

DETERMINANTS OF CONSUMERS' PAYMENT METHOD PREFERENCES: EVIDENCE FROM VIETNAM USING CHOICE-BASED CONJOINT ANALYSIS

LỰA CHỌN PHƯƠNG THỨC THANH TOÁN CỦA NGƯỜI TIÊU DÙNG VIỆT NAM: ỨNG DỤNG PHÂN TÍCH KẾT HỢP DỰA TRÊN LỰA CHỌN (CHOICE-BASED CONJOINT)

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Abstract - This study investigates Vietnamese consumers' preferences for payment methods and offers empirical evidence on the compensatory trade-off mechanisms underlying payment method selection. Using Choice-Based Conjoint (CBC) analysis with Hierarchical Bayes estimation, the study examined the preferences of 149 high-frequency users in Da Nang City across three key attributes: (1) security, (2) convenience, and (3) cost. The results demonstrate that security constitutes the primary determinant of payment decisions, followed by convenience, whereas the effect of cost is relatively modest. To the authors' knowledge, this study represents one of the earliest applications of CBC in explaining consumer payment preferences, advancing theoretical understanding of digital payment adoption in emerging markets. The findings provide important implications for fintech firms and banks and other financial institutions in improving service quality and enhancing customer experience within Vietnam's rapidly evolving electronic payment (e-payment) market.

Key words - Payment methods; Consumers' payment; Choice-Based Conjoint (CBC) Analysis; Electronic payments; Hierarchical Bayes

1. Introduction

Digital payment adoption has accelerated markedly across global markets, with contactless transactions in Vietnam recording annual growth of 172% [1]. Although mobile banking penetration among urban users has reached 65.1% [1], the structural determinants of consumer payment preferences remain insufficiently understood. While existing studies primarily focus on technology adoption intentions [2], [3], relatively few investigate how consumers trade off conflicting attributes when choosing a payment method. This constitutes an important gap for financial service providers in designing optimal payment solutions for customers. Traditional survey methods assess the importance of attributes in isolation and fail to capture the compensatory decision-making process in which consumers accept a reduction in one attribute in order to gain an advantage in another [4]. For instance, whether Vietnamese consumers are willing to pay higher fees in exchange for enhanced security, or to forgo convenience in favor of lower transaction costs, cannot be determined through standard Likert-scale instruments or linear structural models.

This study addresses three research questions: (1) *Which payment attributes most strongly influence Vietnamese consumers' choices?* (2) *How do consumers trade off the attributes of security, convenience, and cost?* (3) *Are these*

Tóm tắt - Nghiên cứu này nhằm khám phá ưu tiên lựa chọn của người tiêu dùng Việt Nam đối với các thuộc tính của phương thức thanh toán dựa trên phương pháp phân tích kết hợp (Choice-Based Conjoint - CBC), bổ sung luận chứng về cơ chế đánh đổi trong hành vi chấp nhận thanh toán. Sử dụng ước lượng Hierarchical Bayes, nghiên cứu đã phân tích sở thích của 149 người dùng có tần suất giao dịch cao tại thành phố Đà Nẵng theo 3 thuộc tính chính là (1) bảo mật, (2) tiện lợi, và (3) chi phí. Kết quả nghiên cứu cho thấy bảo mật chi phối quyết định lựa chọn thanh toán, tiện lợi đứng thứ hai, trong khi ảnh hưởng của chi phí là khiêm tốn. Đây là một trong những nghiên cứu đầu tiên áp dụng CBC để giải thích sở thích thanh toán của người tiêu dùng, đóng góp vào lý thuyết thanh toán số ở thị trường mới nổi và các hàm ý chính sách cho các doanh nghiệp Fintech nhằm nâng cao chất lượng dịch vụ, nâng cao trải nghiệm khách hàng trong thị trường thanh toán số động của Việt Nam.

