DEVELOPING A CONSUMER GREEN MARKETING MODEL USING UTAUT TO MITIGATE GREENWASHING PRACTICES IN MARKETS

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Abstract. The study intends to propose a new conceptual research model that integrates the Unified Theory of Acceptance and Use of Technology Theory (UTAUT) and green factors to address the growing challenge of greenwashing practices and environmental degradation. Causal quantitative research will be conducted using a cross-sectional survey to collect the research data. The proposed model is applicable in various industries such as tourism and hospitality, banking, education, and healthcare. The validated structured questionnaire will be completed by the respondents and will be tested using Smart PLS-SEM to examine the effects of UTAUT constructs and green factors on consumer behavioural intentions. The expected findings suggested that the green factors would strengthen the explanatory power of UTAUT by linking consumer technology adoption with pro-environmental behaviour. Theoretically, the present study extends the UTAUT framework by including additional green constructs, providing a more comprehensive model that bridges consumer technology acceptance with environmental sustainability. Practically, it will guide tourism operators, bankers, educators, and healthcare providers to embed empathy, transparency, and trust in digital platforms to reduce consumers' skepticism towards greenwashing claims.
Keywords: *environmental knowledge, green marketing, greenwashing, technology adoption, UTAUT*

Introduction

The advancement of technology has altered the way businesses engage with consumers, such as through business websites. A website is one of the primary platforms for businesses to engage with consumers, making it a critical interface between organizations and their target markets. Building on this role, the growing shifts from traditional to digital marketing highlight how websites have evolved into not only informational hubs but also strategic tools for branding, customer engagement, and consumer decision-making. The integration of technology, ranging from artificial intelligence, analytics, and personalization to interactive design, has raised websites beyond static pages, positioning them as dynamic marketing instruments that influence perceptions, behavior, and consumer loyalty. However, one of the research findings claimed that the technological advancement combined with overpopulation has driven the use of non-essential technologies, devices, and product manufacturing, which may

contribute to environmental harm (Guzueva et al., 2024). Evidently, nearly 40% of online green claims risk misleading consumers, and based on an international assessment of about 500 websites, it was revealed that four in ten used vague or unsubstantiated claims, or omitted details, to appear more environmentally friendly (Lawrence, 2021). This indicates that many products and services promoted on these websites may, in fact, be harmful, yet they are widely marketed to consumers in ways that could negatively impact their health. This marketing practice is widely known as greenwashing, whereby companies exaggerate or fabricate their environmental commitments to look more sustainable than they really are, often misleading consumers and undermining genuine efforts toward sustainability (Setiawan and Yosephani, 2022). As noted, technological advancement brings convenience to society; however, its negative impacts on human health are often intensified by unethical marketing practices employed by business marketers. Thus, it is crucial to curb this malpractice to protect the people and the environment.

Theoretically, the underlying theory of the Unified Theory of Acceptance and Use of Technology (UTAUT) theory, which comprises of factors such as effort expectancy, performance expectancy, facilitating conditions, and social influences, is a robust framework for predicting technology adoption, but it is not sufficient on its own to curb complex issues like greenwashing (Blut et al., 2022; Tamilmani et al., 2021). Thus, the framework requires a model extension by incorporating green factors such as environmental knowledge (Liobikienė and Poškus, 2019), environmental responsibility (Dam et al., 2019), green attitude (Coskun, 2018), green empathy (Wang et al., 2023), and green trust (Nekmahmud et al., 2022) into the model as additional predicting factor(s) of consumer's behavioural intentions in order to address the environmental issue within the business online websites, including the challenge of greenwashing practice. Therefore, this study will provide outcomes that facilitate consumers to adopt technology while mitigating greenwashing challenges.

