評估區塊鏈特性對顧客使用食品配送平台信任度的影響

Evaluating the Influence of Blockchain Characteristics on Customer Trust in Using Food Delivery Platform

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ABSTRACT

This study explores the impact of blockchain characteristics on customer trust in restaurants on the Food delivery platform. The research investigates how the key attributes of blockchain, including decentralization, immutability, transparency, and interoperability, influence trust in blockchain technology and, subsequently, trust in both restaurants and the Food delivery platform. The theoretical framework is based on trust theory, examining how trust in blockchain can enhance customer trust in digital platforms and influence behavioral intention and commitment. To evaluate these relationships, a survey was conducted with customers who frequently use Food delivery services. Data were collected using structured questionnaires, focusing on customer perceptions of blockchain characteristics and their trust levels. The results revealed significant correlations between blockchain characteristics and customer trust in both the platform and the restaurants. Moreover, the findings highlight how trust in blockchain drives customer behavioral intentions and long-term commitment to the platform. These insights provide valuable implications for food delivery platforms and restaurants, emphasizing the potential of blockchain technology in building customer trust and fostering stronger customer relationships.

Keywords: Blockchain, Blockchain Characteristic, Customer Trust, Trust Theory, Digital Platforms, Food delivery Platforms.

CHAPTER 1: INTRODUCTION

1.1. Background

This study examines how Blockchain's features—transparency, security, and decentralization—affect customer trust and commitment, particularly in online food ordering. While Blockchain has gained attention in both academia and industry, research on its impact on customer behavior, particularly from a trust perspective, remains limited. The study investigates how Blockchain enhances trust by providing a transparent, secure, and decentralized ledger for transactions, which is crucial in an interconnected business environment where trust concerns often hinder cooperation (Ba and Pavlou 2002; Qian et al. 2020; Choo et al. 2020). It also explores the role of demographic factors, such as age, in influencing adoption intentions. Blockchain's potential to enhance transparency and security is significant in e-commerce, especially in sectors like online food delivery, where it ensures secure identity verification and payment processing (Akram et al. 2024; Inshal, Haq, and Akhtar 2024; Strebinger and Treiblmaier 2024). Research in Vietnam highlights Blockchain's potential to address trust challenges in the growing online food delivery market, proposing a conceptual trust model that meets evolving consumer expectations for transparency in digital ecosystems (Su et al. 2022; Vu et al. 2023; Benyam, Soma, and Fraser 2021; Reisch, Eberle, and Lorek 2013).

1.2. Research motivation

This study explores how Blockchain technology enhances customer trust and experience in online food ordering platforms and restaurants by ensuring transparency, security, and immutability (Su et al. 2022; Zhang, Wang, and Wang 2018). It examines how these features impact customer behavioral intentions and commitment, promoting loyalty and repeat usage. Additionally, the research focuses on the strategic application of Blockchain in the e-commerce sector, particularly in the online food ordering industry, to drive long-term benefits such as improved operational efficiency, reduced transaction costs, and sustainable growth (T. Liu, Yuan, and Yu 2023).

1.3. Research objectives

This study investigates how Blockchain technology enhances customer trust and experience in platforms and restaurants through transparency, security, and immutability. It examines how these features influence consumer behavior by ensuring data protection, transaction transparency, and service accountability. Blockchain's strong encryption secures personal information, providing peace of mind during online transactions (Dahal, 2023). It also enables accurate identity authentication and manages black and white lists of service providers, ensuring consumers interact only with trusted partners (Y. Liu et al., 2023). Accurate identity authentication prevents fraudulent activities and ensures consumers deal with reputable providers whose service quality has been verified (Schlegel et al., 2018). Additionally, the research explores Blockchain's impact on e-commerce, particularly in the online food ordering industry, focusing on enhancing operational efficiency, data security, and customer satisfaction, fostering long-term, sustainable growth.

1.4. Research processes

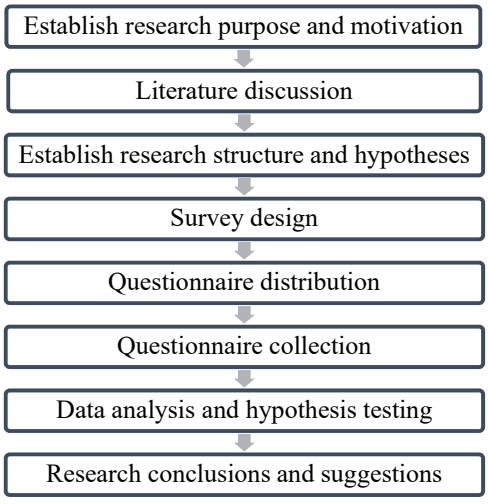

Figure 1.1: The research process

CHAPTER 2: LITERATURE REVIEW

2.1. Blockchain Technology

Blockchain is commonly defined as a decentralized and secure system for recording transactions, often described using terms like immutable, transparent, and trustless (Correia 2019; Li et al. 2020; Bano et al. 2019). It integrates three core technologies: distributed databases, encryption, and consensus protocols (Magazzeni et al. 2017). Blockchain consists of "blocks" of data, each containing transactions that are validated through consensus mechanisms, ensuring security and eliminating the need for a central authority.

