# UNDERSTANDING CUSTOMERS' WILLINGNESS TO PAY MORE AND PURCHASE INTENTION IN BLOCKCHAIN FOOD TRACEABILITY: EVIDENCE FROM VIETNAM

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**Abstract**

The study analyzed the influence of Blockchain usage on purchase intention and the willingness to pay a higher price for customers within the food industry. Data collected through 180 distributed surveys was processed by SPSS 26 and SmartPLS 3.3 software. It is demonstrated that there are five factors influencing consumers' intention to purchase products using Blockchain Food Traceability (BFT): (1) Performance Expectancy, (2) Facilitating Conditions, (3) Social Influence, (4) Trust, and (5) Level of Knowledge. The study showed that trust, performance expectancy, and level of knowledge variables have a strong influence on behavioral intention. Recommendations were also made for managerial purposes. The significance of this paper is insights into customers' willingness to pay more and their purchase intention in Blockchain Food Traceability.

**Keywords:** Blockchain technology, Food traceability, Level of knowledge, Trust, UTAUT, Willingness to pay.

**JEL Classification**: D1

## 1. Introduction

Blockchain technology has emerged rapidly in recent years, introducing a trend in the future. Blockchain is a transparent and decentralized ledger of transactions (Boucher et al., 2017). This definition is at the broadest level and can be further clarified by Lewis et al. (2017). First, the blockchain records are not simply transactions but a network of databases, distributed across multiple entities, ensuring they are kept in sync. Second, decentralization

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means that no single owner or person controls the data; data can then be added and written to, but there is no way to change the historical data without the consent of the network participants. More and more attention is focused on blockchain in different fields due to the fact that all transaction data is protected and secured by its immutability. One of the most common applications is digital money in financial transactions (Fosso Wamba et al., 2020). Besides, Blockchain technology is accepted and experienced broadly within other industries, such as: logistics, consumer goods, pharmaceuticals, and law. Blockchain has played and is playing a vital role in tracking and tracing the sources of products from food retailers. For instance, Walmart employs Blockchain to trace the import process of pork from China. With the support, Walmart understands the manufacturing, logistics, storing as well as transacting processes of any products. Blockchain is also exploited by Unilever, Tyson, and Dole in the pursuit of source traceability (Marr, 2018). According to previous research, it is claimed that blockchain is able to build trust, which drives the intention to purchase products with BFT (Nga & Tuan, 2019; Yeh et al., 2019). Purchase intention, on the other hand, is significantly and positively guided by performance expectancy, effort expectancy, and habit. The results drawn from this paper indicate that technographics strongly boost consumers' intention to adopt BFT (Yeh et al., 2019). Additionally, Yeh et al. (2019) have advised care when respondents lack sufficient knowledge with a particular technology. The prevalence of blockchain is still limited, therefore the majority of respondents had little to no experience with it. Second, Taiwanese customers participated in the survey. Future studies may use it in other nations and compare results. Nga and Tuan (2019) suggested a relationship between trust and the intention to consume pork with source origin based on the Theory of Planned Behavior. However, their study possessed limitations when using OLS regression to analyze the regression model and did not analyze the impact of blockchain on purchase intention in the Vietnam context. Furthermore, the desire to consume food in general, and pork in particular, are both influenced by a variety of other factors not addressed in this study. This suggests that future research should address the constraints mentioned above in order to improve the study's trustworthiness. In addition, Nguyen *et al.* (2019) claimed that pork with obvious and clear origins is paid a higher price voluntarily compared with the common ones. The aim of this paper is to identify factors affecting consumers' intention to buy products using BFT in the Ho Chi Minh City market. A fine product or an implication of innovation are both intended to improve service quality, operation excellence, or create a better customer experience. This research is the foundation for supply chains and food retailers to employ Blockchain in enhancing productivity of logistics activities as well as boosting service quality and building trust among consumers in starting to use or continuing to use products with this advanced technology.

