

Sustainable purchase behavior and brand love: the impact of blockchain-enabled reviews, QR code traceability and sustainable marketing strategy in Vietnam

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Abstract

Purpose – As global environmental challenges intensify, consumers are increasingly seeking brands that demonstrate a commitment to sustainability. Hence, companies are integrating blockchain technology and implementing sustainable marketing activities (SMAs) into their business plans. Previous studies have explored blockchain's role in enhancing transparency and trust, emphasizing its potential to drive eco-friendly purchasing behavior. This study examines the potential impact of blockchain-enabled reviews and QR code traceability systems on brand love and consumer sustainable purchase behavior.

Design/methodology/approach – A quantitative method was conducted through an online survey with 613 respondents in Vietnam and was analyzed using a structural equation model on SmartPLS 4.0.

Findings – The study demonstrates that SMAs (environmental, social, economic and cultural dimensions) and blockchain reviews enhance perceived product quality and brand love. This, in turn, positively influences customers' purchase of sustainable products. Blockchain reviews and QR traceability also have a direct positive impact on sustainable purchase behavior.

Originality/value – Consequently, this research advances signal theory by integrating blockchain to tackle information asymmetry in sustainable consumption, offering practical applications like improving traceability, verifying reviews, enhancing marketing communications and implementing health check-ups to boost product quality and customer engagement in the sustainable F&B industry.

Keywords Traceability system, Blockchain reviews, Sustainability in marketing, Brand love, Sustainable purchase

Paper type Research article

1. Introduction

Sustainability has emerged as a “hotspot” study area, attracting growing academic and practical attention and leading more businesses to embrace sustainable practices to establish the platform for lasting prosperity (Rastogi *et al.*, 2024). Sustainability has four components: economic, social, environmental and cultural (Liu *et al.*, 2019; Jung *et al.*, 2020). Modern customers, particularly younger generations like millennials and Generation Z, are more socially and environmentally sensitive. They not only want high-quality products and services, but they also care about sustainability, production ethics, food safety and the effect of their choices on society. Furthermore, data reveal that the beverage industry strongly relies on

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natural resources and has a significant environmental impact (Garzón-Jiménez and Zorio-Grima, 2022). Hence, this tendency has an impact on the food and beverage (F&B) industry as well. There are several ways and technologies for certifying the origin of F&B goods to assure food safety and give customers information or act as an instrument for encouraging sustainability (Corallo *et al.*, 2019; Qian *et al.*, 2020). With the growth of digital technology, the traceability of blockchain allows for the tracking of the journey of F&B items from manufacturing to consumption and guarantees the transparency of information about goods (Liu *et al.*, 2023).

Businesses that incorporate sustainability into their marketing activities can grow in new markets and draw potential customers, which leads to success and development all around (Lloret, 2016). According to Rastogi *et al.* (2024), the adoption of sustainable marketing initiatives can result in a decrease in waste, heightened consumer engagement and loyalty, and an advantage over rival businesses. These advantages contribute to the “triple bottom line”, which considers “people, planet, and profits”, resulting in advantages for every stakeholder, including sustainable firms, the environment and society (Rastogi *et al.*, 2024). As customers grow more cognizant of their consumption habits, they demand and support companies with a sustainable perspective or a favorable image, which affects their purchasing decisions and loyalty to a brand (Rastogi *et al.*, 2024). Thus, consumers’ increased concern of sustainable marketing encourages firms to adopt sustainability into their promotional activities. Despite the growing emphasis on sustainability, research on the topic remains scarce, particularly in developing countries, even though they collectively have the potential to become the world’s largest economies, consumption and workforce (Ngan *et al.*, 2019). Many organizations are attempting to integrate blockchain into their operations to boost creativity and sustainable growth, as blockchain has demonstrated benefits in terms of improved security, traceability, integrity and transparency. Applying the blockchain is able to enhance customers’ faith in the safety and quality of F&B boosting their purchasing intentions (Zhao, 2023). Despite a wealth of research on sustainability, significant gaps remain in the existing literature, particularly regarding the integration of various constructs such as traceability, sustainable marketing and consumer trust facilitated by blockchain technology, as highlighted by Shahzad *et al.* (2023), Riemens *et al.* (2023) and Treiblmaier and Garaus (2023). While previous studies have extensively explored the individual effects of these variables (Lee *et al.*, 2020; Kamble *et al.*, 2020; Le, 2024), there is a lack of comprehensive models that examine how they collectively influence brand love and sustainable purchasing behaviors (SPBs) – an area that has also been explicitly called for by the authors of those studies. For example, research has predominantly focused on either the operational aspects of traceability or the ethical dimensions of sustainable marketing, often neglecting the consumer’s emotional attachment to brands (Shanahan *et al.*, 2019; Carroll and Ahuvia, 2006). Additionally, while the role of blockchain in enhancing transparency and trust is well-documented, its potential to impact consumer perceptions and behaviors in the context of sustainability has not been fully explored (Le, 2024). Signal theory suggests that clear and credible signals can positively impact consumer perceptions, and it is worth considering the more complex aspects of signaling, such as its influence on customer purchases, referrals and social influence (Dunham, 2011). Few studies have conducted an in-depth analysis of how signal theory influences brand love and consumers, especially when exposed to various blockchain-enabled marketing signals.

This study aims to address aforementioned gaps by developing an integrated theoretical framework that connects blockchain-enabled traceability, reviews, sustainable marketing, brand love and sustainable purchase behavior, grounded in signal theory. Contrary to earlier assumptions that traceability consistently enhances brand affection, our findings show that in the sustainable F&B sector, traceability has only a limited impact on perceived quality and no direct effect on brand love, thereby offering an industry-specific refinement of existing knowledge (Le, 2024). Furthermore, while prior research primarily emphasized the transparency function of blockchain from a theoretical perspective (Kshetri, 2018; Mazzù *et al.*, 2021), this study is among the first to empirically validate the direct impact of

blockchain-based reviews on both perceived quality and brand love, placing emotional responses at the center of analysis. Unlike earlier studies that focused on only one, two or three dimensions (Rastogi *et al.*, 2024), this research extends the literature by simultaneously examining all four pillars of sustainable marketing activities (SMAs): economic, social, environmental and cultural, as antecedents of brand love (Riva *et al.*, 2022). Based on signal theory, originally proposed to address information asymmetry (Spence, 1974), we posit that traceability and consumer reviews function as credible signals that enhance perceived quality, which in turn reinforce brand love - a core emotional driver of sustainable consumption behavior (Nguyen and Nguyen, 2025). By integrating cognitive and emotional into a unified model, this study contributes to the extension of signal theory in the context of sustainability and emerging technologies. It offers novel empirical evidence on how blockchain-based transparency signals influence consumer behavior in the F&B industry (Zhao, 2023; Treiblmaier and Garaus, 2023; Liu *et al.*, 2023). From a practical perspective, the findings offer valuable implications for F&B businesses seeking to design blockchain-enabled sustainable marketing strategies: rather than focusing solely on operational transparency, firms should prioritize building consumer trust and emotional connections, particularly brand love, as these are key to fostering long-term consumer relationships and enhancing the perceived value of sustainable initiatives.

2. Literature review

2.1 Theoretical background

2.1.1 Sustainable marketing activities. Sustainable marketing is described according to Jung *et al.* (2020) as a process which requires a business to satisfy customer demands, make significant progress toward sustainable development (which involves the environment, economy and society throughout the entire phases of manufacturing and operation) and build lasting connections with consumers. Sun *et al.* (2014) proposed that corporations can carry out SMAs to draw in potential consumers, achieve sustained success and add significantly to society. The economic, cultural, environmental and social factors are the four main components of SMAs when taking into account the goals of sustainable development (McDonagh and Prothero, 2014; Stylianou-Lambert *et al.*, 2014; Jung *et al.*, 2020). Specifically, economic practices benefit consumers, partners and other stakeholders, while social marketing refers to community contribution activities that meet a company's goals other than business operations (Jung *et al.*, 2020). Several researchers have identified that a business's social media practices are a reliable predictor of customers' behavioral inclinations to purchase its products (Raza *et al.*, 2020). Environmental marketing activities are defined as activities that allow exchanges to satisfy people's requirements with the least amount of adverse impact on the environment (Jung *et al.*, 2020), which has become increasingly important as consumers' interest in environmentally sustainable consumption. According to Stylianou-Lambert *et al.* (2014), cultural marketing is concerned with the consideration, conservation and representation of both material and intangible legacy, artistic output, the knowledge and abilities of a variety of social categories and communities.

2.1.2 Blockchain. Blockchain was defined according to Treiblmaier (2018) as "a digital, decentralized, and distributed ledger in which transactions are logged and added in chronological order to create permanent and tamper-proof records". In this context, information becomes immutable and resistant to revisions or deletions, promoting stakeholder trust without relying on government intervention (Li *et al.*, 2021). The unique aspect of blockchain goes beyond simply using the internet for communication or social interaction; it also serves as a medium of value exchange (Tan and Saraniemi, 2023; Treiblmaier and Garaus, 2023; Antsipava *et al.*, 2024). As Min (2019) points out, blockchain has the potential to eliminate or possibly minimize a wide range of risk sources, including risk prevention, minimizing the effect of disruptions to the supply chain, increasing companies' adaptability to deal with supply chain interruptions and changing normal operations attitudes.

Blockchain's applications help SMAs achieve their environmental goals by improving tracking of emissions, waste and resources, as well as their economic and social goals by encouraging social responsibility and ethical sourcing (Munir *et al.*, 2023). Therefore, by promoting traceable and verifiable sustainability performance that satisfies changing customer expectations, blockchain acts as a strategic enabler of SMAs.