Initially known for its use in Bitcoin, blockchain now has applications beyond cryptocurrency, including decentralized voting, healthcare, and distributed storage (Miraz and Ali 2018). In the delivery service industry, blockchain enhances transparency and efficiency. It improves food safety and quality by providing visibility into the food supply chain (Sharma et al. 2024). Blockchain also simplifies loyalty programs, reduces transaction fees, and speeds up payments by eliminating intermediaries (Suprayitno et al. 2024). Additionally, it enables advanced identity verification and reputation management (Karyani et al. 2024), and its transparent record-keeping aids in dispute resolution (Patel et al. 2019). While challenges such as scalability and regulatory compliance exist, blockchain's integration into online food ordering platforms promises a more secure and efficient user experience.

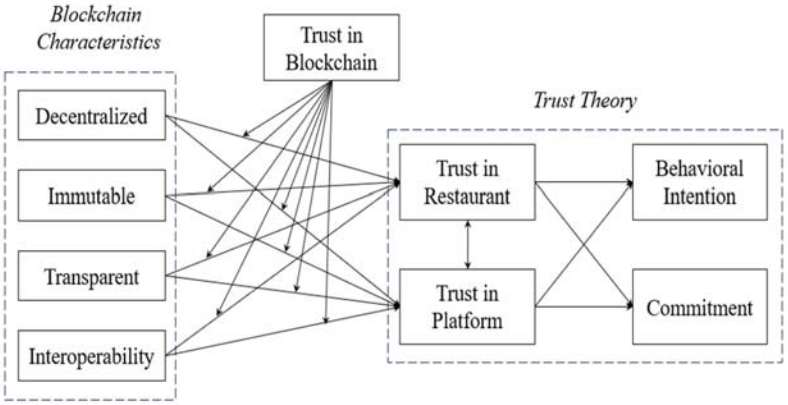

Figure 2.1: Research framework

2.2. Blockchain characteristic

2.2.1. Decentralized

The term "decentralized" in blockchain refers to the shift from traditional centralized systems, where control lies with a single entity, to a distributed structure where decision-making is spread across multiple participants (Pardeshi and Sharada 2022). In blockchain, this decentralized model eliminates the risk of a single point of failure, enhancing resilience, transparency, and security. Yunsen Wang and Alexander Kogana (2018) note that transactions are validated by a network of nodes, each holding an identical copy of the blockchain, ensuring no central authority governs the network. This structure fosters trust and strengthens the network’s resilience against disruptions and attacks.

2.2.2. Immutable

Immutability, or irreversibility, stands as a foundational property of blockchain technology, ensuring that once transactions are successfully verified and recorded into the blockchain, they cannot be altered or deleted. This intrinsic characteristic is rooted in the cryptographic structure of blockchain, where blocks are linked together using the hash value of the preceding block. Each block contains a reference to its parent block through a cryptographic hash of the transaction data within the parent block's header, forming an unbroken chain of blocks (Politou et al. 2022). This immutable nature of blockchain serves as a cornerstone for the integrity and reliability of transactional data. Once recorded, transactions become part of a permanent and tamper-proof ledger, providing a verifiable and transparent record of all activities within the network (Wang, Wang, and Liu 2020). The cryptographic integrity of the blockchain makes it practically impossible for any single or group of malicious actors to alter the recorded transactions without being detected. Overall, immutability is a crucial property of blockchain technology, ensuring the permanence and integrity of recorded transactions. It serves as a cornerstone for the security, transparency, and trustworthiness of blockchain networks, contributing to their widespread adoption across various industries and applications.

2.2.3. Transparent

Transparency in blockchain refers to the openness and accessibility of information within the network, allowing all stakeholders to view transactions and data, which fosters trust and accountability (Sunny, Undralla, and Madhusudanan Pillai 2020b). Key

features contributing to transparency include its immutable ledger, where transactions are permanently recorded and cannot be altered (Samad et al. 2023), and its distributed consensus mechanism, which prevents any central authority from manipulating data (Tapscott and Tapscott 2016). Additionally, cryptographic security measures ensure that only authorized users can access and interact with the blockchain, further protecting data integrity and preventing tampering (Kouhizadeh, Sarkis, and Zhu 2019). In platforms, transparency is enhanced by the same decentralized mechanisms and cryptographic security, ensuring data accuracy and user trust (Alansari 2020). When platforms are transparent about their data handling and security, users are more likely to trust that their information is safe and accurate. This transparency is essential for building trust in blockchain applications, especially in industries like online food ordering.

2.2.4. Interoperability

Interoperability in the context of blockchain is understood as the ability of multiple blockchain networks (BCs) to connect, communicate, and interact with each other seamlessly (Figueredo et al. 2019). It enables a connected ecosystem where information can flow across various blockchain protocols (Pillai et al. 2021). For restaurants, interoperability ensures consistent access to reviews, ratings, and supply chain data across platforms, building customer trust (Khan and Abonyi 2022). For platforms, it allows consistent user data and transaction records across systems, strengthening credibility and user trust (Lohachab et al. 2021). When a platform can integrate and verify information from various sources, it strengthens its credibility and user trust.

