of attitude technology readiness

Item	Mean	S.D.
Shopping at an unmanned convenience store would be a positive experience.	4.21	1.673
Shopping at an unmanned convenience store would be favorable for me.	4.31	1.628
Shopping at an unmanned convenience store would be a foolish idea.	4.42	1.726
Shopping at an unmanned convenience store would be a good idea.	4.51	1.681

4.12 The Description of Behavioral Intention Technology Readiness

The respondents provide feedback on their level of behavioral intention towards technology readiness in machines, following the provided instructions (Table 11). The highest score achieved was "I plan to utilize unmanned convenience stores for purchasing beverages, everyday products, and snacks" with a score of 4.97. The statement received a high score, with an average rating of 4.41. This is closely followed by the statement "Given that I had access to unmanned convenience stores, I predict that I would use it" with an average rating of 4.39.

Table 11. The list of the description of behavioral intention technology readiness

Item	Mean	S.D.
Given that I had access to unmanned convenience stores, I predict that I would use it.	4.39	1.744
Assuming I had access to unmanned convenience stores, I would shop there.	4.41	1.722
I intend to use unmanned convenience stores for shopping beverages, daily products and snacks.	4.97	1.554

5 Conclusions and Suggestions

Based on the study, most respondents are young, educated females. They are primarily students and tend to be single. The demographic composition of this group has significant implications for their attitudes towards technology readiness, especially when it comes to unmanned convenience stores. The findings indicate a favorable attitude towards adopting technology, although there are some concerns in areas like security and privacy.

The respondents demonstrate a high level of optimism towards technology, valuing the convenience and mobility it offers. However, they are not as enthusiastic about constantly using the latest technology. There is a strong presence of innovativeness among the participants, who are often early adopters and highly regarded for their technological expertise. However, there are significant concerns about discomfort, especially the apprehension of technological failures and the intricacies of using advanced gadgets.

Security and privacy continue to be important considerations, as respondents express a sense of wariness regarding the protection of their information when interacting with unmanned stores. However, it seems that offering promotional incentives like discounts and rewards can be quite effective in motivating people to use these stores. Interpersonal and external influences also have a significant impact on the willingness to shop at unmanned convenience stores. Recommendations from peers and positive media portrayals play a critical role in shaping consumer behavior.

Overall, the respondents express a positive and forward-thinking attitude towards technology. However, there are specific areas that require further attention and enhancements to ensure their comfort and security. By addressing these concerns, we can enhance the adoption and foster a more positive attitude towards unmanned convenience stores.

References

[1] V. Kumar, A.R. Ashraf, W. Nadeem, AI-powered marketing: What, where, and how?, International Journal of Information Management 77(2024) 102783.

[2] W.T. Xie, P.L. Hou, C.H. Chiang, H.C. Lin, Finite element method application in computer-aided design for bio-mimetic chair research, Journal of Computers 35(3)(2024) 95-106.

[3] M.N. Xia, A fault diagnosis method for electric vehicle charging circuit based on artificial intelligence recognition, Journal of Computers 35(3)(2024) 209-224.

[4] C.H. Wu, D.Y. Yang, Bi-objective optimization of a queueing model with two-phase heterogeneous service, Computers & Operations Research 130(2021) 105230.

[5] N. Salari, Electric vehicles adoption behaviour: Synthesising the technology readiness index with environmentalism values and instrumental attributes, Transportation Research Part A: Policy and Practice 164(2022) 60-81.

[6]   Y.W. Chang, J. Chen, What motivates customers to shop in smart shops? The impacts of smart technology and technology readiness, Journal of Retailing and Consumer Services 58(2021) 102325.

[7]   A. Parasuraman, Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies, Journal of Service Research 2(4)(2000) 307-320.

[8]   M. Browning, B. Banik, S. Bourke, A. Abdelkader, L. Anish, M. Muduwa, The impact of COVID-19 restrictions on Australian nurse academics attitudes to technology: A survey of Technology Readiness Index 2.0, Nurse Education in Practice 71(2023) 103719.

[9]   M.K. Kaushik, D. Agrawal, Influence of technology readiness in adoption of e-learning, International Journal of Education Management 35(2)(2020) 483-495.

[10]   Z. Demir-Kaymak, Z. Turan, N. Unlu-Bidik, S. Unkazan, Effects of midwifery and nursing students' readiness about medical Artificial intelligence on Artificial intelligence anxiety, Nurse Education in Practice 78(2024) 103994.

[11]   M.J. Hasheem, S. Wang, N. Ye, M.Z. Farooq, H.M. Shahid, Factors influencing purchase intention of solar photovoltaic technology: An extended perspective of technology readiness index and theory of planned behaviour, Cleaner and Responsible Consumption 7(2022) 100079.

[12]   R. Thompson, C. Higgins, J.M. Howell, Personal Computing: toward a Conceptual Model of Utilization, MIS Quarterly 15(1)(1991) 124-143.

[13]   W. Liu, M. Jiang, W. Li, J. Mou, How does the anthropomorphism of AI chatbots facilitate users' reuse intention in online health consultation services? The moderating role of disease severity, Technological Forecasting and Social Change 203(2024) 123407.