In sum, the research significantly contributes to the extension of the Unified Theory of Acceptance and Use of Technology (UTAUT) theory by including the green factors as an additional construct(s) to the existing framework to mitigate the greenwashing practices. This study is aligned with the ongoing research on greenwashing practices (Dong et al., 2023; Nygaard and Silkoset, 2023; Setiawan and Yosephani, 2022). Although the UTAUT framework has been comprehensively used in domains such as artificial Intelligence, healthcare, and banking, the past studies have largely overlooked the integration of green factors, especially in addressing environmental concerns and mitigating greenwashing practices. Integrating the green factors into the UTAUT framework can further extend the application of this new model in the context of tourism and hospitality, banking, healthcare, and education. Thus, the main objective of the current research work is to develop a consumer green marketing model using the integration of Unified Theory of Acceptance and Use of Technology Theory (UTAUT) and green factors.

Literature review

The literature review discusses the existing Unified Theory of Acceptance and Use of Technology (UTAUT) and several key green factors that can be integrated into the existing framework. It further outlines the process of developing the extended framework.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a robust and comprehensive framework that is utilized to explain and predict how an individual adopts and uses technology. The UTAUT was introduced by Venkatesh et al. (2003), based on the incorporation of several theories such as Model of PC Utilization (Thompson et al., 1991), Theory of Planned Behaviour (Ajzen, 1985), Idea Diffusion Theory (Rogers, 1995), Technology Acceptance Model (Davis et al., 1989), Social Cognitive Theory (Bandura, 1986), Motivational Model (Davis et al., 1992), Theory of Reasoned Action (Fishbein, 1967), and Combined Technology Acceptance Model and Theory of Planned Behaviour (Taylor and Todd, 1995). The evolution from these theories resulted in the development of the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT comprises four predicting factors, such as social influence, facilitating conditions, effort expectancy, and performance expectancy, and one main construct, namely behavioural intention. *Table 1* explains the definition of each component of the UTAUT framework;

Table 1. *Definitions of UTAUT constructs.*

No.	UTAUT Construct	Definition
1.	Social Influence	The way users perceive that others judge or influence their behaviour in adopting and using technology (Joa and Magsamen-Conrad, 2022).
2.	Facilitating Condition	This construct refers to users' perceptions of the accessibility of organizational and technical provision that enables and promotes the adoption of technologies (Xue et al., 2024).
3.	Effort Expectancy	This construct refers to an individual's perceived effort required to use and adopt technology (Joa and Magsamen-Conrad, 2022).
4.	Performance Expectancy	This construct refers to how an individual perceives that using a system will facilitate them to accomplish their tasks and enhance their work performance (Camilleri, 2024)
5.	Behavioural Intentions	This construct refers to the likelihood of an individual engaging in a particular behaviour (Irtema et al., 2018)

These constructs have direct influence on behavioural intentions (Al-Momani and Ramayah, 2025; Bhat et al., 2024; Budhathoki et al., 2024). Therefore, four existing hypotheses are proposed as follows; (H1): Social influence has a significant influence on consumers' behavioural intentions; (H2): Facilitating conditions have a significant influence on consumers' behavioural intention; (H3): Effort expectancy has a significant influence on consumers' behavioural intentions; (H4): Performance expectancy has a significant influence on consumers' behavioural intentions.

Green factors

Encouraging consumers to adopt technological applications without first educating and raising their environmental awareness among them is ineffective and unsustainable. While technology can facilitate purchasing and business transactions, it still poses risks to the environment. This highlights the need to extend the UTAUT framework by integrating green factors, thereby encouraging consumers to adopt technology in ways that also protect the environment. Several past studies have adopted green factors such as environmental knowledge (Liobikienė and Poškus, 2019), environmental responsibility (Dam et al., 2019), green attitude (Coskun, 2018), green empathy (Wang et al., 2023), and green trust (Nekmahmud et al., 2022) to initiate the consumer's behavioral intentions. *Table 2* below depicts the definitions of each green factor that has the potential to be incorporated with the UTAUT framework.