Từ khóa - Phương thức thanh toán; Sở thích người tiêu dùng; Phân tích kết hợp dựa trên lựa chọn - CBC; Thanh toán điện tử; Hierarchical Bayes

choice preferences consistent with findings from developed markets worldwide, or are they specific to Vietnam?

This study employs Choice-Based Conjoint (CBC) analysis, a method that simulates real-world purchasing situations by requiring participants to choose among competing alternatives [5]. Compared with rating-based approaches, CBC has the advantage of eliciting preferences through actual choices rather than hypothetical importance rankings, thereby offering higher predictive validity [6]. Accordingly, this study contributes scientific evidence that explains user behavior in selecting and adopting digital payment methods in the contemporary Vietnamese market.

2. Theoretical background

2.1. Payment methods and their attributes

The modern payment system has evolved from the six-method payment system framework proposed by Rambure and Nacamuli (2008) - including checks, Automated Clearing House (ACH), debit cards, credit cards, cash, and electronic transfers - into increasingly complex digital ecosystems (as cited in King [7]). New methods such as mobile wallets (e.g., MoMo, ZaloPay), QR-based payments, Buy Now Pay Later (BNPL), and emerging cryptocurrencies have appeared, each comprising distinct bundles of attributes [8], [9]. Humphrey et al. define payment methods

as instruments that enable the transfer of monetary value to complete commercial transactions and common attributes include transaction speed, security level, acceptance coverage, transaction costs, and ancillary benefits such as loyalty programs (as cited in Schuh and Stavins [10]) [36]. Each payment method's advantage in one attribute (e.g., security) may entail a disadvantage in another (e.g., convenience). Understanding users' attribute preferences is essential because providers cannot optimize all attributes that inherently involve compensation and trade-offs.

2.2. Security

Security has been consistently identified as a primary concern in payment research, spanning both developed and emerging market contexts. Gupta and Hakhu demonstrate that perceived security positively affects trust and intention to use digital payment systems [3]. Tsai et al. extend the Technology Acceptance Model (TAM) and show that transaction security plays a mediating role in the relationship between perceived usefulness and usage intention [11]. Ha et al. find that perceived risk - including security concerns - significantly influences satisfaction and continuance intention toward electronic payment services [12]. Senali et al. report that privacy and security concerns constitute the most significant barriers to mobile wallet adoption in Asian markets [13]. Similarly, Liébana-Cabanillas et al. indicate that trust in security is the most direct antecedent of intention to use mobile payments [14]. Security mechanisms include two-factor authentication, end-to-end encryption, and fraud liability policies [15], [16]. In the Vietnamese context, Decision No. 2345/QĐ-NHNN of the State Bank of Vietnam mandates biometric authentication for high-value transactions, reflecting regulators' emphasis on security [17].

2.3. Convenience and ease of use

Convenience and ease of use are important drivers. Davis's TAM posits that perceived ease of use directly affects technology adoption [18]. Berry et al. define convenience as the reduction of time and effort, which in payment contexts is reflected in minimizing procedural steps, 24/7 accessibility, and seamless application integration [19]. Yang et al. find that users prefer methods requiring minimal steps and infrequent authentication [20]. Shankar and Datta emphasize contactless features (QR codes, NFC) as factors enhancing convenience in developing markets [21]. A recent study by Pal et al. finds that perceived ease of use has a strong effect on user satisfaction in mobile payments, particularly among users with limited technological proficiency [22].

2.4. Cost

Users are sensitive to transaction fees, foreign exchange conversion fees, and other hidden costs in payments [10], [23]. Sahin's diffusion theory identifies cost as an innovation barrier, with users evaluating benefits against financial and non-financial costs (e.g., switching time and switching costs). Liébana-Cabanillas et al. show that higher perceived costs reduce mobile payment adoption, especially in emerging markets [14]. However, Zhao and Kurnia find that cost sensitivity decreases when users perceive added value from security and convenience [24].