## 2. Literature review

### 2.1. Blockchain Food Traceability

Blockchain is considered to be the key player in transparent and decentralized exchanges (Boucher et al., 2017). Lewis et al. (2017) defined blockchain with more details. First, Blockchain is not simply transaction notes, it is a network of databases distributed over a number of nodes being synchronized with each other. Second, decentralization implies that data is not controlled or owned by any entities or individuals. Data cannot be recorded

without the permission of involved personnel. In particular, historical data cannot be edited or adjusted. Many advantages of blockchain have been mentioned and discussed, but its positive effects have not been fully covered (Bashir, 2018), namely: decentralization and disintermediation; transparency and auditability; immutability and security. Decentralization and disintermediation help to save time, reduce costs, and increase the chances for market expansion. The elimination of intermediaries increases the speed of transactions and reduces redundancy (Natarajan et al., 2017). Transparency and auditability present mutual authority when making adjustments. This prevents fraud and removes conciliation costs (Natarajan et al., 2017). Immutability: it is complex and complicated to change any recorded information in a Blockchain system (Bashir, 2018). However, immutability does not block any cancellations of transactions. With newly developed solutions, administrators are allowed to access parts of the blockchain and edit them (Natarajan et al., 2017). The security of the blockchain promotes flexibility and effectiveness of the whole chain. Besides, exchanges within Blockchain are encoded and guaranteed with their integrity, hence, improving data and cyber security (Bashir, 2018; Natarajan et al., 2017). In food supply chains and retailers, the Blockchain model is an advanced innovation. It focuses on the practical implications of connecting parts within the chain (Kehoe et al., 2017). This technology enables involved personnel to track connections between suppliers and retailers during the entire process of delivery. It provides data such as suppliers' information, ingredient information, etc. All details are added and recorded in the system simultaneously, and historical activities are also logged between partners (Kehoe et al., 2017).

## 2.2. Unified Theory of Acceptance and Use of Technology - UTAUT

Venkatesh *et al.* (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) model after reviewing and combining previous models and theories regarding technology acceptance. UTAUT was built based on the foundation of eight models that studied the acceptance of users towards technological innovations: Theory of Reasonable Action (TRA) by Fishbein and Ajzen (1975); Motivation Model (MM) and Theory of Planned Behavior (TPB) by Ajzen (1991); Technology Acceptance Model (TAM) by Venkatesh and Davis (2000); C-TAM-TPB (A model combining TAM and TPB); Social Cognitive Theory (SCT); Innovation Diffusion Theory (IDT); and Model of PC Utilization (MPCU). Among those eight employed models, the core structure of this research is founded on TAM. The UTAUT model aims to predict users' intention to use and their actual behavior on a technology innovation. The model proposed four independent variables (Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions) with four control factors (Gender, Age, Experience, and Voluntariness of Use). While performance expectancy, effort expectancy, and social influence have a direct impact on intention to use, facilitating conditions directly influence users' behavior (Venkatesh et al., 2003). In order to fit into the context of this paper regarding culture and technological innovation in Ho Chi Minh City, UTAUT is utilized with the original model and the addition of other factors.

## 3. Hypothesis development

### 3.1. Performance Expectancy (PE) and Behavioral Intention (BI)

Venkatesh et al. (2003) defines performance expectancy as the degree to which an individual believes that adopting technological advancement will help to improve and boost their productivity. In the research of applying blockchain technology to food retailers and supply chains, the authors expected that the performance expectancy of consumers in retailers using source tracing technology has a strong influence on behavioral intention as they believe they will gain more benefits from it. Williams, Rana and Dwivedi (2015) argue that performance expectancy and behavior intention are good predictors for user behavior in technology adoption. Meanwhile, Bartlett, Julien and Baines (2007) claimed that the transparency of blockchain leads to higher performance expectations for involved personnel to get access to needed information. Blockchain offers a solution for distributing a sole information source that is trustworthy and accurate while also improving data effectiveness.

*H1: Performance Expectancy in using Blockchain Food Traceability has a positive influence on Behavioral Intention.*

### 3.2. Effort Expectancy (EE) and Behavioral Intention (BI)

According to Venkatesh *et al.* (2003), effort expectancy is one of the vital motivators to motivate behavioral intention to use technology advancement. Consumers are willing to learn how to use any application when it is simple and easy to use. They have the tendency to accept new innovations as long as they do not require too much effort. The more accessible a technology solution is to users, the stronger the impact of effort expectancy has on their purchase intention.

*H2: Effort Expectancy in using Blockchain Food Traceability has a positive influence on Behavioral Intention.*

### 3.3. Social Influence (SI) and Behavioral Intention (BI)

When previous findings are compared with the TAM model or MPCU, IDT, Venkatesh *et al.* (2003) argue that social influence is not a crucial element affecting behavioral intention as adopting technology is voluntary. In this paper, adopting BFT to trace the origin of products is a voluntary decision, depending on personal preference and demand for qualifying products before making a purchase. However, food is commonly purchased and consumed for the whole family or a group of friends, for instance; purchase decision is concerned with others' wellbeing. Therefore, social perception affects purchase behavior in the buying process.