2.3. Trust theory (The Commitment- Trust theory)

Tan and Thoen (2000) define transaction trust as the trust that determines whether a person feels confident enough to engage in a transaction, dividing it into party-based trust and control-based trust. Trust and commitment are crucial for fostering long-term relationships, especially in online services (Kwon and Suh 2004). In e-commerce, particularly in food services, consumers are more likely to persist with a service once they feel their perceived risks are minimized (Vatanasombut et al. 2008). The Commitment-Trust Theory (CTT) by Morgan and Hunt (1994), initially designed for business-to-business transactions, has been adapted to business-to-customer contexts (Mukherjee and Nath 2007a). CTT emphasizes that continued usage of e-services is driven by customer commitment and trust, rather than just satisfaction (Riquelme and Maastricht 2009).

2.3.1. Trust in Restaurant and Trust in Platform

Trust in both restaurants and platforms plays a crucial role in shaping customer behavior and satisfaction in the dining industry. Trust in a restaurant involves confidence in its food quality, service standards, hygiene, and accuracy of orders (Chotigo and Kadono 2022). Positive experiences help build this trust, reassuring customers that their expectations will consistently be met (Price et al. 2016). Trust in platforms, on the other hand, refers to customers' confidence in the online intermediaries that connect them to restaurants. This trust is influenced by the platform's reliability, ease of use, security, and the accuracy of the information it provides (Lomotey, Kumi, and Deters 2022). A trustworthy platform should offer a smooth user experience, accurate reviews, and dependable services. The relationship between trust in restaurants and platforms is interdependent. Trust in a restaurant can enhance trust in the platform, and vice versa. A positive experience with a restaurant can increase confidence in the platform, while a reliable platform that provides quality dining options boosts trust in the restaurants it features. This relationship can create a feedback loop, where both types of trust reinforce each other, attracting more users and high-quality establishments.

Based on this, the study proposes the following hypotheses:

H1: Trust in restaurant and trust in platform are positively correlated and mutually reinforce each other.

2.3.2. Behavioral Intention

Behavioral intention in e-commerce refers to a consumer's likelihood of engaging in specific online actions, like purchasing, repurchasing, or recommending products (Restianto et al. 2024). It is influenced by factors like trust, perceived usefulness, and satisfaction with the platform (M. Liu et al. 2023). Key components include purchase intention, which depends on confidence in the platform, product value, and user experience (Saoula et al. 2023), and repurchase intention, which is shaped by satisfaction, trust, and product quality (Restianto et al. 2024). Trust in both restaurants and platforms plays a significant role in shaping these intentions. Trust in a restaurant, based on factors like food quality and service reliability, impacts consumer decisions to visit or recommend it (Omari and Tetteh 2017). Likewise, trust in a platform, regarding its credibility and security, influences consumers' decisions to engage in transactions (Soleimani 2021). The mutual reinforcement of trust between restaurants and platforms strengthens consumer behavioral intentions and decision-making (Song & Li, 2024). Combining arguments from the characteristics of Blockchain with trust in restaurants and platforms, the research can propose the following hypotheses:

H2a: Decentralized characteristics positively impact and increase trust in restaurant and further impact customer's behavioral intentions.

H2b: Decentralized characteristics positively impact and increase trust in platform and further impact customer's behavioral intentions.

H3a: Immutable characteristics positively impact and increase trust in restaurant and further impact customer's behavioral intentions.

H3b: Immutable characteristics positively impact and increase trust in platform and further impact customer's behavioral

intentions.

H4a: Transparent characteristics positively impact and increase trust in restaurant and further impact customer's behavioral intentions.

H4b: Transparent characteristics positively impact and increase trust in platform and further impact customer's behavioral intentions.

H5a: Interoperability characteristics positively impact and increase trust in restaurant and further impact customer's behavioral intentions.

H5b: Interoperability characteristics positively impact and increase trust in platform and further impact customer's behavioral intentions.

2.3.3. Commitment

Trust is essential for fostering commitment, reducing risks, and strengthening long-term customer relationships (Paluri and Mishal 2020). In online services, trust and commitment are interlinked, with commitment promoting continued usage and customer advocacy (Ghorban and Tahernejad 2012). In the online food service context, trust in both the restaurant and platform enhances customer commitment. Trust in the restaurant's quality and reliability influences trust in the platform, and vice versa, with positive experiences boosting both (Yang et al. 2021; Kang, Tang, and Fiore 2014). Based on the above arguments, the study puts forward the following two hypotheses:

H2c: Decentralized characteristics positively impact and increase trust in restaurant and further impact customer's commitment.

H2d: Decentralized characteristics positively impact and increase trust in platform and further impact customer's commitment.

H3c: Immutable characteristics positively impact and increase trust in restaurant and further impact customer's commitment.

H3d: Immutable characteristics positively impact and increase trust in platform and further impact customer's commitment.