This research study examines the use of blockchain in the domains of traceability and customer reviews (reviews in blockchain), emphasizing its multidimensional utility in information management (Liu *et al.*, 2019). The application of blockchain in product tracking improves transparency and traceability (Shahzad *et al.*, 2023), especially in the context of issues related to product safety, quality, counterfeiting and preservation (Nguyen *et al.*, 2022; Riemens *et al.*, 2023). Retrieving previous customer reviews refers to the ability to trace and access previous purchasers' evaluations of things (Riemens *et al.*, 2023; Sun *et al.*, 2022). Importantly, blockchain does not only enhance operational transparency but also functions as a signaling mechanism that strengthens consumer trust, one of the key precursors of emotional brand attachment. By reducing information asymmetry, blockchain-enabled tools such as product traceability and consumer reviews act as credible signals that can indirectly influence brand love through improved trust and perceived quality (Wang and Tsai, 2019; Nguyen and Nguyen, 2025). Furthermore, the integration of blockchain with SMAs enhances the credibility of sustainability-related claims. This technological-verifiable linkage supports the delivery of authentic messages aligned with economic, environmental, social and cultural values, thereby amplifying the emotional resonance of sustainable brands (Riva *et al.*, 2022; Zhao, 2023). Thus, blockchain not only supports SMAs at the operational level but also plays a theoretical and strategic role in facilitating emotional outcomes such as brand love, ultimately fostering stronger consumer engagement and sustainable consumption behavior (Treiblmaier and Garaus, 2023; Liu *et al.*, 2023).

2.1.3 Signal theory. Signal theory (or signaling theory) is developed with a valuable framework that significantly aids in understanding the various antecedents and precursors that drive the sustainable consumption behavior of consumers (Spence, 1974; Khan *et al.*, 2021). Classical signaling theory is useful for describing behavior when two parties (individuals or organizations) have access to different information (Connelly *et al.*, 2011). According to Spence (1974), signaling theory is fundamentally concerned with information asymmetry between two parties when one party has information that the other side lacks. Specifically, one party, the sender, must choose whether and how to communicate (or signal) that information, and the other party, the receiver, must choose how to interpret the signal (Connelly *et al.*, 2011). To reduce that asymmetry, the party holding the information must transmit a signal to the party in need of the information (Spence, 1974). Specifically, in consumer goods markets, firms must try to signal their quality (such as packaging, labels and high-quality descriptions) to potential customers, affecting their perception and behaviors (Liao *et al.*, 2020; Treiblmaier and Garaus, 2023). However, information asymmetry can persist despite the presence of signaling mechanisms, including reputation feedback and the disclosure of product conditions (Ghose, 2009), which can be attributed to the fact that information can easily be faked or biased (Cao, 2020).

The combination of signal theory and blockchain can prevent information fraud by providing quick access to authenticated and shared data among various network participants (Nguyen *et al.*, 2022; Treiblmaier and Garaus, 2023), especially in the sustainable F&B industry. Additionally, when information data is preserved, it becomes difficult to change and resistant to fraud (Chen *et al.*, 2022), promoting consumers' trust and purchase behavior. Signaling theory describes how people and organizations convey information about their capabilities or qualities to others in an effort to build trust and reduce information asymmetry (Valmohammadi *et al.*, 2025). According to Connelly *et al.* (2011), signals are expensive behaviors, features or qualities that provide important information about the caliber, aptitude or qualities of a person or retail brand. According to Ahmed *et al.* (2023), green marketing and consumption, the signaling theory can be taken as a framework to transfer the signals between

firms and consumers. Therefore, in the following sections, we use signal theory to investigate the impact of blockchain-based information and sustainable marketing activities on sustainable consumption behavior, as well as the influence of brand love.

2.1.4 Traceability. Traceability is the capacity to monitor and trace the origin, use and location of a product or its constituent parts across the supply chain (Olsen and Borit, 2013). Effective traceability systems offer transparency that aids in confirming the authenticity of products, guaranteeing adherence to sustainability guidelines and thwarting immoral activities like illicit sourcing, as claimed by Behnke and Janssen (2020). Additionally, traceability helps businesses effectively manage risks, return faulty products and convince stakeholders of their sustainability initiatives (Aung and Chang, 2014). From a marketing standpoint, traceability enhances consumer trust by offering verifiable information about a product's origin, production conditions and ecological footprint (Galvez et al., 2018). This trust is essential for the success of sustainable marketing activities, as consumers increasingly demand transparency in claims related to environmental and social impact (Kamble et al., 2020). Furthermore, real-time data sharing and end-to-end product visibility are further supported by digital traceability technologies like blockchain, RFID and QR codes, which strengthen the credibility of sustainability narratives (Treiblmaier, 2019) (see Table 1).

2.2 Hypotheses development

2.2.1 Traceability labels. First, the term traceability is defined as the ability to track and record information about the origin, production, processing and distribution of a product from the first stage (such as raw materials) to the final product reaching the end consumer (Agriculture Victoria, 2022). QR-based traceability labels allow consumers to look up information about product origin, manufacturing techniques and compliance with quality standards (Le, 2024). According to signal theory, this information is a signal of transparency and responsibility from the business (Ying et al., 2023). This has a positive impact on consumers' attitudes toward products and increases their confidence in the quality of the products they are choosing (Le, 2024). In the F&B industry, food safety is an important attribute that influences customer confidence in product quality (Djekic et al., 2022). Traceability labels provide evidence that a product complies with safety standards, such as the beverage being free of harmful flavourings (Kamiloglu, 2019). Therefore, when customers clearly know the journey of F&B products, they feel more secure, thereby raising their perception of quality.

Second, brand love refers to the degree of consumer affection for a particular commercial brand (Carroll and Ahuvia, 2006). Brand love is built on many different emotional perceptions, including positive emotional connections, a long-term relationship, positive overall attitude (Karjaluoto et al., 2016). Brand love reflects a deep emotional bond that develops gradually through repeated positive experiences and relational trust (Yang et al., 2019; Fournier, 1998). According to Madadi et al. (2021), brand trust serves as an important antecedent of brand love, as consumers who perceive a brand as reliable and honest are more likely to form emotional attachment. In the food and beverage context, where product safety and quality are critical concerns, traceability systems enhance transparency and allow consumers to verify product histories, thereby strengthening trust and reducing uncertainty in the supply chain (Yuan et al., 2020). From a signaling perspective, QR-based traceability labels function as a credible signal that communicates authenticity and safety, which helps alleviate information asymmetry between firms and consumers (Treiblmaier and Garaus, 2023). When consumers consistently perceive that a brand provides transparent and verifiable information, they may develop respect, appreciation and ultimately emotional attachment toward the brand, which constitutes the foundation of brand love (Yang et al., 2019). Therefore, traceability is expected to contribute to brand love by strengthening relational trust and encouraging long-term consumer-brand bonding.

Next, sustainable purchase behavior describes consumer purchasing activities that intentionally prioritize the use of sustainable and environmentally friendly products (De

Table 1. Studies related to the concepts in the research paper

Authors	Antecedent	Outcome	Mediator*/Moderator	Theory	Country	Key finding
Treiblmaier (2018)	Consumer blockchain technology experience	Online purchase behavior (impulse buying)	Environmental information transparency perceived, digital trust, swift trust	Signal theory and trust transfer theory	China	Consumer blockchain technology experience can significantly impact the environmental information transparency perceived. Additionally, both have a considerable effect on digital trust and swift trust. Digital trust has a positive effect on swift trust. Moreover, both trusts have a positive effect on impulse buying
Jung et al. (2020)	Sustainable marketing activities (economic, social, environmental, culture)	Customer loyalty	Brand image, customer satisfaction, customer trust	Signal theory	Korea	Sustainable marketing activities (economic, environmental and cultural) have a positive impact on brand image. However, social sustainability has a negative impact on brand image. Moreover, brand image, customer trust and customer satisfaction are mediating variables in the relationship between sustainable marketing activities and customer loyalty

(continued)

Table 1. Continued

Authors	Antecedent	Outcome	Mediator*/Moderator	Theory	Country	Key finding
Treiblmaier and Garaus (2023)	A blockchain-based traceability label	Purchase intentions	Perceived product quality/brand familiarity	Signaling theory	Austria	A blockchain-based traceability label has a positive impact on purchase intentions. Moreover, perceived product quality acts as an intermediary in the relationship between a blockchain-based traceability label and purchase intentions. Brand familiarity is a moderator that increases the impact of a blockchain-based traceability label on perceived product quality
Zheng et al. (2025)	Sustainable marketing practice	Sustainable consumption behavior	Green intrinsic motivation/environmental knowledge	Value-belief-norm (VBN) theory	China	Sustainable marketing practices have a positive effect on sustainable consumption behavior. In addition, green intrinsic motivation acts as a mediator between these variables. Environmental knowledge strengthens the link between intrinsic motivation and sustainable behavior
Le (2024)	Traceability system, reviews in blockchain	Brand trust	Product quality/brand reputation	Signal theory	Vietnam	Both traceability systems, reviews in Blockchain have a positive effect on product quality. Product quality is positively related to brand trust. Moreover, this relationship will be stronger when the moderator variable, brand reputation is involved

(continued)