*H3: Social Influence in using Blockchain Food Traceability has positive influence on Behavioral Intention.*

### 3.4. Facilitating Conditions (FC) and Behavioral Intention (BI)

Since blockchain is deployed, operated, and administered on smart devices, a hi-tech accessory is needed. This possibly limits the behavior of consumers in adopting this innovation due to the lack of smart phones or tablets. Previous studies have demonstrated that facilitating conditions (i.e.: computers, Internet speed, system integration) impact technology acceptance and usage (Venkatesh et al., 2012). However, the infrastructure of Blockchain stores a copy of all exchanges on cloud service, thus, it supports anytime data query and allows product origin traceability or services providing to chain members as well as consumers effortlessly (Francisco & Swanson, 2018). This research considered whether consumers who possess better conditions to adopt BFT will have a higher intention to purchase products that utilize blockchain technology.

*H4: Facilitating Conditions in using Blockchain Food Traceability has positive influence on Behavioral Intention.*

### 3.5. Behavioral Intention and Willingness to Pay more (WTP)

Behavioral intention is defined as one's willingness to accept a service (Davis, 1989). Venkatesh *et al.* (2003) suggested that accepting the use of a technology is strongly guided by behavioral intention. Willingness to pay more is measured by the monetary unit or percentage unit paid for the product, which is higher than normal. Hence, willingness to pay more is considered as a measurement scale in assessing demand between new products and commonly used products (Athanasios Krystallis & Chryssohoidis, 2005; Athanassios Krystallis et al., 2006). The willingness to pay more variable is widely employed in studies regarding demand for environmentally-friendly products or well-being products (Krystallis, Fotopoulos and Zotos, 2006). Adopting Blockchain technology with the expectation of food safety and sanitation, consumers are more likely to purchase, and they believe that the information provided is trustworthy. It comes to a question of whether consumers are willing to pay more for Blockchain used products and how willing they are.

*H5: Behavioral Intention in purchasing Blockchain Food Traceability products has a positive influence on Willingness to Pay more.*

### 3.6. Trust (TR) and Behavioral Intention, Willingness to Pay more

Böcker and Hanf (2000) indicated that trust can reduce uncertainty to an acceptable level and simplify decisions. Lobb, Mazzocchi and Traill (2007) proved that having trust in a source of information affects the decision to buy chicken in the United Kingdom. Hypotheses were promoted about trust and behavioral intention as well as willingness to pay more:

*H6a: Trust in Blockchain Food Traceability has a positive influence on Behavioral Intention.*

*H6b: Trust in Blockchain Food Traceability has a positive influence on Willingness to Pay more.*

### 3.7. Level of Knowledge (LK) and Performance Expectancy, Effort Expectancy, Trust, Behavioral Intention

Level of knowledge is measured using a knowledge survey tool called LOKUS developed by Stone (2013). The model was designed to measure the current degree of awareness, notice, and usage of new knowledge introduced in the technology field (Stone, 2013). LOKUS is shared among involved personnel through a web-based platform to evaluate their awareness. Participants will be asked a series of questions and grouped into a distinguished degree of knowledge based on their responses. Stone described 10 different degrees, ranging from non-awareness to modified use. Since the development and deployment process of Blockchain is still new, the degree of knowledge used in this paper is framed within the first 5 levels: (1) Not being aware of Blockchain, (2) Being aware of Blockchain, (3) Interest in using Blockchain, (4) Intended to use Blockchain, (5) Modified use of Blockchain (already participated in using Blockchain). Simplifying and adjusting models are made in order to fit within the proposed framework, Stone (2013) specifies that language and replacement have to be modified to be suitable in the context of a specific technology area (Stone, 2013). As mentioned earlier, being familiar with Blockchain or having encountered Blockchain builds a certain level of trust in it. Low levels of knowledge can lead to suspicion. Therefore, hypotheses were proposed to predict the influence of knowledge:

*H7a: Level of Knowledge in Blockchain has positive influence on Performance Expectancy in using Blockchain Food Traceability.*

*H7b: Level of Knowledge in Blockchain has positive influence on Effort Expectancy in using Blockchain Food Traceability.*

*H7c: Level of Knowledge in Blockchain has positive influence on Trust in Blockchain Food Traceability.*

*H7d: Level of Knowledge in Blockchain has positive influence on Behavioral Intention to use Blockchain Food Traceability.*

Based on previous academic theories and proposed hypotheses, the conceptual framework was structured to include seven relationships reflecting independent variables, namely: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Trust; impacting Behavioral Intention and Willingness to Pay more of consumers toward Blockchain Food Traceability. Figure 1 demonstrates the conceptual framework.