H4c: Transparent characteristics positively impact and increase trust in restaurant and further impact customer's commitment.

H4d: Transparent characteristics positively impact and increase trust in platform and further impact customer's commitment.

H5c: Interoperability characteristics positively impact and increase trust in restaurant and further impact customer's commitment.

H5d: Interoperability characteristics positively impact and increase trust in platform and further impact customer's commitment.

2.4. Trust in Blockchain

Trust in blockchain is affected by its complexity and associations with fraud, hindering adoption, especially in online food ordering (Shin 2019a; Alalwan 2020). Despite promises of security and transparency, risks like insecure wallets and complex interfaces contribute to distrust (Shin 2019; Montgomery et al. 2024). To build trust, blockchain providers should focus on education, transparency, real-world success stories, and partnerships with reputable food services (Hughes et al. 2019; Shukla et al. 2024). From the reasons from the above arguments, the study puts forward the following hypotheses to clearly see the regulatory relationship of trust in blockchain between the characteristics of blockchain and trust theory as follows:

H6a: Trust in blockchain moderates the relationship between decentralized and trust in restaurant.

H6b: Trust in blockchain moderates the relationship between decentralized and trust in platform.

H6c: Trust in blockchain moderates the relationship between immutable and trust in restaurant.

H6d: Trust in blockchain moderates the relationship between immutable and trust in platform.

H6e: Trust in blockchain moderates the relationship between transparent and trust in restaurant.

H6f: Trust in blockchain moderates the relationship between transparency and trust in platform.

H6g: Trust in blockchain moderates the relationship between interoperability and trust in restaurant.

H6h: Trust in blockchain moderates the relationship between interoperability and trust in platform.

CHAPTER 3: RESEARCH METHODS

3.1. Data collection and sample

This study used a survey questionnaire to test the proposed model and hypotheses. All variables, except demographics, were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The survey targeted adult users of online food ordering apps in Vietnam and was distributed via email and social media. Out of 336 responses, 289 valid ones were retained after excluding ineligible or incomplete entries. To evaluate the possibility of non-response bias, an extrapolation method was employed by comparing early and late respondent (Scott Armstrong and Overton Marketing Scientist 1977). The t-statistic results indicated no significant differences in either substantive or demographic variables, suggesting that non-response bias was not present. The demographic characteristics of the sample are as follows: with distributions closely mirroring the general demographic profile of online food ordering app users in Vietnam, where 51.2% of users are female and 48.8% are male, with the largest age group being between 24 and 29 years old.

3.2. Measurement Method

The development of the questionnaire was grounded in a thorough review of existing literature to identify previously validated measurement scales, with some modifications made to tailor them to the context of online food ordering applications. Cronbach's alpha coefficient, which evaluates the internal consistency and reliability of the constructs, was calculated for each factor. In accordance with the guidelines provided by (Joseph F. Hair JR et al., 2009; van Griethuijsen et al. 2015), factors with a Cronbach's alpha (α) value of less than 0.7 were excluded from the final questionnaire. In many cases, an alpha value between 0.6 and 0.7 is considered acceptable for exploratory studies or when there is a trade-off between reliability and the number of items in the scale. To measure user's trust in technology, a thirteen-item scale was adopted from the study by (Pinkleton et al., 2002). Additionally, based on the research by (Aron O'Cass, 2002), a six-item scale was incorporated to assess user's confidence in the security of their transactions and the perceived protection of their personal information.

Lastly, single-item scales were used to assess six control variables—age, gender, education, occupation, and frequency of app usage. These demographic factors were considered because they may represent sociocultural variables that influence user's perceptions and behaviors, which in turn could impact their trust in blockchain technology and confidence in online food ordering processes (Gefen & Straub, 1997).

3.3. The Indicators of Construct Measurements

The questionnaire included 43 questions covering 9 key measurements related to the use of Blockchain in online food ordering apps. These measurements include decentralization, immutability, transparency, interoperability, customer trust in Blockchain, customer trust in restaurants, user satisfaction and loyalty, perceived value, and ease of use. Each construct was evaluated using a five-point Likert scale, with questions adapted from established scales in relevant literature.

The study explores how blockchain enhances customer trust and behavior in e-commerce by improving transparency, security, and data accuracy. It examines blockchain's role in building trust in restaurants and platforms, reducing fraud, and ensuring food quality and authentic reviews. Additionally, the study looks at blockchain's impact on behavioral intentions and customer commitment, including loyalty and participation in blockchain-based programs

CHAPTER 4: FINDING AND DISCUSS

4.1. Correlations

The correlation table highlights the relationships between variables in the study. Gender shows weak correlations, particularly with Behavioral Intention and Trust in Restaurant. Age has moderate correlations with Trust in Platform and Behavioral Intention, suggesting that older consumers tend to trust the platform more and have higher intention to use it. Education level shows slight associations with Trust in Platform and Transparency. Trust in Restaurant and Trust in Platform are strongly correlated with most variables, with Trust in Platform showing a particularly strong link to Behavioral Intention. Technical features like Decentralization, Immutability, Transparency, and Interoperability are strongly associated with trust and behavioral outcomes. Lastly, Behavioral Intention, Customer Commitment, and Trust in Platform are closely related, indicating that trust is a key factor influencing consumer behavior and commitment.