Table 1. Continued

Authors	Antecedent	Outcome	Mediator*/Moderator	Theory	Country	Key finding
Sun <i>et al.</i> (2016)	Confucian philosophy (Benevolence, righteousness, propriety, wisdom, trustworthiness)	Customer life value	Sustainable marketing (environment, economic, social), customer equity drivers (value, brand, relationship)	Customer equity framework	China	Confucian philosophy has a positive effect on sustainable marketing. However, Confucian philosophy has a negative effect on equity drivers. Sustainable marketing is positively related to customer equity driver. Sustainable marketing has a negative impact on customer life value, but the customer equity driver is the opposite
Rastogi <i>et al.</i> (2024)	Economic sustainability, environment sustainability, social sustainability	Customer loyalty	Brand image	Not specific	India	Three aspects of sustainable marketing (Economic sustainability, environmental sustainability, social sustainability) that positively impact brand image and customer loyalty. In addition, brand image has a positive effect on customer loyalty
Wang and Butkouskaya (2023)	Sustainable marketing activities	Tourists' behavioral intentions	Sports tourism event image, tourists' perceived value	Brand theory	China	Sustainable marketing activities related to tourists' behavioral intentions. Sports tourism event image and tourists' perceived value play an intermediary role between the two variables, sustainable marketing activities and tourists' behavioral intentions

(continued)

Table 1. Continued

Authors	Antecedent	Outcome	Mediator*/Moderator	Theory	Country	Key finding
Current study	Traceability, sustainable marketing activities (economic sustainability, social sustainability, environmental sustainability, cultural sustainability), reviews in blockchain	Sustainable purchase behavior	Perceived quality, brand love	Signal theory	Vietnam	Traceability and review in blockchain has a direct impact on sustainable purchase behavior. Moreover, these relationships are mediated by the variables perceived quality and brand love Sustainable marketing activities impact on sustainable purchase behavior through intermediate variables (perceived quality, brand love)

Pelsmacker *et al.*, 2005). Past studies have shown that if individuals think their actions have a positive impact on social benefits, they will proactively do them (Ellen *et al.*, 1991). Therefore, this explains why consumers are willing to pay more for products that clearly signal environmental friendliness (Bradu *et al.*, 2014). One of the key signals that helps customers assess the sustainability of a product is traceability labels - allowing them to verify information about production processes, raw materials and environmental impacts before making a purchasing decision (Lee *et al.*, 2020). Consumers have the ability to reduce or minimize environmental damage by purchasing sustainable products (Arvola *et al.*, 2008). According to Liu *et al.* (2014), a brand with sustainable or environmentally friendly values will be very attractive to customers. Thus, traceability labels increase customer awareness of sustainable brands and increase their ability to prioritize sustainable purchases.

H1a. Traceability labels have a positive impact on customer's perceived quality of F&B

H1b. Traceability labels have a positive impact on customer's brand love

H1c. Traceability labels have a positive impact on customer's sustainable purchase behavior

2.2.2 Sustainable marketing activities. The conception of sustainability is considered an important aspect in marketing research (Sheth and Parvatiyar, 2021). Sustainable marketing activities refer to marketing strategies that companies use for long-term development, to draw customers and to contribute to society (Sun *et al.*, 2014). According to Jung *et al.* (2020), sustainable marketing activities include four aspects: Economic sustainability, social sustainability, environmental sustainability and cultural sustainability.

According to Valmohammadi *et al.* (2025), signaling theory explains how individuals and organizations communicate information about their traits or talents to others in an attempt to foster trust and lessen information asymmetry. Moreover, Connelly *et al.* (2011) define signals as pricey behaviors, attributes or aspects that convey crucial information about the quality, ability or attributes of an individual or retail brand. While sustainable marketing activities are commonly used as signals to communicate firms' commitment to sustainability (Spence, 1973), such signals are often subject to skepticism due to information manipulation and greenwashing (Maignan, 2001; Delmas and Burbano, 2011). Blockchain technology enables sustainability-related signals to become verifiable, immutable and costly to fake, thereby transforming sustainability signaling from low-cost, firm-controlled claims into high-credibility and trustworthy signals (Nygaard and Silkoset, 2023; Dong *et al.*, 2023).

Economic sustainability is defined as "sharing economic benefits through economic support within a region" (Jung *et al.*, 2020, p. 295). According to the signaling theory (Valmohammadi *et al.*, 2025), firms employ visible economic action such as innovation, value creation and accountable financial practices to signal their operational capability and long-term viability to market participants. Prior research suggests that economically sustainable practices can enhance firm profitability, strengthen brand image and extend brand longevity, thereby functioning as indicators of firm quality and competitiveness (Maignan and Ferrell, 2001). In this sense, economic sustainability operates as a performance-based signal, as its outcomes, such as revenue growth, innovation and product quality, are highly observable and provide tangible cues for consumers to evaluate firms' capabilities (Jung *et al.*, 2020). Therefore, economic sustainable activities signal their abilities and positioning themselves as reliable partners or providers, which enhance financial health and long-term profitability (Connelly *et al.*, 2011). Revenue growth is positively impacted by economic accountability, innovation, value creation and effective management (Jung *et al.*, 2020). These factors should produce profits through new and quality goods and services and distribute them to regional stakeholders (Jung *et al.*, 2020). These activities can enhance perception of quality and brand love because firms signal their quality, such as new goods and services, as well as high-quality descriptions to potential customers, affecting their perception and behaviors (Liao *et al.*, 2020; Treiblmaier and Garaus, 2023).

Social sustainability refers to implementing an organization's purpose other than commercial profit-making behavior (Sun *et al.*, 2014). Signal theory offers a useful perspective for addressing this disparity by arguing that businesses should use reliable and verifiable methods to successfully communicate to customers their sincere commitment to sustainability (Spence, 1974; Liao *et al.*, 2020). The brands need to transparently provide the information about corporate social responsibility programs to foster the quality signal and brand love of customers. In addition, by giving different network participants rapid access to verified and shared data, signal theory and blockchain can help prevent information fraud (Nguyen *et al.*, 2022; Treiblmaier and Garaus, 2023). According to Nestlé (2024), Nestlé Nespresso partnered with the social impact start-up Open SC to apply blockchain technology in order to enhance digital transparency across its value chain. The report also stated that QR code traceability was used to allow consumers to trace the origin of their coffee down to the farm level in the Democratic Republic of the Congo. Hence, social SMAs can lead to brand love for customers because the social activity of a firm has a positive impact on the belief of customers (Jung *et al.*, 2020). These activities help customers remain tied to their behavioral intentions, such as their reactions and attitudes toward a company's products (Park *et al.*, 2017).

Environmental sustainability represents all activities initiated to create and support any exchanges meant to meet human needs or desires in a way that has the least negative effect on the environment (Jung *et al.*, 2020). Meeting these needs and wants occurs with minimal detrimental impact on the natural environment (Wang and Butkouskaya, 2023). According to the signaling theory, the brands must try to signal their quality to potential customers, affecting their perception and behaviors (Liao *et al.*, 2020; Treiblmaier and Garaus, 2023). In this sustainable F&B industry context, these acts, like the disclosures of the use of environmentally friendly materials or environmental pollution in production and distribution (Rastogi *et al.*, 2024), can serve as visible signals of environmental sustainability, which can impact customers' perceived quality and brand love. In environmental SMAs, customers who are in love with a brand are more likely to participate actively in co-creation within the brand community and their brand loyalty (Singh and Wagner, 2023). Consumers are aware of the right and wrong practices adopted by the brands and are not willing to purchase environmentally hazardous practices (Singh and Wagner, 2023).

Cultural sustainability is the consideration, protection and display of tangible and intangible heritage, artistic creation, as well as the knowledge and abilities of various social groups, communities and nations (Loach and Rowley, 2022). When businesses integrate local culture into their products, brands or communications, they are sending signals to consumers about authenticity, respect and ethical values, thereby reducing information bias and building trust.

SMAs help businesses find out the values that businesses and consumers share to motivate and promote them to engage in both a healthy environment and a thriving economy (Park *et al.*, 2022). These activities can improve consumer perceptions of quality and lower consumer perceptions of risk in relation to environmental concerns in order to gain a competitive edge (Chen, 2010). In the sustainable F&B industry, customers are more inclined to buy goods from businesses that practice social responsibility and environmental responsibility (Kalafatis *et al.*, 1999). Businesses must give customers access to sufficient information so they may compare their products to those of other companies based on environmental functionality in order to lower the perceived risk to their customers (Chen and Chang, 2013). Hence, the brands must provide more details about their goods than merely their greenness (Chen and Chang, 2013). In contrast, it is challenging for green marketers to persuade consumers of the superiority of their products if these brands do not provide transparent information and trustworthy facts and as a result, consumers may become skeptical of their green promises (Chen and Chang, 2013), leading to a reduction in customers' brand love. When sustainability signals are supported by blockchain-enabled transparency, customers are more likely to perceive such signals as credible and diagnostic, thereby enhancing perceived quality and brand love.

H2a. SMAs have positive impacts on perceived quality.

H2b. SMAs have positive impacts on brand love.

2.2.3 Reviews in blockchain. In accordance with [Le \(2024\)](#), through a decentralized and distributed ledger, blockchain digitally records and validates transactions. By adding each transaction to a block linked to the previous one, blockchain tech ensures transparency and reliability in customer reviews, as they cannot be altered or removed ([Patelli and Mandrioli, 2020](#)). Moreover, blockchain technology can offer transparent and accessible information through QR codes and interactive kiosks. This capability directly addresses the growing consumer need for transparent and reliable information, as many customers struggle to interpret technical data such as milligrams or nano-units ([Brouwer et al., 2020](#)). By doing this, blockchain can significantly enhance the perceived quality of products, allowing consumers to easily verify the product's authenticity, which significantly improves their perception of the product's quality ([Mazzù et al., 2021](#)). Due to those inherent characteristics, many brands have implemented cryptographic ledger tech for ensuring the product quality, preventing tampering, encouraging honest feedback and providing secure, long-term data storage ([Le, 2024](#)). Consequently, this increased transparency and reliability enhance consumer trust and their perception of the product's overall quality, especially for higher-risk or premium items.