Table 2. *Definitions of green factors.*

No.	Type of Green Factor	Definition
1.	Environmental Knowledge	This concept refers to an individual's capability to recognize symbols, concepts, and behavioural trends related to environmental concerns and protection, based on the information gathered (Liobikienė and Poškus, 2019).
2.	Environmental Responsibility	This concept refers to an individual obligation to reduce negative environmental implications and actively contribute to environmental protection (Dam et al., 2019).
3.	Green Attitude	This concept relates to an individual psychological tendency expressed by assessing environmental issues, green products, or sustainable behaviour with some degree of favor or disfavor (Coskun, 2018).
4.	Green Empathy	This concept refers to an individual's capability to accept and appreciate the environment emotionally, particularly when the environment is endangered (Wang et al., 2023)
5.	Green Trust	This concept refers to consumers' tendency to purchase and depend on environmentally sustainable products by considering factors such as performance, reliability, credibility, effectiveness, and past quality (Nekmahmud et al., 2022)

Based on the higher education study by Xue et al. (2024), it was found that performance expectancy, social influence, effort expectancy, and facilitating conditions emerged as the predictors of students' behavioural intention to adopt mobile learning tools. However, if future research incorporates additional green factors into the UTAUT framework, such as environmental knowledge, environmental responsibility, and green attitude, the expected outcomes are a stronger and more holistic explanation of behavioural intentions. Students or consumers who are well informed about environmental issues, feel responsible for protecting the environment, and hold positive green attitudes are more likely to adopt sustainable technologies. These constructs would complement UTAUT's core constructs, shifting intentions not only to technology but also toward eco-friendly and more responsible adoption behavior. Another robust and interesting finding is expected to be generated if the study in tourism (Chinniah and Anuar, 2025; Omar et al., 2025; Ali et al., 2024), banking (Dhanya and Ramya, 2025; Kaur et al., 2025), and healthcare (Almojaibel et al., 2025; Kelkay et al., 2025) incorporates green factors such as green empathy and green trust into the UTAUT framework. In tourism, apart from increasing adoption of technologies, green empathy fosters tourist awareness of sustainable practices. Meanwhile, green trust strengthens consumers' confidence in eco-friendly services. Similarly, in the context of banking, green empathy fosters consumers to opt for digital and sustainable banking services, while green trust enhances acceptance of green financial services and products. In contrast, healthcare research works found that green empathy drives patients and providers to support eco-friendly health innovations, while green trust builds confidence in adopting sustainable healthcare technologies.

Thus, future research has several options to choose from among the listed green factors above (*Table 2*) to be integrated with the UTAUT framework. Incorporating any of these green factors with the UTAUT framework could help fill in the research gaps in the existing literature from various fields of study, such as tourism and hospitality, education, healthcare, and banking. Since any green factors above have a direct effect on behavioural intentions, the study suggests another hypothesis as follows; (H5): Green factor (s) have/has significant influence(s) on an consumers' behavioural intentions.