Table 4.1. Correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Gender	1												
Age	0.010	1											
Education	-.135*	.226**	1										
Occupation	-.117*	-.215**	-0.056	1									
Use times	0.034	0.017	0.048	-0.028	1								
Decentralized	-0.063	.356**	.163**	0.020	-.120*	1							
Immutable	-0.059	.374**	.194**	-0.052	-.126*	.868**	1						
Transparent	0.007	.236**	.120*	-0.072	-0.026	.605**	.709**	1					
Interoperability	-0.081	.282**	0.101	-0.067	-0.043	.569**	.702**	.700**	1				
Trust in Restaurant	-.119*	.282**	0.108	0.029	-.202**	.570**	.625**	.403**	.596**	1			
Trust in Platform	-.136*	.327**	.122*	0.034	-.215**	.560**	.651**	.435**	.607**	.789**	1		
Behavioral Intention	-.162**	.264**	0.098	-0.090	-0.107	.385**	.518**	.362**	.577**	.720**	.797**	1	
Customer Commitment	-.119*	.248**	0.098	0.065	-.136*	.442**	.526**	.391**	.681**	.682**	.777**	.766**	1

N= 289 (two-tailed test). **: Statistically significant at P <0.01

Source: Compiled by this study.

4.2. Regression model

First, in Table 4.2, we examine the relationship between trust in restaurants and trust in platforms while controlling for demographic factors as control variables. In Model 1a, trust in restaurants is the dependent variable, while trust in platforms serves as the independent variable. Conversely, in Model 1b, trust in platforms is the dependent variable, with trust in restaurants as the independent variable. Control variables include gender, age, education, occupation, and use times. The study confirms that trust in platforms and trust in restaurants are mutually reinforcing factors. While demographic variables largely do not play a significant role, age appears to be a relevant factor in shaping trust in platforms. The models provide strong statistical evidence, making them reliable for understanding the dynamics of consumer trust in this context.

Table 4.2. Results of Regression Analysis for Hypothesis 1

Variable	Model	
	Trust in restaurant	Trust in Platform
	1a	1b
Gender	-0.012	-0.041
Age	0.021	0.077**
Education	0.005	0.009
Occupation	0.003	0.013
Use times	-0.024	-0.038
Independent variables		
Trust in Platform	0.843***	
Trust in restaurant		0.667***
VIF	<10	<10
R^2	0.79	0.801
Adjusted R^2	0.617	0.634
F-value	78.241***	84.255***

N = 289 (two-tailed test).

***: Statistically significant at P < 0.001; **: P < 0.01; *: P < 0.05.

Next, in Table 4.3, the analysis examines the relationship between the independent variables (Blockchain characteristics), the mediator variables (trust in restaurants and platforms), and customers' behavioral intention. Control variables, including gender, age, education, occupation, and usage frequency, were also incorporated to account for potential confounding effects. From here, it can be inferred that blockchain has the capacity to strengthen consumer trust in both restaurants and platforms, thus affecting behavioral intentions. However, the influence of different Blockchain characteristics varies, with trust playing a crucial role as the mediating factor in the model.

Similarly, in Table 4.4, this study continues to analyze and test the impact of Blockchain characteristics on consumer commitment while considering the mediating role of trust in restaurants and platforms. The results indicate that decentralization, immutability, transparency, and interoperability significantly influence commitment. However, their effects are often mediated by trust, suggesting that Blockchain's ability to foster consumer confidence is crucial. Therefore, it can be concluded that Blockchain attributes have a positive effect on consumer commitment, with trust serving as the key mediating factor. Businesses should prioritize using Blockchain to improve transparency, security, and interoperability, as these elements help build trust and ultimately foster stronger consumer commitment.

Finally, Table 4.5 presents the regression analysis results on the impact of Blockchain characteristics on consumer trust in restaurants and platforms. The findings indicate that decentralization, immutability, transparency, and interoperability play a crucial role in shaping trust, but their effects differ depending on the context. While these attributes positively influence trust in restaurants, they tend to negatively affect trust in platforms. This suggests that consumers perceive Blockchain as a valuable tool for enhancing security and transparency in restaurant transactions, yet they may associate it with potential risks or uncertainties in platform-based interactions. Overall, the results underscore that while Blockchain characteristics can enhance trust in restaurants, their impact on platforms is more nuanced. Businesses aiming to integrate Blockchain should focus on enhancing transparency, security, and interoperability while addressing consumer concerns about decentralization in platform-based settings to maximize trust and acceptance.