The unchangeable and reliable feature of review in blockchain can also be seen in the relationship with brand love. In the context of brand love, which is known as the intensity of a profound emotional attachment and loyalty that a consumer feels toward a brand ([Carroll and Ahuvia, 2006](#)). Additionally, as proposed by [Fournier and Mick \(1999\)](#), brand love goes beyond mere satisfaction or preference, not all satisfied consumers experience this feeling. By empowering consumers with better control over their personal data ([Boukis, 2020](#)), blockchain technology can enhance the relationship between brand and consumer. In particular, consumers are able to manage who has access to their information and ensure it is used transparently and ethically. Furthermore, by verifying the entire lifecycle of products, consumers can lower the risk of disinformation and make more informed purchases. This transparency, similar to the proven effect of providing more information on water treatment and quality, strengthens customer trust ([Brouwer et al., 2020](#)). As trust is a key driver of brand love, blockchain's role in fostering transparency and reliability directly contributes to a deeper emotional attachment and loyalty toward the brand ([Kshetri, 2018](#); [Montecchi et al., 2019](#)).

Sustainable purchase behavior can be defined as the consumer's overall perspective and evaluation of making purchase decisions that prioritize environmental and social responsibility ([De Pelsmacker et al., 2005](#)). In addition, this behavior reflects a commitment to supporting brands and products that align with environmental principles, social justice and long-term ecological balance ([Joshi and Rahman, 2017](#)). Blockchain technology can further support this commitment by promoting the adoption of new green production methods, while also enabling the monitoring and storage of data related to activities that contribute to pollution and environmental degradation. Through the real-time collection and analysis of green or low-carbon data, it supports timely decision-making and drives the development of a green supply chain ([Saber et al., 2019](#)). Moreover, research by [Zhou et al. \(2023\)](#) highlights that blockchain-based traceability systems can help eliminate consumer doubts about the sustainability attributes of a product. Furthermore, [Centobelli et al. \(2022\)](#) demonstrate that blockchain facilitates the adoption of green production methods while monitoring and storing data related to pollution and environmental degradation. Real-time collection and analysis of green or low-carbon data further assist in making timely decisions, promoting the development of a sustainable supply chain. When customers make purchase decisions with this spirit, they directly provide support to environmental organizations ([Joshi and Rahman, 2017](#)).

H3a. Reviews in Blockchain have a positive impact on perceived quality.

H3b. Reviews in Blockchain have a positive impact on brand love.

H3c. Reviews in Blockchain have a positive impact on sustainable purchase behavior.

2.2.4 Perceived quality. Perceived quality, which refers to a consumer's evaluation of a product's overall excellence or superiority, plays a crucial role in shaping consumer attitudes and behaviors (Zeithaml, 1988). High perceived quality leads to consumer satisfaction, trust and loyalty, fostering a positive emotional connection with the brand (Bagozzi *et al.*, 2017). This emotional connection or brand love, is characterized by strong positive feelings, passion and a sense of attachment to the brand (Albert and Merunka, 2013). When consumers perceive high quality in a brand's products or services, they are more likely to develop affection and loyalty toward the brand, which translates into brand love (Khalid *et al.*, 2024). In the context of the food and beverage (F&B) industry, blockchain has been growing rapidly in recent years. This study refreshes this relationship by retesting them with the context of blockchain applications in F&B for products from sustainable brands. As sustainability in F&B becomes more and more popular, with countless consumers more interested in the passion for diverse culinary experiences and delicious dishes, they always place the feeling of quality through the products they buy (Briefing, 2023). Therefore, it is hypothesized that:

H4. Perceived quality has a positive impact on brand love

2.2.5 Brand love. The F&B industry has seen a significant increase in popularity in recent years, with consumers increasingly wanting to use products that they enjoy and love using over a long period of time. This trend highlights the importance of brand love in the industry (Alnawas and Altarifi, 2016). Brand love, defined as a consumer's deep emotional connection to a brand, positively influences behavioral outcomes such as loyalty, word-of-mouth and willingness to forgive brand transgressions (Bagozzi *et al.*, 2017). This affection includes favorable attitudes, strong positive emotions, passion and a sense of attachment to the brand (Rageh Ismail and Spinelli, 2012). From an affective-behavioral perspective, positive emotions act as a powerful motivator for brand endorsements, meaning the stronger the emotional attachment, the higher the likelihood of a purchase (Bagozzi *et al.*, 1999). In the context of sustainable consumption, consumers who love a brand are more likely to support its ethical and environmental values because emotional attachment with the brand strengthens responsible purchasing choices (Fazal-e-Hasan *et al.*, 2025). Several studies have explored the relationship between brand love and SPB, particularly in sectors like fashion, retail and hospitality (e.g. Kukreti and Yadav, 2025; Hegner *et al.*, 2017; Magano *et al.*, 2024; Khalid *et al.*, 2024). According to that research, consumers who feel emotionally connected to a brand are more likely to align with its sustainability values and engage in sustainable consumption. Existing research on brand love predominantly focuses on other industries, calling for further exploration of this relationship in new contexts. However, despite the growing importance of sustainability in the F&B sector, there is a noticeable gap in the literature when it comes to examining how brand love influences SPB within this industry in new interdisciplinary contexts.

Therefore, this study aims to extend prior research by exploring the connection between brand love and SPB within the context of blockchain-enabled marketing signals, specifically in the F&B industry, where the consumption experience is more sensory-driven and deeply embedded in daily habits.

H5. Brand love has a positive impact on sustainable purchase behavior

3. Methods

3.1 Data collection

With Google Forms tool, we conducted an online survey in Vietnam using a non-probability sampling, specifically employing the snowball sampling method. Snowball sampling, in which existing participants recommend new participants, is considered appropriate for this

study. In order to verify the quality and content of each question, we ran a pretest with 20 people and revised it before the official survey. All scales were developed and translated into Vietnamese (translation/back-translation procedure). Thus, some of the wording was changed to make the questions more understandable. Before filling out the questionnaire, respondents were briefly introduced to 5 sustainable marketing brands in Vietnam: Vinamilk, TH True Milk, Nestlé, Starbucks and Nutifood. Screening questions asked: (1) “Do you know the above brands?”; (2) “Have you ever purchased products from any of the listed brands or from other F&B brands with a sustainable marketing orientation?”; and (3) “Are you willing to buy products from brands that practice sustainable marketing at a higher price than companies that do not?”. The authors clarified that these brands were used merely as illustrative examples to help respondents visualize what a brand engaged in sustainable marketing might look like, given that these five brands are highly recognizable in Vietnam. These five big brands have the applications of blockchain and traceability labels technology with their products. In addition, they are involved in sustainability boosting actions based on four aspects (Economic, Cultural, Social and Environmental). Once respondents understood the concept and passed the screening questions, the subsequent measurement items did not refer specifically to those brands. Instead, they captured consumer behavior and attitudes toward sustainable marketing more broadly, allowing for the inclusion of experiences with other F&B brands that follow a similar sustainable marketing orientation. Surveyors who answer “Yes” to the first two questions, while the third question remains optional, will be allowed to proceed with the survey. This approach ensures that participants meet the eligibility criteria for completing the questionnaire. The survey collected 627 respondents, but only 622 completed questionnaires were valid thus, it had an effective rate of 99.2%. The exploratory factor analysis is tested using the IBM SPSS Statistics 26 software. Of the 613 responses, there were 281 males (45.2%) and 332 females (54.8%). The majority were young people, with 62.4% aged 18–24 and 22.2% aged 25–30, followed by 9.2% aged 31–40, 4.3% aged 41–50, 1.4% aged under 18 and 0.5% aged over 50. In terms of education, the majority have a university education (accounting for 79.9%), followed by post-graduate education (13.8%), the high school level (3.9%) and lastly, college/apprenticeship (2.4%). When it came to average monthly earnings (which includes a family stipend), the group earning less than 5 million Vietnam Dong (VND) (34.4%), followed by the group from 5 to under 10 million VND (21.6%), the group from 10 to under 20 million VND (22.2%). The earning group from 20 to under 30 million VND made up 13.8%, the group from 30 to under 40 million VND accounted for 4.5%, and finally, the group over 40 million VND took up 3.5% (Table 2).

3.2 Measurement

To test the theoretical model, the variables in this study were measured using items created and used in earlier research to ensure validity and reliability. Every component in the conceptual model was assessed using a seven-point Likert scale (strongly disagree, disagree, somewhat disagree, neither disagree nor agree, somewhat agree, agree and strongly agree). To ensure respondents understood the meaning of each item, questionnaires were written in English and subsequently translated into Vietnamese according to the procedures presented by Brislin (1986).

Traceability was adapted from Le (2024) with 3 items. SMAs were measured by 4 latent variables encompassing economic sustainability, environmental sustainability, social sustainability and cultural sustainability. Using the scale of Jung *et al.* (2020) and Rastogi *et al.* (2024) to test the conceptual model encompass economic sustainability was measured by 4 items; social sustainability was measured by 7 items; environmental sustainability was measured by 6 items; and cultural sustainability was measured by the scale of Jung *et al.* (2020). Reviews of blockchain items were adapted from Le (2024). Perceived quality was measured by 5 items from Shanahan *et al.* (2019). Brand love was derived from Carroll and

Table 2. Demographic descriptives

Variable	Responses	Amount (<i>N</i> = 613)	Percent (%)
Gender	Male	281	45.20
	Female	332	54.80
Age	18–24	388	62.40
	25–30	138	22.20
	31–40	57	9.20
	41–50	27	4.30
	Over 50	3	0.50
Education	High School	15	3.90
	College/Vocational Training	15	2.40
	University	497	79.90
Monthly income	After university	86	13.80
	Under 5 million	205	34.40
	5 million - under 10 million VND	134	21.60
	10 million - under 20 million VND	138	22.20
	20 million - under 30 million VND	86	13.80
	30 million - under 40 million VND	28	4.50
	Over 40 million	22	3.50

Ahuvia (2006) with 8 items. Sustainable purchase behavior was adapted from Joshi and Rahman (2017) with 4 items. All items were included in the Appendix.