In Vietnam, e-wallets such as MoMo and ZaloPay apply zero-fee models to attract users, creating an expectation of near-zero costs as a baseline standard for digital payment methods [25]. Prior studies in Vietnam have used regression-based approaches to assess the effects of individual attributes, overlooking the reality of trade-offs between cost and other benefits [26], [2], [27]. No study has placed consumers in realistic scenarios that directly require acknowledging that improving one attribute may degrade another. This methodological gap limits understanding of the hierarchy of preferences and compensatory decision rules that explain users' actual behavior.

Among the many attributes of payment methods, security, convenience/ease of use, and cost consistently rank as leading factors influencing the adoption of digital payment methods across markets [31]. Drawing on the most recent studies in emerging markets [12], [21], [22], [24], [25], we propose the following hypotheses:

H1: Security exhibits the highest relative importance in Vietnamese consumers' payment choices, compared with convenience/ease of use and cost.

H2: Vietnamese consumers are willing to trade off convenience/ease of use and cost to ensure security.

H3: Different consumer segments exhibit different preferences in choosing digital payment instruments.

3. Methodology

3.1. Research design: CBC analysis

Grounded in random utility theory, CBC analysis models consumer choices by presenting respondents with realistic choice sets that simulate market conditions, thereby enhancing external validity [5], [6], [28]. Participants select their preferred profiles, revealing attribute trade-offs through choices rather than stated importance ratings. CBC has been successfully applied in a range of international payment studies. Polites et al. used CBC to examine switching resistance in payment technologies [29]. More recently, Kauffman et al. applied CBC to analyze competition among digital payment platforms in Asian markets [30].

3.2. Attribute and level selection

Table 1. Attribute Levels

Attribute	Level 1 (Low)	Level 2 (Medium)	Level 3 (High)
Security	No authentication, no protection policy	OTP/PIN authentication, basic protection policy	Biometric/ Multi-factor authentication, comprehensive protection policy
Convenience	Complex process (5-6 steps)	Partial automation (3-4 steps)	One-touch payment (1-2 steps)
Cost	High fee (100,000-200,000 VND/year)	Standard fee (50,000-100,000 VND/year)	Completely free

A meta-analysis by Dahlberg et al. on digital payments identifies security, convenience and ease of use, and cost as dominant payment factors [31]. Based on Dahlberg et al., Ha et al., as well as State Bank regulations and digital payment practices in Vietnam (MoMo, ZaloPay, VNPAY), this study specifies three attributes with three levels each (Table 1) [31],

[12], [17]. The levels (high, medium, low) were determined according to current practices in Vietnam through an analysis of the general policies of major digital payment instruments, such as banking applications (BIDV, VCB, MB, TCB) and leading e-wallets (MoMo, ZaloPay, VNPay).

3.3. Empirical study

Study design

The full factorial design yields 27 profiles (3^3) which would include many profiles with repeated attribute patterns. Therefore, this study employed an orthogonal fractional factorial design generated in SPSS to create nine efficient profiles, and then removed the dominant profile (Profile 9 with all high levels) to avoid trivializing the choice sets, resulting in eight experimental profiles. This design ensures statistical independence among attributes (orthogonality) while minimizing participant burden. According to Orme, designing 8–12 profiles is optimal for estimation accuracy and participant completion [32].

Data collection

The survey was conducted at retail locations (supermarkets, convenience stores, traditional markets, and food-and-beverage venues such as cafés and eateries) in Da Nang from September to November 2024. Participants were recruited using quota sampling to ensure representativeness across locations. Eligibility criteria were: (1) age ≥ 18 ; (2) frequent use of digital payments (≥ 5 transactions/month); and (3) residence in Da Nang. Respondents who failed to complete the experiment or whose responses failed embedded attention checks were excluded from analysis. Prior to the main survey, a pre-test with 20 participants was conducted to assess design clarity and refine attribute descriptions. Each participant evaluated all eight profiles and chose the most preferred option, yielding 1,192 choice observations (149×8).