Table 4.3. Results of Regression Analysis on Behavioral Intention

Variable	Model													
	Behavioral Intention													
	2a	**2b**	**2c**	**3a**	**3b**	**3c**	**4a**	**4b**	**4c**	**5a**	**5b**	**5c**	**6a**	**6b**
Gender	-0.164**	-0.101*	-0.075	-0.158*	-0.103*	-0.076	-0.183**	-0.106*	-0.077*	-0.132*	-0.096*	-0.075	-0.101*	-0.076
Age	0.092*	0.036	-0.009	0.055	0.016	-0.019	0.125**	0.024	-0.020	0.072*	0.014	-0.026	0.029	-0.020
Education	-0.005	-0.003	-0.007	-0.023	-0.012	-0.010	-0.001	-0.009	-0.011	0.004	-0.006	-0.011	-0.006	-0.010
Occupation	-0.039	-0.048*	-0.056***	-0.030	-0.048**	-0.058***	-0.022	-0.048*	-0.058***	-0.021	-0.044*	-0.054***	-0.049**	-0.058***
Use times	-0.043	0.022	0.043	-0.028	0.024	0.044	-0.062	0.021	0.044	-0.054	0.013	0.037	0.023	0.044
Independent variables														
Decentralized	0.234***	-0.036	-0.060											
Immutable				0.342***	0.070	-0.004								
Transparent							0.251***	0.060	0.007					
Interoperability										0.597***	0.237***	0.145**		
Trust in Restaurant													0.721***	
Trust in Platform														0.914***
Mediator variables														
Trust in Restaurant		0.747***			0.666***			0.692***			0.597***			
Trust in Platform			0.959***			0.918***			0.910***			0.827***		
VIF	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
R^2	0.199	0.543	0.663	0.299	0.547	0.659	0.207	0.546	0.659	0.368	0.596	0.669	0.541	0.659
Adjusted R^2	0.182	0.532	0.655	0.284	0.535	0.65	0.187	0.535	0.65	0.354	0.558	0.661	0.532	0.652
F-value	11.664***	47.689***	79.073***	20.054***	48.403***	77.539***	12.038***	48.273***	77.556***	27.342***	52.991***	81.156***	55.483***	90.776***

N = 289 (two-tailed test).

***: Statistically significant at P< 0.001; **: P < 0.01; *: P < 0.05.

Table 4.4. Results of Regression Analysis on Customer Commitment

Variable	Model													
	Commitment													
	7a	**7b**	**7c**	**8a**	**8b**	**8c**	**9a**	**9b**	**9c**	**10a**	**10b**	**10c**	**11a**	**11b**
Gender	-0.079	-0.032	-0.008	-0.075	-0.034	-0.009	-0.097	-0.038	-0.012	-0.044	-0.022	-0.005	-0.031	-0.008
Age	0.078*	0.037	-0.001	0.056	0.026	-0.004	0.113***	0.036	-0.003	0.052	0.018	-0.013	0.044	0.0002
Education	0.002	0.004	0.001	-0.011	-0.003	-0.001	0.007	0.001	-0.001	0.011	0.005	0.001	0.006	0.001
Occupation	0.028	0.021	0.015	0.038	0.024	0.015	0.045*	0.025	0.017	0.046**	0.033*	0.024	0.023	0.015
Use times	-0.049	-0.003	0.019	-0.039	0.001	0.019	-0.068*	-0.005	0.016	-0.058*	-0.018	0.003	-0.001	0.019
Independent variables														
Decentralized	0.238***	0.0378	0.007											
Immutable				0.303***	0.099**	0.027								
Transparent							0.243***	0.096**	0.048					
Interoperability										0.638***	0.424***	0.334***		
Trust in Restaurant													0.578***	
Trust in Platform														0.757***
Mediator variables														
Trust in Restaurant		0.551***			0.500***			0.531***			0.355***			
Trust in Platform			0.752***			0.733***			0.729***			0.557***		
VIF	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
R^2	0.226	0.476	0.606	0.303	0.488	0.607	0.222	0.49	0.61	0.497	0.591	0.678	0.474	0.606
Adjusted R^2	0.21	0.463	0.596	0.288	0.475	0.597	0.206	0.477	0.6	0.486	0.581	0.67	0.463	0.598
F-value	13.761***	36.480***	61.781***	20.403***	38.242***	62.017***	13.415***	38.499***	62.741***	46.362***	58.084***	84.492***	42.329***	72.311***

N = 289 (two-tailed test).