3.3 Data analysis

Using SmartPLS 4.0 software, the partial least squares structural equation modeling (PLS-SEM) approach was utilized to evaluate the study model. According to Chin and Newsted (1999), a high sample size is not necessary for the PLS-SEM model to function, as it depends on data that is both primary and secondary. It enables the balance of prediction and explanation to be reconciled in the study's conclusions. Moreover, PLS-SEM is recommended for intricate research models including moderators and reflective-formative higher-level components (Cheah *et al.*, 2023; Becker *et al.*, 2023). Because hypotheses and path models rely on cause-and-effect relationships, the model's precisely anticipated results offer both causal explanations and significant managerial implications (Hair *et al.*, 2019; Sarstedt *et al.*, 2019). Hwang *et al.* (2020) also advise using PLS-SEM when dealing with unknown data to prevent biased estimates and potential mistakes (Type I and Type II). This study aims to explore and extend signal theory by examining how blockchain-based technology and sustainable marketing activities influence brand love and sustainable consumption behavior. Therefore, PLS-SEM is considered a suitable analytical approach because PLS-SEM's soft modeling approach is well-suited for exploratory studies, particularly when theoretical foundations are still underdeveloped as well as it is especially appropriate when the goal is to explain and predict key constructs (Avkiran, 2018). Finally, the study aims to address problems of multicollinearity, while reducing the issue of co-linearity or duplication among predictor variables (Ramli *et al.*, 2018).

4. Results

4.1 Common method bias (CMB)

Common data collection techniques may cause covariance among variables, which makes additional analysis challenging (MacKenzie and Podsakoff, 2012). Prior to the model assessment, CMB was utilized to examine Harman's single-factor test. The results showed that the greatest variance illustrated by a single factor was approximately 50% (42.4), within

4.2 Measurement model

An item is considered reliable if its outer loading exceeds 0.70, as specified by the standard set by Hair *et al.* (2019). The reliability of each item, which is also called outer loading, must surpass 0.70. Specifically, after analyzing the data shown, we discovered that all variables meet this standard.

To assess the reliability as well as the convergent validity, we use three statistical measures: composite reliability (CR), Cronbach's alpha (CA) and the metrics (rho_C) (Dijkstra and Henseler, 2015). In addition, for the purpose of achieving the framework convergence, we applied the method of Rasoolimanesh *et al.* (2017), which requires that the Average Variance Extracted (AVE) must not fall below 0.5.

Making reference to Table 3, the AVE measurements all conform to the standard (above 0.5), so this result confirms verification of the model's validity. Moreover, to emphasize the validity of convergence, the score of CA and the rho_C both exceed 0.7, with the BL variable leading the value at 0.945.

The Fornell–Larcker technique assesses discriminant validity at the latent variable level (Fornell and Larcker, 1981). The Fornell–Larcker technique provides a baseline approach, but this technique demonstrates that in order to quantify discriminant validity at the latent variable level, the square root of each construct's AVE must be greater than its correlation with other latent variables (Table 4). Distinguishing between two latent variables becomes difficult if their HTMT value is greater than 1 (Esposito Vinzi *et al.*, 2010), which indicates that the data of the two sets of variable indicators are quite similar. Therefore, HTMT provides a more accurate assessment of discriminant validity (Henseler *et al.*, 2015). Using HTMT can obtain higher specificity and sensitivity rates than Fornell–Larcker (Nguyen *et al.*, 2024). As the results in Table 4 show, all HTMT values in this study are below 0.9 (Esposito Vinzi *et al.*, 2010), which confirms the acceptance of the discriminant validity of the measurement model (see Table 5).

4.3 Structural model

Furthermore, to evaluate the collinearity phenomenon between observed variables, we tested the VIF (Variance Inflation Factor) statistic. And the results of the internal model analysis show that all VIFs are below 5. Therefore, we do not detect collinearity (Hair *et al.*, 2019).

The analysis of Table 6 indicates that the highest correlation is observed between Brand Love (BL) and Perceived Quality (PQ), with a value of 0.851. While this strong positive correlation suggests an association between the two variables, indicating that higher perceived quality is generally related to greater brand love, it does not imply a causal relationship. Similarly, the correlation of 0.783 between Environmental Sustainability (EVS) and Social Sustainability (SS) reflects a notable positive association, indicating that these sustainability dimensions tend to vary together. The weakest correlation identified was between Cultural Sustainability and Sustainable Purchase Behavior, at 0.548, which still suggests a moderate positive association. It is important to note that correlation coefficients demonstrate the strength and direction of relationships between variables but do not provide evidence of causation or the impact of one variable on another.

Bootstrapping Test: To generalize the study model (see Figure 1) to the full population, dependability must be ensured. As a result, the accuracy of the estimated outcomes must be reevaluated. This can be accomplished by repeating the study and collecting more observation samples. Instead of the standard method, PLS-SEM employs bootstrapping to assess statistical significance. The next step in hypothesis testing is to evaluate the significance of the correlations between variables (Table 7) using *t*-test, path coefficients and *p*-values. The bootstrap methodology, a non-parametric method, was used to assess the accuracy of

Table 3. Metrics for evaluating reliability and validity

Constructs/Variables	Outer loadings	Cronbach's alpha	Composite reliability	AVE
<i>Sustainable marketing activities (Second order)</i>		0.894	0.966	0.608
<i>Economic sustainability (First order)</i>		0.866	0.868	0.713
ES1	0.821			
ES2	0.872			
ES3	0.845			
ES4	0.834			
<i>Social sustainability (First order)</i>		0.928	0.928	0.698
SS1	0.822			
SS2	0.852			
SS3	0.846			
SS4	0.836			
SS5	0.841			
SS6	0.856			
SS7	0.794			
<i>Environmental sustainability (First order)</i>		0.942	0.942	0.774
EVS1	0.858			
EVS2	0.881			
EVS3	0.882			
EVS4	0.871			
EVS5	0.897			
EVS6	0.889			
<i>Cultural sustainability (First order)</i>		0.902	0.902	0.836
CS1	0.897			
CS2	0.930			
CS3	0.916			
<i>Brand love</i>		0.945	0.945	0.722
BL1	0.827			
BL2	0.870			
BL3	0.835			
BL4	0.876			
BL5	0.871			
BL6	0.855			
BL7	0.844			
BL8	0.820			
<i>Perceived quality</i>		0.925	0.925	0.769
PQ1	0.872			
PQ2	0.895			
PQ3	0.879			
PQ4	0.881			
PQ5	0.855			
<i>Review in blockchain</i>		0.860	0.860	0.781
RB1	0.871			
RB2	0.901			
RB3	0.880			
<i>Traceability</i>		0.876	0.876	0.801
TR1	0.890			
TR2	0.915			
TR3	0.880			
<i>Sustainable purchase behavior</i>		0.894	0.895	0.760
SPB1	0.848			
SPB2	0.901			
SPB3	0.868			
SPB4	0.868			

Table 4. Heterotrait-monotrait ratio (HTMT)

	BL	CS	ES	EVS	PQ	RB	SS	SPB	TR
BL									
CS	0.772								
ES	0.760	0.759							
EVS	0.728	0.774	0.812						
PQ	0.810	0.730	0.755	0.729					
RB	0.857	0.777	0.821	0.784	0.857				
SS	0.823	0.802	0.866	0.839	0.786	0.806			
SPB	0.763	0.610	0.675	0.608	0.691	0.735	0.690		
TR	0.754	0.694	0.747	0.712	0.753	0.883	0.736	0.705	

Note(s): Economic Sustainability – ES; Social Sustainability – SS; Environmental Sustainability – EVS; Cultural Sustainability – CS; Brand Love – BL; Perceived Quality – PQ; Review in Blockchain – RB; Traceability – TR; Sustainable Purchase Behavior – SPB

Table 5. Fornell–Larcker

	BL	CS	ES	EVS	PQ	RB	SS	SPB	TR
BL	0.850								
CS	0.713	0.914							
ES	0.690	0.672	0.845						
EVS	0.688	0.713	0.734	0.880					
PQ	0.851	0.667	0.678	0.681	0.877				
RB	0.774	0.685	0.709	0.706	0.765	0.884			
SS	0.772	0.733	0.776	0.783	0.728	0.719	0.835		
SPB	0.702	0.548	0.597	0.558	0.629	0.645	0.629	0.872	
TR	0.687	0.617	0.651	0.648	0.678	0.767	0.663	0.626	0.895

Note(s): Economic Sustainability – ES; Social Sustainability – SS; Environmental Sustainability – EVS; Cultural Sustainability – CS; Brand Love – BL; Perceived Quality – PQ; Review in Blockchain – RB; Traceability – TR; Sustainable Purchase Behavior – SPB

Table 6. Latent variable correlations

	BL	CS	ES	EVS	PQ	RB	SS	SPB	TR
BL	1.000	0.713	0.690	0.688	0.851	0.774	0.772	0.702	0.687
CS	0.713	1.000	0.672	0.713	0.667	0.685	0.733	0.548	0.617
ES	0.690	0.672	1.000	0.734	0.678	0.709	0.776	0.597	0.651
EVS	0.688	0.713	0.734	1.000	0.681	0.706	0.783	0.558	0.648
PQ	0.851	0.667	0.678	0.681	1.000	0.765	0.728	0.629	0.678
RB	0.774	0.685	0.709	0.706	0.765	1.000	0.719	0.645	0.767
SS	0.772	0.733	0.776	0.783	0.728	0.719	1.000	0.629	0.663
SPB	0.702	0.548	0.597	0.558	0.629	0.645	0.629	1.000	0.626
TR	0.687	0.617	0.651	0.648	0.678	0.767	0.663	0.626	1.000