Data analysis

This study employs Hierarchical Bayes (HB) estimation rather than Multinomial Logit (MNL), given its demonstrated superiority in recovering individual-level preference utilities from small-to-medium samples [32]. The HB model was specified at two levels: individual and population. The posterior distribution was estimated via Markov Chain Monte Carlo (MCMC) using the No-U-Turn Sampler (NUTS), implemented in PyMC3 [33]. We ran four chains with 10,000 iterations (5,000 burn-in). Convergence diagnostics included divergences (≈ 0 indicating no sampling issues), the Gelman–Rubin statistic ($\hat{R} \sim 1.0$ indicating convergence across chains), and the Effective Sample Size (ESS) (> 400 indicating adequate posterior precision). The percentage of correctly predicted choices (Hit Rate $> 12.5\%$) and the geometric mean of predicted choice probabilities (Root Likelihood (RLH) > 0.125) were used to evaluate model performance.

To explore heterogeneity in consumer preferences, the study additionally conducted Latent Class Analysis (LCA) to identify user segments with distinct preference structures. Models with 2–5 classes were estimated, and the optimal number of classes was selected based on the Bayesian Information Criterion (BIC) and interpretability

[34]. In addition, the study performed 5-fold cross-validation by randomly splitting the sample into five subsets, using four for training and one for testing, repeated five times. The average hit rate across test folds was used to confirm the model's generalizability.

Table 2. Sample characteristics ($N=149$)

Characteristic	Category	Quantity	Percentage (%)
Gender	Male	77	51.7
	Female	72	48.3
Age	18-24	99	66.4
	25-34	39	26.2
	≥ 35	11	7.4
Income	10 million VND/month	73	49.0
	≥ 10 million VND/month	76	51.0
Primary Payment Method	Banking App	97	65.1
	E-wallet	28	18.8
	Cash	16	10.7
	Other (Debit, Apple Pay, Mobile money..)	8	5.4

4. Results

4.1. Predictive model

Convergence diagnostics confirmed reliable estimation: no divergences were observed; $\hat{R}=1.00$ for all parameters; and ESS ranged from 2,581–9,183 (bulk) and 3,924–5,623 (tail), meeting the criteria of Vehtari et al. [35]. Model fit was acceptable, with a Hit Rate of 69.79% (104/149 correctly predicted), far exceeding the random benchmark (12.5%) and the acceptable threshold ($>60\%$), although below the ideal level ($>80\%$). RLH was 0.8981, close to the maximum (1.0), indicating strong overall fit.

Table 3. Profile Choice Distribution

Profile	Security	Convenience	Cost	Choice	Percentage (%)
1	High	Low	Low	31	20.8
2	Medium	Low	Medium	0	0.0
3	Medium	Medium	High	39	26.2
4	Medium	High	Low	14	9.4
5	Low	Medium	Low	0	0.0
6	Low	Low	High	0	0.0
7	Low	High	Medium	0	0.0
8	High	Medium	Medium	65	43.6

Table 3 shows that Profile 8 (high security, medium convenience, medium cost) attracted 43.6% of choices, Profile 3 (medium–medium–free) 26.2%, and Profile 1 (high–complex–high fee) 20.8%. Four profiles received no choices, indicating dominated alternatives.

4.2. Part-worth utilities

Table 4 reports population-level part-worth utilities (μ) with standard deviations and 95% Highest Density Intervals (HDIs). The reference levels are medium security, medium convenience, and medium cost.

High security is associated with the strongest positive utility ($\mu = 2.263$), while the absence of security yields the most strongly negative utility ($\mu = -2.751$), resulting in the

widest utility range across all attributes (5.014). One-touch convenience shows a negative utility ($\mu = -0.289$) with an HDI spanning zero $[-1.443; 1.017]$, indicating heterogeneous preferences. Free cost yields a positive utility (1.358), while the high-fee level shows an ambiguous effect (0.481, HDI $[-0.359; 1.323]$).