The development of a research framework

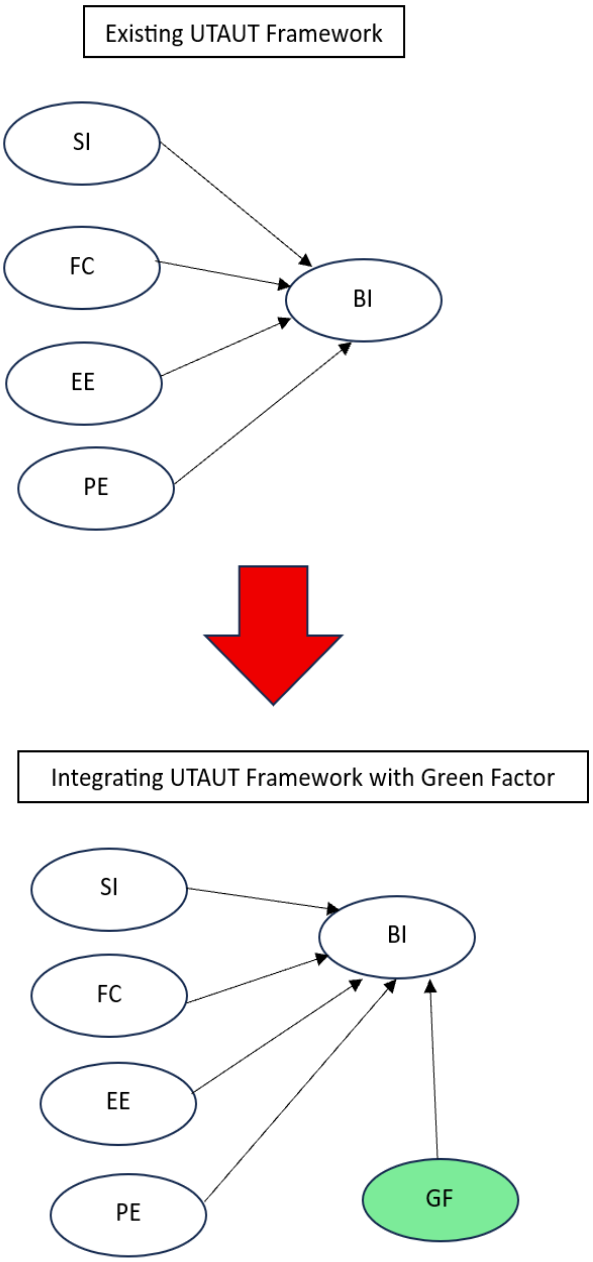

Figure 1. *The extension of the UTAUT Framework.*
**Notes: SI=Social Influence, FC=Facilitating Conditions, EE=Effort Expectancy, PE=Performance Expectancy, BI=Behavioural Intentions, and GF=Green Factors (environmental knowledge, environmental responsibility, green attitude, green empathy, and green trust).*

Materials and Methods

The present study is causal quantitative research similar to studies by Ghani et al. (2023), Muhamad Nasir et al. (2022), Nasir and Wongchestha (2022), as well as Ab Ghani et al. (2021), , whereby the purpose of the study is to test the effects of social influence, facilitating conditions, effort expectancy, performance expectancy, and green factor (s) on consumers' behavioural intention. We propose to use a cross-sectional

study whereby the data will be collected at a single point in time. The individual consumer from tourism, banking, and healthcare can be selected as the unit of analysis of the study (depending on the scope of the study). The research data will be collected using a questionnaire survey either through an online platform or physical face-to-face distribution. The questionnaire is structured into several sections. The first part of the questionnaire is related to the demographic profile of the respondents, including age, gender, income, and ethnicity. Next, four sections of the questionnaire are related to the UTAUT constructs, such as performance expectancy, consisting of three items adapted from Raffaghelli et al. (2022), effort expectancy, consisting of three items adapted from Raffaghelli et al. (2022), social influence, consisting of three items adapted from Raffaghelli et al. (2022), and facilitating conditions, consisting of four items adapted from Jeon et al. (2020). The behavioural intentions comprise of four items adapted from the research works by Nekmahmud et al. (2022) and Raffaghelli et al. (2022). In the next section(s), the researchers have the option to use one green factor, half, or all green factors suggested in this study. Thus, the following section(s) comprise(s) of four items related to environmental knowledge, consisting of four items adapted from Nekmahmud et al. (2022), and environmental responsibility comprising two items adapted from Culiberg et al. (2023), green attitude comprising three items adapted from Nekmahmud et al. (2022), green empathy comprising three items adapted from Musitu-Ferrer et al. (2019), and green trust comprising four items adapted from Nekmahmud et al. (2022). All questionnaires use a seven-point Likert scale because it provides greater sensitivity and reliability in capturing an individual's response while reducing central bias.

Implication of the study

Theoretically, this study proposed to extend the existing Unified Theory of Acceptance and Use of Technology (UTAUT) by incorporating the green factor(s). This is considered a blueprint for future research, whereby the researcher may be able to select any of the green factors, such as environmental knowledge, environmental responsibility, green attitude, green empathy, or green trust, based on the research context. They may select one, two, or more green factors to be included in their existing UTAUT framework as additional independent variables to mitigate the greenwashing practices or protect the environment. This study contributed significantly to the existing literature by filling the research gap through developing a new conceptual framework. Secondly, this extended model can be utilized in any technological research work in multidisciplinary research fields using the UTAUT framework, such as tourism, banking, healthcare, education, and more. The aim is to encourage the adoption of technology while mitigating greenwashing practices and safeguarding the environment.