Note(s): Economic Sustainability – ES; Social Sustainability – SS; Environmental Sustainability – EVS; Cultural Sustainability – CS; Brand Love – BL; Perceived Quality – PQ; Review in Blockchain – RB; Traceability – TR; Sustainable Purchase Behavior – SPB

the hypotheses (Beckeret *et al.*, 2023). According to Ryff *et al.* (2006), the bulk of the hypotheses are supported by the data, with the exception of hypothesis H1b, which has *p*-values larger than 0.05 and is thus not statistically significant. Based on the hypothesis H1a, H1b, H1c, H2a, H2b,

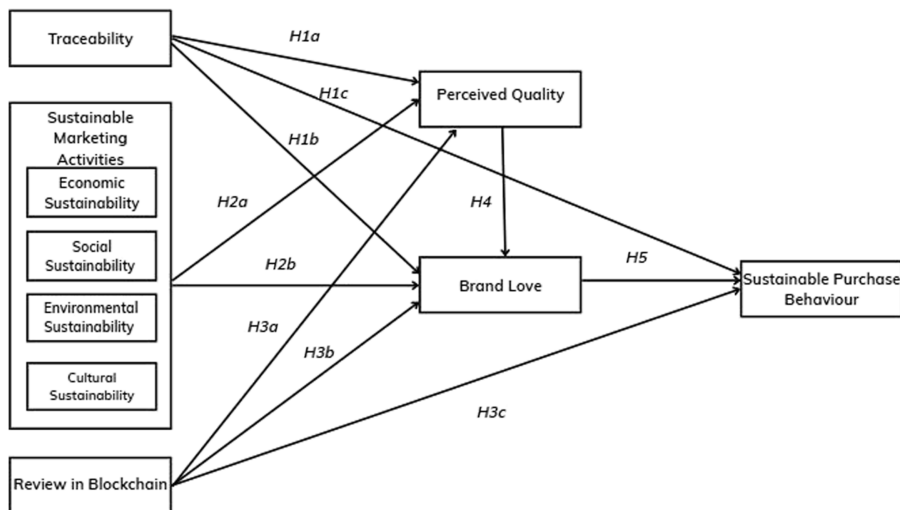


Figure 1. Research model. Authors' construction

Table 7. Path coefficients, mean, STDEV, *T* values, *p* values

	Original sample (β)	Standard deviation	<i>t</i> -value	<i>p</i> -value	Decision
TR → PQ = H1a	0.106	0.042	2.505	0.012	Accepted
TR → BL = H1b	0.039	0.038	1.036	0.300	Unaccepted
TR → SPB = H1c	0.215	0.056	3.848	0.000	Accepted
SMA → PQ = H2a	0.407	0.054	7.556	0.000	Accepted
SMA → BL = H2b	0.264	0.050	5.236	0.000	Accepted
RB → PQ = H3a	0.366	0.055	6.596	0.000	Accepted
RB → BL = H3b	0.149	0.046	3.249	0.001	Accepted
RB → SPB = H3c	0.128	0.060	2.126	0.034	Accepted
PQ → BL = H4	0.507	0.051	10.018	0.000	Accepted
BL → SPB = H5	0.455	0.050	9.046	0.000	Accepted

Note(s): Brand Love – BL; Perceived Quality – PQ; Review in Blockchain – RB; Traceability – TR; Sustainable Purchase Behavior – SPB; Sustainable Marketing Activities – SMA

H3a, **H3b**, **H3c**, **H4** and **H5**, this conclusion is supported. The findings showed that TR had an impact on SPB ($\beta = 0.215, p = 0.000$) as well as PQ ($\beta = 0.106, p = 0.012$). **H1a** and **H1c** were therefore approved. The findings showed that SMA affected BL ($\beta = 0.264, p = 0.000$) as well as PQ ($\beta = 0.407, p = 0.000$), supporting **H2a** and **H2b**. Furthermore, RB had positive effects on PQ ($\beta = 0.366, p = 0.000$), BL ($\beta = 0.149, p = 0.001$) and SPB ($\beta = 0.128, p = 0.034$), providing support for **H3a**, **H3b** and **H3c**. Moreover, PQ had a positive and significant impact on BL ($\beta = 0.507, p = 0.000$), so **H4** was accepted. In addition, BL significantly influenced SPB ($\beta = 0.455, p = 0.000$), supporting **H5**.

Additionally, PLS-SEM provides information on model performance, structural relationships and R-squared values (Table 8) (Hair *et al.*, 2019). It can be seen that brand love has the largest adjusted R-squared ($R^2 = 0.784$), showing that the independent factors

Table 8. *R*-square

	<i>R</i> -square	<i>R</i> -square adjusted
BL	0.785	0.784
PQ	0.664	0.663
SPB	0.537	0.535

Note(s): Brand Love – BL; Perceived Quality – PQ; Sustainable Purchase Behavior – SPB

related to quality and environmentally conscious shopping patterns account for 78.4% variance in consumer brand loyalty.

4.4 Analyses of mediation

Bootstrapping Test: Regarding the results of [Table 9](#), all intermedia effects are statistically meaningful because of *p*-values <0.005 ([Ryff et al., 2006](#)) but BL as a mediating role of TR and SPB is not supported (*p* = 0.299 > 0.05). PQ is a mediating variable of three independent variables RB (*p* = 0.000), SM (*p* = 0.000) and TR (*p* = 0.016) that affect the dependent variable BL. The standardized impact coefficients of RB, SM and TR on BL through the mediating variable are 0.185, 0.206 and 0.054, respectively. Thus, SM, RB and TR have the strongest to weakest impact on BL through the mediating variable PQ. The results also illustrate that BL participates in mediating the variables PQ (*p* = 0.000), RB (*p* = 0.002), SM (*p* = 0.000) affecting SPB. Moreover, the findings show the significant impact of PQ (β = 0.231) and SM (β = 0.120) on SPB through BL. Nevertheless, the impact of RB through BL on SPB is weak (β = 0.068). We can see in [Table 8](#) that PQ and BL mediates the impact of TR (*p* = 0.015), RB (*p* = 0.000), SM (*p* = 0.000) on SPB. The impact of TR, RB and SM on BL through PQ and BL are 0.185, 0.206 and 0.054, respectively. Therefore, RB impacts on SPB most strongly through PQ and BL. Next, TR is the second strongest impact on SPB and SM is the weakest impact on SPB through PQ and BL.

Table 9. Mediation effect results

Relationship	Original sample (β)	Sample mean (M)	Standard deviation	<i>t</i> -values	<i>p</i> -values	Decision
RP → PQ → BL	0.185	0.185	0.037	4.988	0.000	Accepted
SMA → PQ → BL	0.206	0.208	0.032	6.479	0.000	Accepted
TR → PQ → BL → SPB	0.024	0.024	0.010	2.434	0.015	Accepted
TR → PQ → BL	0.054	0.053	0.022	2.404	0.016	Accepted
PQ → BL → SPB	0.231	0.231	0.035	6.569	0.000	Accepted
RB → BL → SPB	0.068	0.067	0.022	3.043	0.002	Accepted
SMA → BL → SPB	0.120	0.120	0.026	4.544	0.000	Accepted
TR → BL → SPB	0.018	0.017	0.017	1.039	0.299	Unaccepted
RB → PQ → BL → SPB	0.084	0.084	0.019	4.420	0.000	Accepted
SMA → PQ → BL → SPB	0.094	0.095	0.020	4.748	0.000	Accepted

Note(s): RP – Review in Blockchain; PQ – Perceived Quality; BL – Brand Love; TR – Traceability; SPB – Sustainable Purchase Behavior; SMA – Sustainable Marketing Activities

4.5 Discussion

The research proposed a conceptual framework and investigated the impact of traceability, reviews in blockchain, SMAs on perceived quality, brand love and sustainable purchase behavior.

Our study illustrates the significance of traceability to customer's perceived quality in the F&B industries ($\beta = 0.106, p < 0.05$). This study is consistent with the previous results of [Le \(2024\)](#), who found that traceability is a fundamental signal that increases product quality. However, the study of [Le \(2024\)](#) does not focus on a specific field or industry, and her research also does not focus on features of sustainability in products and branding, while our research emphasizes the formation of customer quality perceptions in the sustainable F&B field. According to signaling theory, information disclosure acts as a tangible signal of a supplier's commitment to ethical and quality practices, addressing consumer concerns about product origin, safety and sustainability ([Nguyen and Nguyen, 2025](#)). In fact, consumer demand for information related to food origin, production methods and ethical practices is increasing due to their health, environmental and social concerns ([Van Rijswijk and Frewer, 2012](#)). Therefore, QR code traceability can improve customers' perception of quality in sustainable products when combined with information driven by sustainable marketing efforts.