Table 4. Hierarchical Bayes Utility Estimations

Attribute	Level	Means	Std. Dev	HDI 2.5%	HDI 97.5%	ESS (bulk)	\hat{R}
Security	High (Biometric)	2.263	0.456	1.338	3.122	4.740	1.0
	Low (No Auth)	-2.751	0.585	-3.951	-1.670	9.183	1.0
Convenience	High (1-touch)	-0.289	0.615	-1.443	1.017	4.936	1.0
	Low (Complex)	-1.532	0.419	-2.355	-0.716	4.913	1.0
Cost	High (Free)	1.358	0.521	0.337	2.412	2.581	1.0
	Low (High Fee)	0.481	0.425	-0.359	1.323	4.371	1.0

4.3. Relative attribute importance

Table 5 presents the relative importance of attributes in digital payment choice. Security dominates with 70.28% importance, far exceeding convenience (17.42%) and cost (12.30%). This approximately 7:2:1 ratio indicates that Vietnamese consumers prioritize safety over efficiency or price.

Table 5. Attribute Importance Ranking

Attribute	Utility Range	Relative Importance (%)	Rank
Security	5.014	70.28	1
Convenience	1.243	17.42	2
Cost	0.877	12.30	3

4.4. Latent Class Analysis (LCA)

Latent Class Analysis identified three distinct segments (optimal BIC at $K=3$) with the following characteristics (Table 6).

Table 6. Segment Characteristics (N=149)

Segment	Size	Primary Priority	Demographic Profile
Segment 1: "Security guardians"	58.4% (n=87)	Security >>> Convenience \approx Cost	Female (62%), Age 25-34 (51%), High Income
Segment 2: "Balanced users"	28.2% (n=42)	Security > Cost > Convenience	Gender Balanced, Age 18-24 (74%)
Segment 3: "Price-sensitive"	13.4% (n=20)	Cost > Security \approx Convenience	Male (70%), Low Income (85%)

Segment 1 (58.4%) - "Security guardians": highly sensitive to security (weight 62%), willing to accept cost and complexity. This segment is mainly women aged 25–34 with higher income, reflecting responsibility for household financial management.

Segment 2 (28.2%) - "Balanced users": consider all three attributes with relatively even weights (security 55%, cost 25%, convenience 20%). This group of young consumers (18–24) of both genders exhibits "trial" behavior toward new payment methods.

Segment 3 (13.4%) - "Price-sensitive users": prioritize low cost (45%) over security (35%). This smaller group is predominantly low-income men, potentially due to budget constraints.

Robustness checks yielded an average hit rate of 67.2% across the five folds ($SD = 3.1\%$), close to the full-sample hit rate (69.79%), confirming model stability. Model comparisons (Table 7) show that the HB model with latent classes outperforms alternative approaches, supporting the methodological choice of CBC in this study. The CBC-based results support accepting all three proposed hypotheses.

Table 7. Model Performance Comparison

Model	Log-Likelihood	BIC	Hit Rate (%)	RLH
Multinomial Logit	-523.4	1,089.2	62.4	0.8123
Mixed Logit	-487.2	1,063.8	66.1	0.8564
Hierarchical Bayes	-451.8	1,024.5	69.8	0.8981
HB + Latent Class (K=3)	-438.1	1,018.7	73.2	0.9147

5. Discussion and managerial implications

5.1. Security as the dominant attribute

The finding that security accounts for 70.28% of relative attribute importance aligns with Dao et al., who identified security as the strongest predictor of fintech adoption among Vietnamese consumers ($\beta=0.366$) [2]. Using CBC, this study provides independent, choice-based confirmation: Vietnamese consumers are willing to accept the procedural complexity associated with biometric authentication as a priority in their selection of payment methods. This extends Gupta and Hakhu [3] and Tsai et al. [11] by demonstrating not merely the significance of security, but its disproportionate weight relative to other attributes in actual choice contexts. The study also reaffirms the central role of security in digital payments reported in prior work such as Senali et al. [13] and Liébana-Cabanillas et al. [14].