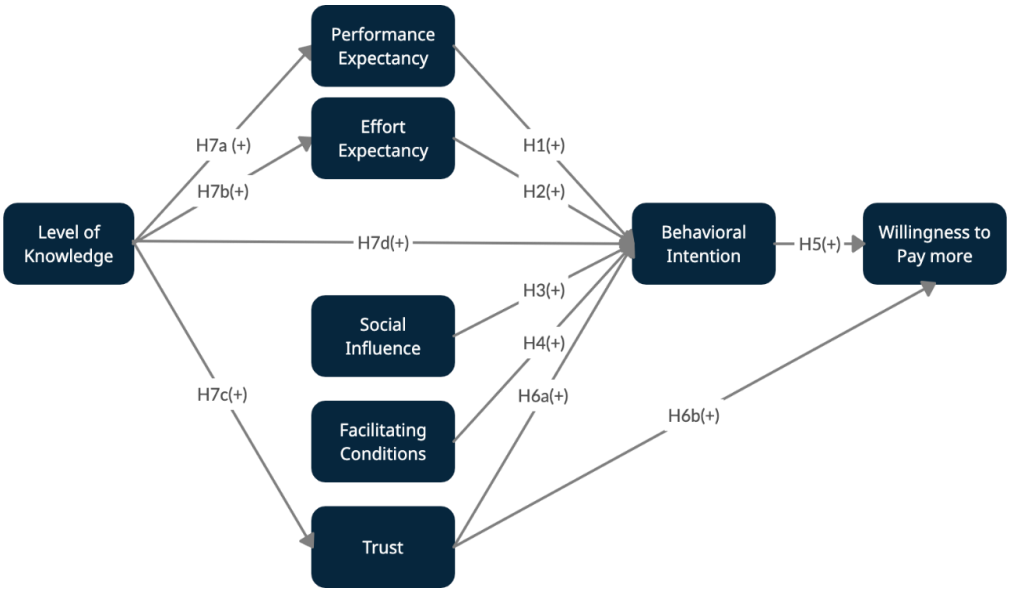


Figure 1. Proposed Conceptual Framework

## 4. Methodology

This paper combined quantitative research methods with qualitative research methods. The qualitative research approach employed in-depth interviews performed on experts: 10 experts in technology, enterprise managers, and food retailers. Each interview was conducted in 30 minutes. All 10 experts agreed to confirm that seven variables in the UTAUT2 model have an influence on the intention to purchase BFT. Besides, almost all experts agree that trust and level of knowledge are crucial variables in adoption and usage of BFT. Respondents also mentioned other factors such as convenience, shopping routine and culture, technology capability, habit in using smart devices and marketing, communication, etc. with discrete frequency and minority consensus, thus, the authors did not include in the model of this paper.

The quantitative questionnaire was structured with three sections: (1) demographics; (2) questions using the Likert scale from 1-5 to measure PE, EE, SI, FC, TR, BI and WTP, (3) level of knowledge. In this paper, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed. Using a convenient sampling method, target audiences who consume food residing and working in Ho Chi Minh City were provided online forms, 100% of participants responded through Google Form navigating from the authors' personal Facebook page, indicating their frequency of using smart devices. The items for behavioral intentions, performance expectancy, effort expectancy, social influence, and facilitating conditions were adapted from Venkatesh et al. (2012). The items of trust were adapted from Kim et al. (2009). The items of Level of knowledge were adapted from a survey tool called LOKUS developed by Stone (2013) and the willingness to pay more was adapted from Laroche et al. (2001).