Our research shows that traceability does not impact brand love in the field of F&B ($p = 0.300 > 0.05$). This is one of the first studies on the effect of QR code traceability on brand love; literature has only shown that traceability exerts a strong influence on consumer trust ([Nguyen and Nguyen, 2025](#)). This study complements and provides a more multi-dimensional view than the past study of [Power \(2019\)](#). A previous study indirectly showed that traceability positively affects brand love when placed in the field of infrastructure ([Power, 2019](#)). However, when we apply this relationship directly in the sustainable F&B industry, traceability has absolutely no impact on brand love ($p = 0.300 > 0.05$). The possible explanations for this insignificance may come from the difference between cognitive and emotional engagement; QR codes may primarily enhance functional trust (cognitive) rather than affective attachment (emotional brand love). Traceability systems provide open data through online platforms, allowing consumers to monitor product information throughout the supply chain, including third-party quality certifications ([Lam et al., 2025](#)). When this information is transparent and useful, it primarily strengthens consumers' trust by reducing uncertainty and increasing perceptions of reliability ([Lam et al., 2025](#)). However, while traceability can build cognitive trust in the product and the brand, it does not necessarily foster emotional attachment or brand love, as brand love typically develops through deeper experiential, symbolic and affective connections beyond informational transparency ([Lam et al., 2025](#)). Some consumers may view QR codes as technical tools for information access rather than as elements that emotionally enhance brand relationships. Brand familiarity, product types or consumer involvement can play a role in determining whether QR code traceability translates into brand love. Future research could test whether trust mediates the relationship between QR code traceability and brand love or explore interaction effects with consumer digital literacy.

Our research finds that customers' SPB for F&B items was significantly impacted by traceability ($\beta = 0.215, p < 0.05$). According to [Bradru et al. \(2014\)](#), traceability labels influence customers' willingness to buy a chocolate bar, but more study is required to determine how new traceability labels affect consumers in different situations. Our findings suggest that traceability functions as a credible signal that reduces information asymmetry between firms and consumers. In F&B markets, where concerns about product safety, origin and ethical production are prevalent, transparent traceability systems help alleviate perceived risk and consumer anxiety ([Wu et al., 2021](#)). QR code labels function as external cues of product quality and origin by delivering real-time, accurate, accessible and verifiable information ([Nguyen and Alang, 2024](#)). When customers can clearly identify the origin and production conditions of F&B products through QR code traceability, they are more likely to increase trust in the brand. Therefore, by enhancing information transparency, firms can

reduce uncertainty and strengthen consumer trust, which in turn increases purchase intention (Nguyen and Alang, 2024).

In the context of F&B, this finding revealed that sustainable marketing activities had a positive effect on perceived quality ($\beta = 0.407, p < 0.05$). These results suggest that sustainable marketing activities act as credible signals of a company's commitment to environmental and social responsibility, thereby enhancing customer perception of overall quality. This result is similar to Riva *et al.* (2022), companies that practice social sustainability by disclosing environmentally important information about their products and services and implementing these environmental sustainable strategies can increase customers' perceptions of the quality of those products and services. Transparent communication about sustainability efforts helps reduce consumer skepticism and strengthens the link between ethical practices and superior quality standards. However, the study of Riva *et al.* (2022) primarily focused on green consumerism and green perceived value in the context of restaurants, while this study approaches the concept of sustainable marketing in a more holistic way by integrating four different aspects of sustainable marketing activities. This multidimensional approach provides a more complete view of how sustainability-oriented marketing efforts combine to shape consumer perceptions of quality.

The study also showed that in the F&B industries, sustainable marketing activities positively impacted brand love ($\beta = 0.264, p < 0.05$). This study is equivalent to the research of Sarkar (2014), which suggests that SMAs, including social and environmental marketing strategies, are a reason for particular brand love, so businesses may improve customer's brand perception. However, our findings explored the comprehension of 4 aspects of SMAs (encompassing economic, social, environmental and cultural sustainability) as well as being placed in a specific context (F&B industries), compared to other studies in the general emerging market context (Sarkar, 2014). Moreover, there were businesses using sustainable marketing, which may eventually turn into a strong passion and love toward the brand (Sarkar, 2014). Sarkar (2014) suggested that consumers in emerging markets may demonstrate lower levels of environmental concern compared to those in developed economies. The present findings indicate that sustainable marketing activities remain a significant driver of brand love in a developing country context such as Vietnam.

The findings also highlight that review in blockchain plays an essential role in the assessment of perceived quality in food service industries ($\beta = 0.366, p < 0.05$). In the context of the relationship between review in blockchain and perceived quality, several previous papers have mentioned this positive relationship, such as the research of Le (2024), which indicated that the role of blockchain in food monitoring systems is not a new discovery, as prior findings have shown that cryptographic ledger tech is one of the most widely used in this process. Additionally, according to the study by Mazzù *et al.* (2021), which pointed out that apart from existing factors like brand or ingredients, detailed product information provided by blockchain technology is also an important factor influencing the overall judgment of customers. While this previous paper focused on examining the effect of information certified with blockchain technology on perceived flavor and perceived healthiness, our study explores how blockchain reviews directly impact perceived quality as a more comprehensive construct, offering a deeper perspective on consumer perception.

With regard to the importance of reviews in blockchain in brand love, it is crucial that this technology is commonly used to build and maintain brand love in the food service sector ($\beta = 0.149, p < 0.05$). In comparison with the findings of Kshetri (2018), our research provides a more direct perspective by demonstrating that review in blockchain directly impacts brand love, whereas that study focused on examining the role of transparency and other blockchain attributes in fostering customer trust. Dissimilar to traditional reviews, which are centralized and vulnerable to manipulation, modification and posting by fake accounts or fictitious consumers, blockchain-based reviews are immutable and transparent, meaning they cannot be altered once recorded (Martens and Maalej, 2018). This significantly limits fraud and enhances authenticity, and due to this higher level of credibility, blockchain-enabled reviews

are more effective in strengthening consumer trust and fostering a stronger emotional attachment to the brand.

There is little research investigating the impact of pre-purchase reviews on blockchain on sustainable consumption. According to [Liu et al. \(2023\)](#), consumers' perceptions of information transparency are much improved by their experiences with blockchain technology; when they have confidence in the system, they are more likely to make purchases right away. Our study demonstrates the direct impact of previous buyer reviews in blockchain on consumers' sustainable buying behavior for F&B items ($\beta = 0.128, p < 0.05$). Thus, considering feedback from prior buyers becomes an important factor influencing consumer decision-making in the F&B industry.

The study highlights the significant relationship between perceived quality and brand love in Vietnam's rapidly growing F&B industry, with results showing a strong positive correlation ($\beta = 0.507, p < 0.05$). This indicates that consumers' assessment of product excellence profoundly impacts their emotional connections to brands, aligning with [Zeithaml \(1988\)](#) findings on the importance of perceived quality in shaping consumer attitudes. The study suggests that F&B companies can boost brand love by improving perceived quality, thereby boosting consumer loyalty and positive behaviors ([Khalid et al., 2024](#)). Our findings are more advanced than those in the study by [Khalid et al. \(2024\)](#), which explores similar relationships but lacks the detailed regional context and updated methodologies used in our research.

While [Rageh Ismail and Spinelli \(2012\)](#) highlight the significant role of brand love in driving consumer loyalty and SPB, our study takes this a step further by offering a more contemporary analysis within the specific context of Vietnam's rapidly growing F&B industry. The positive correlation ($\beta = 0.455, p < 0.05$) found in our research not only aligns with existing studies but also incorporates updated methodologies and region-specific insights, providing a more nuanced understanding of how brand love influences consumer behavior in this unique market. This focus on current consumer dynamics and the integration of recent data make our findings more relevant and applicable, thus advancing the conversation within the field.

5. Implications

5.1 Theoretical implications

This research advances signal theory by integrating it with blockchain technology to address information asymmetry in sustainable consumption. Traditionally, signal theory has relied on signals like packaging and labels, which can be easily manipulated or misinterpreted ([Cao, 2020](#)). However, these conventional signals are often vulnerable to manipulation, greenwashing or consumer skepticism. Our findings extend the theory by demonstrating that blockchain-based traceability and review systems function as high-credibility technological signals, characterized by immutability, verifiability and transparency ([Nguyen et al., 2022](#); [Treiblmaier and Garaus, 2023](#)).

Specifically, this finding solved the research gap identified by [Rapezzi et al. \(2025\)](#) about signal theory that other perceived signals may act as boundary conditions for the positive effects of blockchain technology (brand love is another signal). Our findings reveal that brand love operates as an emotional signaling outcome, while perceived quality functions as a cognitive mediating signal. In doing so, the study refines signaling theory by distinguishing between cognitive signals (e.g. perceived quality, transparency) and emotional signals (e.g. brand love). The results also show that QR-based traceability enhances functional trust but does not automatically and directly generate brand love. This distinction contributes to theory by demonstrating that not all credible signals translate into emotional attachment. Thus, the study introduces a dual-layer signaling mechanism, cognitive verification and emotional resonance.

Signal theory posits that factors like perceived quality ([Dangelico and Vocalelli, 2017](#)), green express packaging ([Cao and Xu, 2023](#)) influence SPB; however, limited research has

explored how advanced technologies such as blockchain influence emotional constructs. This article is among the pioneering studies to integrate the concept of brand love into signal theory, specifically exploring the impact of advanced technologies such as blockchain on the food supply chain. By doing so, it provides new and valuable insights into how the application of these high-tech solutions influences consumer perceptions and trust, thereby making a significant contribution to the understanding and development of signal theory. SMAs also play a crucial role in reinforcing a brand's commitment to sustainability, thereby shaping consumer decisions. By doing so, it extends the theory's relevance to modern technologies and sustainability-focused markets, improves consumer trust and promotes sustainable consumption behaviors, thereby opening new avenues for research in consumer behavior and information systems.

This is one of the first studies to comprehensively use the four-dimensional dimension to examine the impact on brand love in the sustainable F&B industry, while previous studies only included three aspects: economic, social and environmental, complementing the research by [Riva et al. \(2022\)](#) in the context of the hospitality field that only mentioned social factors, consumer electronics sector, traditional fashion and marketing ([Rastogi et al., 2024](#)). Promoting sustainability in marketing practices about F&B products, especially implementing environmental and social sustainable strategies, can increase customers' perceptions of the quality of those products, which plays a strategic role in building a long-term relationship between consumers and brands.