Across markets, while Shin [15], and Kim et al. [16] emphasize security in mobile payments in emerging economies, Western studies tend to report more balanced attribute weights. Schuh and Stavins, examining the U.S. and EU, find a more even distribution among security (35%), convenience (40%), and cost (25%) [10]. Vietnam's security dominance (70%) suggests that the country may be at an early "trust-building" stage of digital financial transformation, in which adoption decisions are governed primarily by risk mitigation rather than utility maximization.

In other emerging markets, Senali et al. [13] in Sri Lanka and Shankar and Datta [21] in India similarly reported high security priorities, although the level is lower in Vietnam (50–55%). Vietnam's particularly strong emphasis may reflect recent data breaches and the rapid growth of digital payments (172% in 2024) [1]. The findings may also capture consumer concerns stemming from recent fraud and scam incidents, or a culture of risk avoidance, as suggested by Ha et al. [12]. Zhao and Kurnia report similar patterns in other Asian markets, indicating that this may be a regional characteristic rather than unique to Vietnam [24].

5.2. The role of convenience and ease of use

The negative utility for "convenience" (-0.289) in Table 4 is not consistent with Yang et al. and Shankar and

Datta, who argue that contactless payments promote the adoption of digital payment technologies [20], [21]. This paradox may result from the security–convenience tension: Vietnamese consumers may perceive extremely simplified processes as insufficiently safe. The popularity of Profile 8 (medium convenience, high security) indicates a preference for solutions that are “secure enough but not overly simple.” The results suggest that convenience matters only when paired with high security. Convenience improvements in isolation may fail to persuade consumers to engage in risk-bearing behaviors such as payments. Pal et al. support this view, showing that ease of use improves satisfaction only when users trust the system [22].

5.3. The role of cost

Table 5 shows that cost has a relatively modest importance (12.3%), in contrast to Liébana-Cabanillas et al., who argue that cost strongly affects mobile payment adoption in emerging markets [14]. This may be because Vietnam’s widespread expectation of free payment instruments (e.g., MoMo, ZaloPay) reduces pressure to consider costs. The success of Profile 8 (with a medium fee) suggests that users treat security as the key decision factor and relegate cost to an incremental consideration, consistent with Zhao and Kurnia [24]. The ambiguous effect of the high-fee level ($\mu=0.481$, HDI [-0.359; 1.323]) indicates heterogeneity: some consumers accept paying for premium features, while others reject any fee. Segment 3 (13.4%) demonstrates high price sensitivity (Table 6).

This study provides deeper explanations of choice and adoption behavior in digital payments. Whereas mainstream technology adoption research based on TAM places substantial emphasis on ease of use, this study shows that security is the pivotal factor in digital payment choice. Only when security is ensured do convenience and ease of use play an influential role.

Based on these findings, we argue that Vietnamese consumers choose payment instruments according to a sequential, hierarchical structure - analogous to Maslow’s needs hierarchy - rather than TAM’s parallel pathways. Specifically, users may evaluate and decide according to a hierarchy of priorities - **Security** → **Convenience** → **Cost** - in which lower-level attributes influence choice only when higher-level attributes meet a minimum threshold. Our extended model can be formalized as follows:

Payment Preference Hierarchy Model

Level 1 (Foundational): Security (minimum threshold)

Level 2 (Functional): Convenience (active only when Level 1 is satisfied)

Level 3 (Economic): Cost (influential only when Levels 1–2 are acceptable)

This proposed model has implications for both theory and practice. Theoretically, it extends the understanding of digital payment adoption as hierarchical rather than purely additive. This may be a promising research direction for clarifying results obtained under TAM-based approaches. Practically, the model suggests a sequential product development strategy rather than parallel optimization. The study also demonstrates

the advantage of conjoint analysis over opinion-based surveys: questionnaire-based studies tend to emphasize convenience, whereas actual choices clearly reveal security concerns. This may be an important insight that reshapes how digital payment behavior is studied in Vietnam.