## 5. Findings

### 5.1. Population sampling

There were 125 respondents who had not used BFT, which accounted for 69.4%, and 55 of those who had and are still using BFT, which accounted for 30.6%. This indicated that the percentage of people who have not used BFT took up a considerate portion. The samples include 52.8% males and 47.2% females. Regarding the age range of the population, participants who were under 20 accounted for 6.1%, from 20 to under 30 accounted for 51.7%, from 30 to under 40 was 31.1%, from 40 to under 50 was 6.7%, and above 50 was the least with 4.4%. The population samples are appropriate since the authors aimed to study younger generations who are more likely to accept technology in the future. Respondents mostly pursued undergraduate programs, which accounted for 61.7%. Graduates were 22,8%, vocational and college were 8.3% and highschoolers were 7,2%. This showed that participants had a variety of educational backgrounds. Average income was mostly above 1000 USD per month, accounting for 31.1%. Average income below 250 USD per month accounted for 27.8%, from 250 USD to under 500 USD per month was 22.8%, from 500 USD to under 750 USD per month was 11,1% and from 750 USD to under 1000 USD per month was 7.2%. The distribution of occupations was even, with mostly university students and employees. This diversity was able to reflect reality and guarantee population representation.

### 5.2. Convergent Validity

Chin (1998) claimed that Cronbach's Alpha is not the only ratio to be concerned in empirical study, but also Composite Reliability (CR) has to be 0.6 and higher. In conducting confirmatory research, a threshold of 0.7 is appropriate for CR. (Henseler & Sarstedt, 2013). Other scholars also confirmed that 0.7 is an applicable assessment for a majority of studies like Hair *et al.* (2017).

The Average Variance Extracted (AVE) was utilized in validating PLS-SEM convergence. Höck and Ringle (2010) believe that AVE has to be above 0.5 for a measurement scale to be convergent.

Data from analytical result claimed that CA, CR, and AVE of chosen measurement scales were well performed, where CAs and CRs are higher than 0.9 and AVEs are above 0.75.

### 5.3. Discriminant Validity

HTMT has to be under 1.0 for a model to be well structured. Henseler et al. (2015), however, justify that if HTMT is below 0.9, a discriminant value is established between the chosen pair of constructs.

Heterotrait-Monotrait Ratio (HTMT) between given pairs was presented to be lower than 0.9. To be specific, ratios were mostly below 0.85, except for the pair of TR → BI (0.851), which signified that available value was satisfying for study.

### 5.4. Hypothesis testing and discussion

The results of the coefficient of determination $R^2$ showed that the framework with dependent variable BI is strongly explained by the index of $R^2 = 0.817$. With an $R^2$ of 0.48, WTP is adequately described. The $Q^2$ value of five exogenous variables (BI, WTP, EE, PE, and TR) was significantly greater than 0. The highest $Q^2$ values were 0.644 and 0.369 for BI and WTP, respectively. The $f^2$ values of most variables were excellent, with the exception of the EE variable BI, which had an effect coefficient of $f^2 = 0.017 < 0.02$ (not significant). Furthermore, in recent studies, as mentioned in the literature review, EE was claimed to have a significant impact on BI;the authors explored the significance of EE in subsequent assessments. The SRMR index of 0.059, lower than 0.08, showed that the model is well-fitting (Hair et al., 2017).