[14]   H.C. Triandis, Values, Attitudes, and Interpersonal Behavior, Nebraska Symposium on Motivation: Beliefs, Attitudes, and Values, University of Nebraska Press, Lincoln, NE, 1979 (195-259).

[15]   L. Wang, W. Chai, N. Sun, R. Tong, Unlocking the mechanism of work environment on miners' unsafe behaviors: A meta-analysis and system dynamics, Resources Policy 96(2024) 105217.

[16]   B. Shi, H. Wang, An AI-enabled approach for improving advertising identification and promotion in social networks, Technological Forecasting and Social Change 188(2023) 122269.

[17]   H. Hu, W. Chen, Y. Hu, Opinion dynamics in social networks under the influence of mass media, Applied Mathematics and Computation 482(2024) 128976.

[18]   A. Leschanowsky, S. Rech, B. Popp, T. Backstrom, Evaluating privacy, security, and trust perceptions in conversational AI: A systematic review, Computers in Human Behavior 159(2024) 108344.

[19]   E.A. Gyasi, H. Handroos, P. Kah, Survey on artificial intelligence (AI) applied in welding: A future scenario of the influence of AI on technological, economic, educational and social changes, Procedia Manufacturing 38(2019) 702-714.

[20]   F.D. Davis, R.P. Bagozzi, P.R. Warshaw, User Acceptance of Computer Technology: A Comparison of Two Theoretical Models, Management Science 35(8)(1989) 982-1003.

[21]   V. Venkatesh, M.G. Morris, G.B. Davis, F.D. Davis, User Acceptance of Information Technology: Toward a Unified View, MIS Quarterly 27(3)(2003) 425-478.

[22]   Y. Pastor, V. Perez-Torres, H. Thomas-Curras, L.L. Lobato-Rincon, M.A. Lopez-Saez, A. Garcia, A study of the influence of altruism, social responsibility, reciprocity, and the subjective norm on online prosocial behavior in adolescence, Computers in Human Behavior 154(2024) 108156.

[23]   M. Zibarzani, R.A. Abumalloh, M. Nilashi, Adoption behavioral intention of robots in last mile food delivery: The importance of environmental friendliness and moderating impacts of privacy and security concerns, Research in Transportation Business & Management 55(2024) 101146.

[24]   S.E. Kang, C.K. Lee, Y. Park, H. Olya, C. Suess, How does the media influence Korean travelers' intention to use hyperloop trains? Transportation Letters 17(3)(2025) 528-540. https://doi.org/10.1080/19427867.2024.2366330

[25]   C. López-Nicolas, F.J. Molina-Castillo, H. Bouwman, An Assessment of Advanced Mobile Services Acceptance: Contributions from TAM and Diffusion Theory Models, Information and Management: The International Journal of Information Systems Theories and Applications 45(6)(2008) 359-364.

[26]   R. Raman, S. Mandal, P. Das, T. Kaur, J.P. Sanjanasri, P. Nedungadi, Exploring university students' adoption of ChatGPT using the diffusion of innovation theory and sentiment analysis with gender dimension, Human Behavior and Emerging Technologies 2024(1)(2024) 3085910.

[27]   OOSGA, Most Popular Social Media in Taiwan in 2024. <https://www.digitalmarketingforasia.com/most-popular-social-media-in-taiwan-in-2024/>, 2024 (accessed 12.09.2024).

[28]   I. Ajzen, M. Fishbein, Understanding Attitudes and Predicting Social Behavior, Prentice-Hall, Englewood Cliffs, NJ, 1980.

[29]   L. Labrague, R. Aguilar-Rosales, B.C. Yboa, J.B. Sabio, J.A. Santos, Student nurses' attitudes, perceived utilization, and intention to adopt artificial intelligence (AI) technology in nursing practice: A cross-sectional study, Nurse Education in Practice 73(2023) 103815.

[30]   K. Magsamen-Conrad, J.M. Dillon, Mobile technology adoption across the lifespan: A mixed methods investigation to clarify adoption stages, and the influence of diffusion attributes, Computers in Human Behavior 112(2020) 106456.

[31]   J. Zhang, Z. Liu, X. Luo, Unraveling juxtaposed effects of biometric characteristics on user security behaviors: A controversial information technology perspective, Decision Support Systems 183(2024) 114267.

[32]   K.J. Lancaster, A New Approach to Consumer Theory, Journal of Political Economy 74(2)(1966) 132-157.

[33] D. Trabucchi, P. Bellis, D. Di-Marco, T. Buganza, R. Verganti, Attitude vs involvement: A systematic literature review at the intersection between engagement and innovation, European Journal of Innovation Management 24(5)(2021) 1730-1762.

[34] M. Conner, P. Norman, Understanding the intention-behavior gap: the role of intention strength, Frontier in Psychology 13(2022) 923464.

[35] S. Kelly, S. Kaye, O. Oviedo-Trespalacios, What factors contribute to the acceptance of artificial intelligence? A systematic review, Telematics and informatics 77(2023) 101925.