5.4. Managerial implications

The findings offer managerial implications for fintech companies, particularly digital payment service providers, in refining their customer acquisition strategies. First, providers should invest in advanced security technologies such as biometric authentication (Face ID, fingerprint) and multi-factor authentication. In addition, security communication should be strengthened, emphasizing trust over speed by using certifications, insurance policies, and transparent incident handling. Customers in Segment 1 - “security guardians” (58.4%; predominantly female, young, and higher-income) - are especially responsive to security-focused messages.

Payment service firms should also design products to optimize a “golden point” of convenience: targeting 3–4 payment steps, avoiding overly complex processes (Profile 2, 0% choice) and/or overly simple flows. Steps that do not enhance safety should be automated while preserving the salience of authentication. Finally, segmented pricing strategies should be applied by maintaining free models to attract Segments 2 and 3 (41.6%), while offering premium packages with enhanced security for Segment 1, who are willing to pay (Profile 8 with medium cost: 43.6% of choices).

6. Limitations and future research directions

This study has several limitations. First, regarding data collection, the sample is urban-focused and skewed toward young users (Da Nang only, with 66.4% of participants aged 18–24), which limits generalizability. Rural consumers may exhibit distinct security priorities, potentially attributable to limited digital infrastructure and lower fintech familiarity. Future studies should employ quota sampling across regions and age groups. With $N=149$, the sample is adequate for basic CBC estimation but limits the robustness of segmentation analysis. For stable segment-level inference and tests of heterogeneity by demographics, $N \geq 300$ is recommended [32].

A second limitation relates to the experimental design, which tested only three attributes and omitted transaction speed, merchant acceptance coverage, loyalty rewards, and customer support. Future research should systematically expand the attribute set, potentially using adaptive CBC designs. In addition, the observed choice outcomes show that four profiles received no selections (2, 5, 6, 7), reflecting dominated alternatives and reducing statistical efficiency. Future studies may apply adaptive design approaches to remove dominated profiles. Another weakness is that the Hit Rate reached 69.79%. Although it exceeds conventional standards, it remains below an excellent threshold (>80%). Subsequent research could apply more advanced methods, such as Bayesian nonparametric clustering, longitudinal CBC, or integration with real transaction settings, to improve predictive accuracy and uncover latent factors in user behavior.

7. Conclusion

This study employed CBC analysis to examine Vietnamese consumers' payment preferences and to quantify the disproportionate salience of security (70.28% relative importance) in shaping consumer payment choices. Unlike prior survey-based research that emphasizes multiple factors on an equal footing, the CBC approach more effectively identifies the hierarchy of real-world decision-making: Vietnamese consumers consistently trade off convenience and cost in exchange for stronger security in payments. For Vietnam's VND 116 trillion digital payments market, the findings support the development of financial products and services that prioritize security, focus on authentication standards, and implement marketing strategies tailored to different customer segments. As cashless transactions continue to expand in scale and prevalence, capturing and understanding the preference structure underlying payment services becomes essential for the sustainable growth of Vietnam's digital payment ecosystem.