***: Statistically significant at P < 0.001; **: P < 0.01; *: P < 0.05.

Table 4.5. Results of Regression Analysis for Hypothesis 6

Variable	Model															
	Trust in Restaurant								Trust in Platform							
	4a	4b	4c	4d	4e	4f	4g	4h	5a	5b	5c	5d	5e	5f	5g	5h
Gender	-0.085	0.007	-0.082*	0.016	-0.112*	0.002	-0.060	-0.008	-0.094*	-0.019	-0.089*	-0.025	-0.117*	-0.020	-0.070	-0.028
Age	0.074*	0.020	0.059*	0.020*	0.146***	0.039	0.097*	0.044	0.105**	0.061*	0.081**	0.051	0.159***	0.068*	0.118***	0.076**
Education	-0.002	-0.003	-0.017	-0.008	0.011	0.022	0.017	0.003	0.002	0.001	-0.015	-0.007	0.011	0.002	0.018	0.006
Occupation	0.013	0.019	0.028	0.024	0.036	0.027	0.037	0.034	0.018	0.023	0.030	0.028	0.039	0.030	0.039*	0.037*
Use times	-0.088**	-0.064**	-0.079**	-0.065**	-0.121***	-0.074**	-0.112***	-0.084**	-0.090**	-0.071**	-0.078**	-0.067**	-0.116***	-0.077***	-0.109***	-0.087***
Independent variables																
Decentralized	0.363***	-0.451***							0.307***	-0.355***						
Immutable			0.409***	-0.322***							0.377***	-0.19**				
Transparent					0.276***	-0.457***							0.267***	-0.353***		
Interoperability							0.603***	-0.395**							0.546***	-0.246*
Interaction variables																
Trust in blockchain*Decentralized		0.142***								0.115***						
Trust in blockchain*Immutable				0.120***								0.093***				
Trust in blockchain*Transparent						0.134***								0.113***		
Trust in blockchain*Interoperability								0.123***								0.097***
VIF	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
R^2	0.36	0.587	0.421	0.588	0.259	0.559	0.414	0.544	0.369	0.55	0.467	0.588	0.313	0.573	0.45	0.548
Adjusted R^2	0.346	0.576	0.409	0.578	0.243	0.548	0.402	0.532	0.356	0.539	0.456	0.578	0.299	0.562	0.438	0.537
F-value	26.391***	56.998***	34.165***	57.272***	16.388***	50.838***	33.228***	47.819***	27.498***	49.089***	41.180***	57.277***	21.442***	53.861***	38.456***	48.696***

N = 289 (two-tailed test).

***: Statistically significant at $P < 0.001$; **: $P < 0.01$; *: $P < 0.05$.

4.3. Mediation and moderation effects

Table 4.6 presents the results of the bootstrap analysis, Trust in Restaurant consistently shows a significant mediating effect in the relationships between decentralized features (such as Decentralized, Immutable, Transparent, and Interoperability) and the outcomes (Behavioral Intention and Commitment). Similarly, Trust in Platform also plays a significant mediating role. Overall, while both trust constructs serve as key mediators, Trust in Restaurant often demonstrates full mediation, whereas Trust in Platform tends to show partial mediation, especially in contexts where the technology itself directly impacts user behavior.

In Table 4.5, Trust in Blockchain plays an important role as a moderator in the relationship between the four characteristics of Blockchain and Trust in Restaurant as well as Trust in Platform. This highlights the need for blockchain platforms to proactively build and maintain consumer trust, as higher levels of trust will significantly enhance the positive effects of decentralized, immutable, interoperable, and transparent features on consumer intentions and behavioral engagement.

Table 4.6. Bootstrap analysis to test significance of mediation effects.

Path/effect	Bootstrap estimate			
	B	**SE**	**LLCI**	**ULCI**
Total	0.2800	0.0830	0.1340	0.4620
Direct	-0.0270	0.0360	-0.0980	0.0450
Ind: Decentralized→ Trust in Restaurant→ Behavioral Intention	0.3070	0.0470	0.2320	0.4170
Total	0.2790	0.0690	0.0020	0.4260
Direct	0.0500	0.0330	-0.0150	0.1150
Ind: Decentralized→ Trust in Restaurant→ Commitment	0.2290	0.0360	0.0170	0.3110
Total	0.2800	0.0840	0.1380	0.4650
Direct	-0.0640	0.0310	-0.1260	-0.0030
Ind: Decentralized→ Trust in Platform→ Behavioral Intention	0.3440	0.0530	0.2640	0.4680
Total	0.2790	0.0670	0.1600	0.4230
Direct	0.0070	0.0280	-0.0490	0.0620
Ind: Decentralized→ Trust in Platform→ Commitment	0.2720	0.0390	0.2090	0.3610
Total	0.3720	0.0850	0.2210	0.5550
Direct	0.0800	0.0370	0.0060	0.1540
Ind: Immutable→ Trust in Restaurant→ Behavioral Intention	0.2920	0.0480	0.2150	0.4010
Total	0.3280	0.0730	0.1950	0.4820
Direct	0.1020	0.0340	0.0350	0.1690
Ind: Immutable→ Trust in Restaurant→ Commitment	0.2260	0.0390	0.1600	0.3130
Total	0.3720	0.0920	0.2150	0.5810
Direct	-0.0010	0.0340	-0.0680	0.0650
Ind: Immutable→ Trust in Platform→ Behavioral Intention	0.3730	0.0580	0.2830	0.5160
Total	0.3270	0.0790	0.1940	0.5000
Direct	0.0220	0.0310	-0.0380	0.0820
Ind: Immutable→ Trust in Platform→ Commitment	0.3050	0.0480	0.2320	0.4180
Total	0.2890	0.0880	0.1450	0.4900
Direct	0.0680	0.0360	-0.0020	0.1390
Ind: Transparent→ Trust in Restaurant→ Behavioral Intention	0.2210	0.0520	0.1470	0.3510
Total	0.2710	0.0720	0.1490	0.4320
Direct	0.0960	0.0320	0.0320	0.1590
Ind: Transparent→ Trust in Restaurant→ Commitment	0.1750	0.0400	0.1170	0.2730
Total	0.2890	0.0870	0.1500	0.4900
Direct	0.0150	0.0320	-0.0480	0.0770
Ind: Transparent→ Trust in Platform→ Behavioral Intention	0.2740	0.0550	0.1980	0.4130
Total	0.2710	0.0750	0.1470	0.4390
Direct	0.0450	0.0290	-0.0110	0.1010
Ind: Transparent→ Trust in Platform→ Commitment	0.2260	0.0460	0.1580	0.3380
Total	0.6490	0.1090	0.4450	0.8750
Direct	0.2590	0.0550	0.1500	0.3680
Ind: Interoperability→ Trust in Restaurant→ Behavioral Intention	0.3900	0.0540	0.2950	0.5070
Total	0.6640	0.0880	0.4990	0.8440