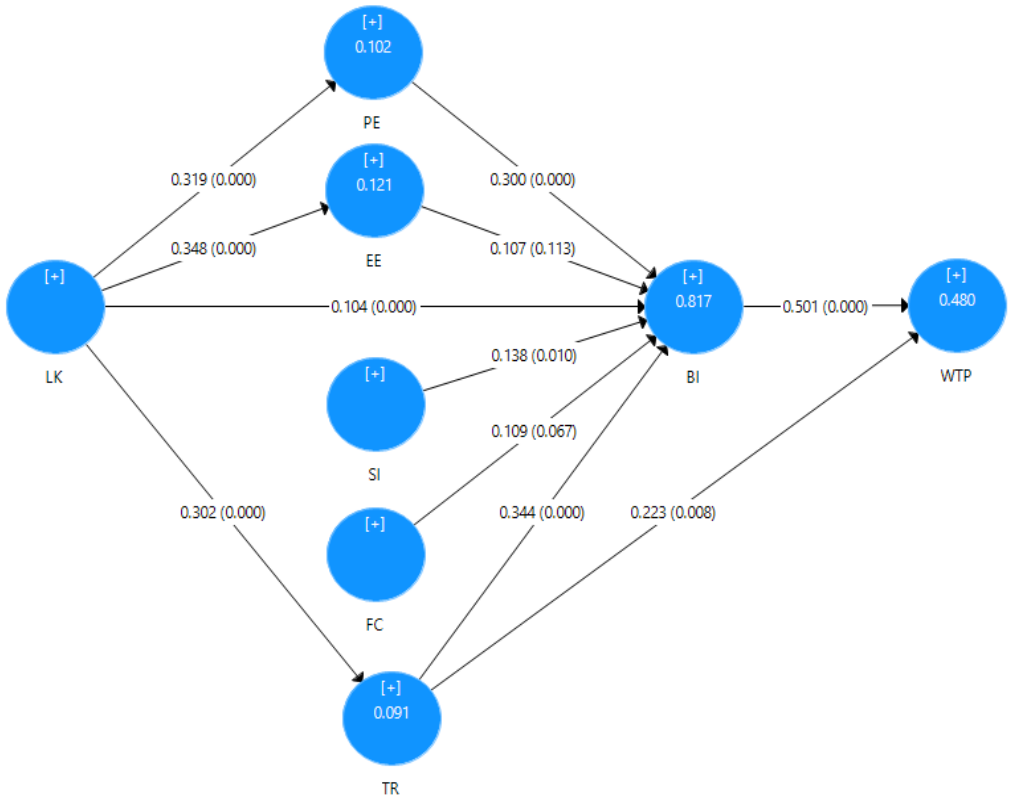


Figure 2. PLS-SEM Path Coefficient result

The relative significance of exogenous variables on behavioral intention and willingness to pay more indicated that trust is mostly critical for behavioral intention with a path coefficient of 0.344 as well as contributes positively to willingness to pay more. It can be concluded that reinforcing and enhancing trust of consumers in BFT increases intention to purchase along with the Willingness to pay more for products integrated with Blockchain

technology. These findings are aligned with the results of previous studies by Yeh *et al.* (2019), Queiroz and Fosso Wamba (2019), Nga and Tuan (2019). The outcome from Lobb, Mazzocchi and Traill's (2007) paper argued that trust in information sources had an impact on the intention to buy chicken in the UK. Research by Muringai and Goddard (2018) conducted in Canada, the United States of America and Japan suggested that trust affected pork and beef consumption. Meanwhile, Buaprommee and Polyorat (2016) claimed that trust had a positive influence on the intention to purchase.

Performance Expectancy is the variable with the second highest path coefficient of 0.300 in the Behavioral Intention model, indicating that the expectation of performance has a significant positive influence on behavioral intention. The findings are in agreement with results drawn from the research of Venkatesh et al. (2012), Nair, Ali and Lim (2015), Yeh *et al.* (2019), Queiroz and Fosso Wamba (2019).

Social Influence has the third highest path coefficient, indicating that concerns from family, acquaintances, and society positively influence Behavioral Intention to purchase products using BFT. This outcome is supported by the studies of Venkatesh et al. (2012), Nair, Ali and Lim (2015) and shows that social influence is not a significant factor. On the other hand, the findings pointed out a contradictory result in Yeh *et al.* (2019), Queiroz and Fosso Wamba (2019), where it was claimed that social influence did not show any statistical meaning in affecting behavioral intention.

The common outcome of the effect facilitating conditions variables have on behavioral intention is their light impact, with a path coefficient of 0.109, respectively. The finding of Facilitating Conditions is consistent with Venkatesh et al. (2012), Nair, Ali and Lim (2015), Queiroz and Fosso Wamba (2019). A compatible device or favorable support of knowledge, devices boost intention to purchase products with BFT. For the effort expectancy factor, ease of use and simplicity do not contribute to the augment of purchase intention; this can be explained by the demographic of this paper's chosen population. Respondents were mostly well-educated with good educational backgrounds, including undergrads and postgrads. The finding of facilitating conditions is inconsistent with Yeh *et al.* (2019) and supported by Sharma et al. (2020).

Measuring willingness to pay more and factors affecting that will be critical for new products and services introduced to the market. Analytical result illustrates that trust and behavioral intention positively influence willingness to pay more, with a path coefficient of 0.223 and 0.501, respectively. When trust and the intention to purchase are enhanced, consumers are willing to pay more for BFT.

## 6. Managerial Implications

Findings indicated that trust plays a vital role in influencing the intention to purchase products using BFT from individual consumers.