This study has filled the research gap of [Rapezzi et al. \(2025\)](#), which states that other perceived signals had a positive relationship with the applications of blockchain. Therefore, this result explores the direct impact of review in blockchain on perceived quality. Prior research has just pointed out that blockchain technology in product tracking improves transparency and traceability ([Wang et al., 2021](#)) and the effect of transparency on perceived quality, trust and future intentions ([Rapezzi et al., 2025](#)). Moreover, this finding examines the nexus between review in blockchain and brand love. Prior studies have not fully examined the potential impact of blockchain technology on the food supply chain and consumer behavior ([Queiroz and Fosso Wamba, 2019](#)), to take full advantage of the benefits of blockchain technology. We recognize that when an F&B company uses blockchain technology, they make customers find love with that brand, thereby encouraging sustainable purchase intentions. Moreover, this is one of the first studies on the nexus between traceability and brand love in the sustainable F&B industries, while previous studies have only shown that traceability exerts a strong influence on consumer trust ([Nguyen and Nguyen, 2025](#)), consumers' product quality perceptions ([Wang and Tsai, 2019](#)) and attachment ([Wang et al., 2024](#)).

5.2 Practical implications

The findings suggest that F&B firms should move beyond basic sustainability labels or unverified claims and adopt blockchain-enabled traceability and review systems as strategic tools for strengthening both cognitive trust and emotional consumer-brand relationships. First, blockchain-based traceability systems allow firms to communicate product origin, production processes, inspection records and logistics information in a verifiable manner. By embedding QR codes linked to blockchain records, firms can transform traceability from a static label into an interactive transparency platform. This enhances perceived quality and trust, which in turn contributes to higher sustainable purchase intentions. Second, reviews in blockchain can serve as a credibility-enhancing mechanism for online feedback. Because reviews stored on blockchain cannot be altered or fabricated, they reduce concerns about fake reviews and improve information reliability. This strengthens brand reputation and supports long-term customer loyalty. From a managerial perspective, this can translate into measurable outcomes such as improved customer retention, stronger brand equity, higher willingness to pay and enhanced lifetime customer value.

However, our findings show that QR code traceability does not significantly influence brand love, suggesting that such technologies may enhance functional trust rather than emotional connection. Many businesses set up campaigns to attract customers to buy their products by pledging to carry out community projects if consumers buy their products or participate in their campaigns. In 2024, the Kun milk brand has a campaign that they will donate a box of milk to highland children if social network users post an article in response to their campaign (Tran, 2025). However, many people do not participate in this campaign because they think that this campaign is a way for the company to promote their brand, and the actual amount of milk this company is donating will not be as much as the number of consumers' shared posts. Therefore, managers should complement technological transparency with emotionally resonant strategies such as storytelling about farmers or producers, co-creation campaigns and visible community engagement programs. Blockchain verification can then be integrated into these campaigns to demonstrate real impact. For example, in cause-related marketing campaigns (e.g. donating products when consumers participate in online activities), blockchain technology can be used to verify each contribution. Firms could provide digital tracking mechanisms allowing consumers to confirm how their individual participation translates into tangible social benefits. This reduces skepticism, strengthens emotional attachment and improves campaign credibility, ultimately enhancing both firm performance and relational value.

Moreover, our research demonstrates that sustainable marketing activities impact SPB through the variable perceived quality. Thus, businesses can increase customers' perceived quality by collaborating with the government to create free health check-up points for customers to buy sustainable products. This not only enhances consumers' perceived value of the product but also reinforces the brand's commitment to community well-being. Beyond managerial relevance, the findings also carry broader societal implications. By enhancing transparency and verification in food supply chains, blockchain-based systems can improve food safety standards, reduce fraud and strengthen consumer protection mechanisms. Increased transparency may foster public trust in food systems, contributing to improved consumer confidence and overall quality of life.

From a policy perspective, regulators and public authorities could encourage or standardize the use of verifiable traceability technologies in sustainability certification schemes. Policymakers may develop regulatory frameworks that promote transparency, digital verification and accountability in sustainability claims, thereby reducing greenwashing practices. In addition, the findings suggest implications for consumer education and sustainability-related curricula. Educational institutions and public awareness programs can integrate knowledge about digital verification technologies, helping consumers develop critical evaluation skills when assessing sustainability claims. This would strengthen informed decision-making and support the transition toward more sustainable consumption patterns. By linking technological transparency, consumer trust formation and sustainable behavior, this study provides insights that can inform regulatory design, public policy initiatives and sustainability governance frameworks.

5.3 Limitations and future research

This study makes several important contributions to the literature and aligns closely with the scope of the Asia-Pacific business administration. First, it advances signaling theory by introducing blockchain-enabled mechanisms, specifically traceability systems and immutable consumer reviews, as high-credibility signals that effectively reduce information asymmetry in sustainable consumption contexts. By integrating both cognitive (perceived quality) and affective (brand love) mechanisms into a unified framework, the study offers a more holistic understanding of how technology-driven signals influence consumer decision-making. Second, the research contributes to the growing body of knowledge on sustainable marketing in the Asia-Pacific region by providing empirical evidence from Vietnam, an emerging market



characterized by rapid digital transformation and increasing sustainability awareness. In doing so, the study responds to recent calls for more context-specific investigations in developing economies, where institutional trust and information transparency remain critical challenges. Third, from a business administration perspective, this study provides actionable insights for managers by demonstrating that blockchain technologies should not be viewed solely as operational tools, but also as strategic marketing instruments that enhance perceived quality, foster emotional attachment and ultimately drive SPB. These insights are particularly relevant for firms operating in the food and beverage industry, where issues of safety, trust and sustainability are highly salient. Although this finding contributes to several theoretical and practical implications, it has some limitations in this research that point out the need for further work. First, the research employed a non-probability snowball sampling method focused on respondents primarily from urban areas in Vietnam, which may limit the generalizability of the findings. Future studies could adopt stratified random sampling across urban and rural regions to capture a more diverse consumer base (Hair *et al.*, 2019). Future research could also consider expanding the geographic scope across various countries with different demographic and socio-economic backgrounds to provide a more nuanced understanding of the research phenomena. Second, while the sample size ($n = 622$) satisfies the requirements for PLS-SEM analysis, the age distribution was heavily skewed toward younger participants (62.4% aged 18–24), potentially biasing the results toward Gen Z consumer preferences. Future studies should ensure a more balanced age representation to generalize findings across generations (Hwang *et al.*, 2020). Third, this study relied solely on self-reported data, which is vulnerable to social desirability bias. Although Harman’s single-factor test was conducted to assess common method bias, future research should triangulate findings using behavioral data or experiments (MacKenzie and Podsakoff, 2012). Finally, the research was confined to the F&B industry, where sustainability concerns and brand dynamics differ from other industries such as fashion, electronics or automotive. Comparative multi-sector studies would provide broader insights into the generalizability of the proposed model.

Appendix

Table A1.

Constructs	Items
Economic sustainability (Jung <i>et al.</i> , 2020; Rastogi <i>et al.</i> , 2024)	These brands make the effort to make for efficient management These brands make a lot of effort for technological innovation These brands improve the economic power of the traditional F&B market with various activities These brands plan for their long-term success
Social sustainability (Jung <i>et al.</i> , 2020; Rastogi <i>et al.</i> , 2024)	These brands return some of the profits to society These brands spend a part of the profit devoted to donation These brands help solve social problems These brands allocate some of the resources toward social activities These brands take care of the employees well These brands strive for collaboration with globalization and local culture

(continued)

Table A1. Continued

Constructs	Items
Environmental sustainability (Jung et al., 2020 ; Rastogi et al., 2024)	These brands use environmentally friendly materials These brands consider the environment throughout the design process These brands prevent environmental pollution during the production and distribution process These brands use recycled material These brands are concerned with the waste management practices
Cultural sustainability (Jung et al., 2020)	These brands try to use resources wisely These brands respect various races These brands recognize international multiculturalism These brands strive for collaboration with globalization and local culture
Brand love (Carroll and Ahuvia, 2006)	These brands are wonderful I feel good when I use these brands' products I am very impressed with these brands I feel happy when I use these brands' products I love these brands I have a deep love for these brands I am passionate about these brands
Perceived quality (Shanahan et al., 2019).	I will continue to use products from these brands in the future When it comes to quality, these brands are truly the best Consumers can rest assured that the quality standards of these brands' products are very high Products from these brands are rich in nutrition and quality The likelihood these brands are reliable is very high There is no doubt that the quality of these brands is at the highest level
Review in blockchain (Le, 2024)	Pre-purchase customer reviews from the review traceability label improves my shopping efficiency I feel more in control of my shopping when using pre-purchased customer reviews from the review retrieval label I find the experience of reading pre-purchase customer reviews from a review retrieval label very enjoyable
Traceability (Le, 2024)	Products of these brands provide me with complete basic information about the product (ingredients, place of manufacture, expiration date, etc). In addition, I was also provided with ways to identify fake goods I was provided full information on how to preserve the product for the best quality and the product's distribution process, including: each stage of transportation (where the goods are bought and how it is quarantined) I was provided with information about process-processed products (information about raw material sources: where are they imported from, are the raw materials tested for disease/safety)
Sustainable purchase behavior (Joshi and Rahman, 2017)	During the shopping process, I inspect name-brand products carefully and identify any ingredients that may be harmful to the environment Whenever I go shopping, I deliberately choose brands that have environmentally friendly packaging solutions I'm willing to pay more for sustainable brands, even if they come at a higher price than other options Before making a purchase, I always take the time to carefully check the brands of the product to see if it has any environmental or fair trade certifications

Note(s): *These brands: F&B brands that follow sustainable marketing orientation

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