Direct	0.4150	0.0460	0.3240	0.5060
Ind: Interoperability→ Trust in Restaurant→ Commitment	0.2490	0.0420	0.1750	0.3380
Total	0.6500	0.1010	0.4580	0.8540
Direct	0.1670	0.0500	0.0690	0.2640
Ind: Interoperability→ Trust in Platform→ Behavioral Intention	0.4830	0.0510	0.3890	0.5900
Total	0.6640	0.0770	0.5140	0.8190
Direct	0.3230	0.0420	0.2420	0.4050
Ind: Interoperability→ Trust in Platform→ Commitment	0.3410	0.0350	0.2720	0.4140

CHAPTER 5: CONCLUSION

5.1. Conclusion on research findings

Blockchain has gained significant attention, but research on its impact on customer behavior, particularly trust, remains limited. This study explores how Blockchain's features affect user trust and commitment, focusing on factors like demographics and adoption intentions. The study proposes 25 hypotheses, all of which are supported, offering valuable insights for Blockchain adoption.

1. **Trust in Blockchain serves as a crucial moderator between blockchain characteristics and trust in restaurants and food delivery platforms**

The fundamental characteristics of Blockchain such as decentralization, immutability, transparency, and interoperability significantly influence consumers' trust in the technology itself. When consumers develop trust in Blockchain, they are more inclined to extend that trust to restaurants and food delivery platforms that adopt Blockchain in their operations. The findings suggest that trust in Blockchain is not merely a passive reaction to the technology but acts as a critical moderating factor. It helps translate the positive attributes of Blockchain—like transparency and immutability into actual trust in the services offered by these platforms. This indicates that Blockchain's technological features can substantially enhance consumer trust in associated services, with trust in Blockchain strengthening the connection between the technology and the platforms that implement it.

2. **Trust in Blockchain indirectly influences trust in restaurants and food delivery platforms**

The analysis also reveals that as customers' trust in Blockchain grows, it has a positive downstream effect on their trust in food delivery platforms and restaurants that incorporate Blockchain technology. This heightened trust in Blockchain, in turn, increases customers' behavioral intention to use these services and their long-term commitment to these platforms. Specifically, as demonstrated by the confidence intervals for indirect effects in the analysis, the results show that trust in Blockchain strengthens the likelihood of customers engaging with and committing to these platforms. This underscores the importance for businesses to not only improve service quality but also clearly communicate the value and security that Blockchain brings, fostering deeper trust in both the technology and the services it enables.

5.2. Theoretical contributions and practical implications

This study enhances the understanding of blockchain adoption by applying the Commitment-Trust Theory (CTT), demonstrating how blockchain's transparency, security, and decentralization influence customer trust and commitment. Trust is highlighted as a key driver of adoption and long-term relationships. For blockchain providers, building trust through transparency and security is essential. Businesses should align blockchain with customer expectations to boost adoption and educate customers on its benefits, especially in data security, to foster trust and commitment.

5.3. Research limitations and recommendations for future research

Despite its valuable insights, this study has several limitations. First, its focus on blockchain adoption in the restaurant and online platform industries may restrict the generalizability of findings to other sectors, which may not share the same level of customer interaction or trust dependency. The study also relies on self-reported data, which is subject to biases such as social desirability and recall errors. Although respondents were diverse in age and experience, their perspectives may not fully capture real-world attitudes toward blockchain. In addition, the sample size may not be large enough to reflect the full spectrum of consumer behavior, limiting broader applicability. Moreover, external factors such as regulatory shifts or emerging technologies were not accounted for, though they could significantly influence blockchain adoption. Finally, the research centers primarily on trust and commitment, omitting other important factors like perceived ease of use and cost-effectiveness.

To address these limitations, future research should explore blockchain adoption across a variety of industries, such as finance, healthcare, or logistics, to assess how different contexts shape trust and commitment. Longitudinal studies are also recommended to track how trust in blockchain evolves over time and how it impacts long-term customer loyalty. Researchers should consider external variables like regulatory developments and technological progress, which can greatly affect user perceptions. Lastly, future studies could examine additional influencing factors such as ease of use, affordability, and user experience to provide a more holistic understanding of blockchain adoption dynamics.

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