The level of knowledge has a positive effect on trust in BFT. Improving security, on the other hand, will increase consumers' trust in BFT service. To build trust in consumers, besides ensuring food safety and information security for customers, supply chains and food retailers need to pay attention to solutions such as: enhancing supply chain reputation, brand image; expanding network scale; not being limited geographically; reinforcing

infrastructure; and strengthening the legal framework on information corruption or insecurity. Consumers' perceptions have been shifted because of the mass of information on social media and technological encounters. Consumers love modern supply chains and food retailers that constantly innovative technology to fulfill convenience with the lowest cost. The customer service systems of the food industry at selling destinations, branches, or online channels need to be optimized to retain customers.

Nowadays, consumers' awareness of consuming safe products is being raised, especially in hard to persuade markets like the United States of America, Europe, and Japan. According to research about consumer behavior on food conducted by Hidayat (2014), there are 10 critical factors affecting their purchase intention, among which, the three most vital ones are freshness, safety and price which depend significantly on manufacturers, other factors depend on retail units. Using Blockchain to trace origin can help manufacturers solve these three factors. Supply chains and food retailers need to plan suitable marketing strategies to raise awareness about the efficiency of blockchain in adapting to consumers' expectations.

Through statistical data regarding Blockchain level of knowledge among surveyed populations, it can be seen that respondents still have a low degree of knowledge. The most common responses were (1) Not being aware of Blockchain and (2) Being aware of Blockchain, with a percentage of 59.5%. Besides, findings claim that consumers with a higher level of knowledge have a higher intention to purchase products using BFT. Therefore, enhancing awareness and level of knowledge of Blockchain is significantly meaningful in reinforcing intention to purchase and willingness to pay more. It is recommended that supply chains and food retailers plan positive communication about blockchain. Partnerships with universities or technology companies can contribute to raising awareness and the level of knowledge of potential consumers. In the context of digital transformation, utilizing technology innovations and communications to encourage consumers to seek information through events and promotions is necessary.

To attract consumers to this new innovative product, administrators should combine referral marketing and sustainable food brands with a high trust level in the market to create a strong impact on consumers. To enhance product competency, enterprises should consider using promotion codes or accumulated points when recommending products to friends and family. Good product quality, an efficient delivery process, and high service quality related to products are strong motivators for consumers to talk and discuss the products with family, friends, and the community.

Food traceability should be easy to perform and convenient for consumers of all age ranges and educational backgrounds. Managers are suggested to prepare plans for multi-platform applications in case a mobile device does not support application installation due to an incompatible operating system or is not supportive of updated versions. It is also highly recommended to focus on communication channels, such as: hotlines, customer centers, and emails; so as to support customers with the best service when they encounter troubles.

## 7. Conclusions, limitations, and further research

Research findings demonstrated that the effects of Blockchain on behavioral intention and willingness to pay more for BFT through UTAUT framework depend on variables:

performance expectancy, social influence, facilitating conditions, trust, and level of knowledge. Path analysis of factors influencing behavioral intention and willingness to pay more for BFT showed that chosen variables have positive impacts and different weights, except for the factor of effort expectancy, which was eliminated from the model. This is the basis and foundation for supply chains and food retailers. Strategic administrators communicate products in order to achieve more in changing customers' awareness and trust. Based on the basis of researching impacts of Blockchain on Behavioral Intention and Willingness to Pay more, this paper recommended sufficient marketing strategies for ongoing trends. Principle solutions are suggested aiming to improve product marketing processes, increase market consumption, and develop the economy to enrich the lives of consumers. It is also a way for domestic food retailers to grow and expand their potential market.

As many research, this study has several limitations. First, this paper has limitations in geographic and scope, which only focuses on the population working and living in Ho Chi Minh City without exploring other regions, especially the countryside. The research population did not represent Vietnam. Second, the limitation is target respondents. Because of the complicated circumstances of COVID-19 during the data collection process, this paper did not distribute offline surveys. 100% of participants responded through Google Form navigated from the authors' personal Facebook page, indicating their frequency in using smart devices. Hence, this study failed to evaluate segments who do not own or adopt few smart devices. Moreover, data was regarded as individual consumers and did not include enterprise customers. Third, the authors adopted the 5-Likert scale based on subjective assessment of companies about service quality; thus, undesired limitations are unavoidable. Hence, further studies should utilize other data sources to confirm the findings of this paper. Further research should be conducted in other cities or in rural areas with diverse target research segments to be universally representative of the model.

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