Practically, the study contributes to multidisciplinary fields of study, the proposed green marketing framework serves significant value to tourism, education, healthcare, and banking by equipping the practitioners with a framework to enhance sustainable adoption of technology while curbing the greenwashing practices. In the context of the tourism industry, incorporating green factors such as empathy and trust enables industry players to design eco-friendly travel platforms, promote transparent sustainability claims, and increase tourists' confidence and experiences in green initiatives, products, and services. Meanwhile, in the banking industry, the framework serves as guidance for developing trustworthy and credible green financial services, motivating customers to engage in paperless, digital, and environmentally sustainable banking practices. By enhancing customers' trust and responsibility, the banking sector can improve green

banking products while reducing the risks of consumers' skepticism toward misleading green claims.

In the healthcare and education sectors, the new proposed model offers practical pathways to align technology adoption with environmental sustainability. Healthcare providers can integrate green trust and empathy to enhance confidence in eco-friendly innovation, such as energy-efficient medical technologies and digital health systems, thereby ensuring both improved patient outcomes and reduced ecological implications. Meanwhile, in the education sector, the proposed model empowers institutions to embed environmental knowledge and responsibility into digital learning platforms, shaping students into environmentally conscious technology adopters. This initiative not only encourages sustainable practices in learning and campus management but also nurtures a generation of consumers who critically evaluate and resist greenwashing practices in future consumption.

Results and Discussion

The expected results of the study would highlight the significant role of incorporating green constructs into the UTAUT framework to better explain consumer behaviour intentions. Traditionally, the UTAUT constructs such as effort expectancy, performance expectancy, facilitating conditions, and social influences remain the key drivers of technology adoption; the additional green factors such as environmental knowledge, environmental responsibility, green attitude, green empathy, and green trust are expected to substantially strengthen the predictive power in the context of sustainable consumption. Performance expectancy and effort expectancy are most likely to remain strong as consumers value technological adoption that is effective, simple, and easy to use. These influences on behaviour intentions are further strengthened by environmental knowledge that creates and enhances environmental awareness of ecological implications and encourages support for technologies that reduce waste, resource use, and emissions. This study also expected that social influence and facilitating conditions would work alongside green attitude and environmental responsibility.

Consumers who feel accountable for environmental protection and hold a positive green attitude are most likely to follow social norms and institutional support for adopting eco-friendly technologies such as paperless banking. The other green factor, like green empathy, shapes adoption in healthcare and tourism, driving support for eco-conscious medical practices and travel. Green trust is anticipated to minimize skepticism towards greenwashing practices, ensuring credibility and transparency that catalyzes consumer confidence. Overall, the integration of the UTAUT framework and green factors is expected to capture both functional and ethical drivers, advancing theory and providing guidance for sustainable technology adoption. However, this research paper is just a blueprint or conceptual in nature; thus, to verify these interrelationships among the variables, the researcher must collect the data and verify the data collected using Smart PLS-SEM analysis. Moreover, the results might differ according to industry and the selection of the green factors of the study.

Conclusion

In conclusion, the present study extends the Unified Theory of Acceptance and Use of Technology (UTAUT) framework by incorporating additional green factors to address the greenwashing claims and environmental degradation in businesses, including business websites, in the context of tourism and hospitality, healthcare, education, banking, and more. The traditional UTAUT framework explains the functional and social drivers of technological usage, whereby it overlooks the aspect of environmental and ethical considerations, which are now becoming central to consumer expectations. Integrating environmental knowledge, environmental responsibility, green attitude, green empathy, and green trust strengthens the new proposed framework, fostering accountable, credible, and sustainable consumer choice. Theoretically, the present study bridges UTAUT and green marketing, enriching the existing literature with sustainable technology adoption. Practically, it guides the practitioners in tourism and hospitality, healthcare, education, and the banking industry in designing trustworthy, transparent, and eco-friendly digital solutions. By mitigating greenwashing and reinforcing genuine sustainability, businesses can build consumer loyalty while supporting environmental protection.

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Conflict of interest

The authors declare no conflict of interest.

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