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REFERENCES

- [1] State Bank of Vietnam, *Statistical Report on Cashless Payment Activities*. Hanoi, Vietnam: State Bank of Vietnam, 2024.
- [2] M. H. Dao, N. T. Thao, D. T. Hoai, and N. T. L. Thu, "Factors affecting the adoption of fintech payment services among Vietnamese consumers," *Journal of Banking Science and Training*, no. 194, pp. 11–19, 2018.
- [3] P. Gupta and D. Hakhu, "Impact of perceived security and perceived trust on intention to use digital payments: A study on Indian customers," *Webology*, vol. 18, no. 6, pp. 1–15, 2021. <https://doi.org/10.2307/1251756>
- [4] P. E. Green and V. Srinivasan, "Conjoint analysis in marketing: New developments with implications for research and practice", *Journal of Marketing*, vol. 54, no. 4, pp. 3–19, 1990. <https://doi.org/10.2307/1251756>
- [5] J. Louviere, D. A. Hensher, and J. Swait, *Stated Choice Methods: Analysis and Applications*. Cambridge: Cambridge University Press, 2000.
- [6] V. R. Rao, *Applied Conjoint Analysis*. Berlin: Springer, 2014.
- [7] B. King, *Bank 4.0: Banking Everywhere, never at a Bank*. Singapore: John Wiley & Sons, 2020.
- [8] Z. Hu, S. Ding, S. Li, L. Chen, and S. Yang, "Adoption intention of fintech services for bank users: An empirical examination with an extended TAM," *Symmetry*, vol. 11, no. 3, p. 340, 2019. <https://doi.org/10.3390/sym11030340>
- [9] Deloitte, *Global Payments Trends 2023: Bold Moves in Challenging Times*. New York, USA: Deloitte Development LLC, 2023.
- [10] S. Schuh and J. Stavins, "Why are (some) consumers (finally) writing fewer checks? The role of payment characteristics", *Journal of Banking & Finance*, vol. 34, no. 8, pp. 1745–1758, 2010. <https://doi.org/10.1016/j.jbankfin.2009.09.018>
- [11] S. C. Tsai, C. H. Chen, and K. C. Shih, "Exploring transaction security and consumers' willingness to use mobile payment", *Applied System Innovation*, vol. 5, no. 6, p. 113, 2022. <https://doi.org/10.3390/asi5060113>
- [12] M. T. Ha, K. T. Tran, G. Sakka, and Z. U. Ahmed, "Understanding perceived risk factors toward mobile payment usage using extended technology continuance theory: A Vietnamese perspective", *Journal of Asia Business Studies*, vol. 18, no. 1, pp. 158–182, 2024. Doi: [10.1108/JABS-01-2023-0025](https://doi.org/10.1108/JABS-01-2023-0025)
- [13] M. G. Senali *et al.*, "Determinants of intention to use e-wallet: The moderating role of innovativeness and trust," *Computers in Human Behavior*, vol. 142, p. 107663, 2023. Doi: [10.1080/10447318.2022.2076309](https://doi.org/10.1080/10447318.2022.2076309)
- [14] F. Liébana-Cabanillas, V. Marinkovic, I. R. de Luna, and Z. Kalinic, "Predicting the determinants of mobile payment acceptance: A hybrid SEM-neural network approach," *International Journal of Bank Marketing*, vol. 39, no. 2, pp. 220–240, 2021. <https://doi.org/10.1016/j.techfore.2017.12.015>
- [15] D. H. Shin, "Towards an understanding of consumer acceptance of mobile wallet," *Computers in Human Behavior*, vol. 25, no. 6, pp. 1343–1354, 2009. <https://doi.org/10.1016/j.chb.2009.06.001>
- [16] C. Kim, M. Mirusmonov, and I. Lee, "An empirical examination of factors influencing intention to use mobile payment," *Computers in Human Behavior*, vol. 26, no. 3, pp. 310–322, 2010.
- [17] State Bank of Vietnam, Decision No. 2345/QĐ-NHNN on the Application of Biometric Authentication, Hanoi, Vietnam, 2024.
- [18] F. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, 1989.
- [19] L. Berry, K. Seiders, and D. Grewal, "Understanding service convenience," *Journal of Marketing*, vol. 66, no. 3, pp. 1–17, 2002. DOI: [10.1509/jmkg.66.3.1.18505](https://doi.org/10.1509/jmkg.66.3.1.18505)
- [20] M. Yang, A. Mamun, M. Mohiuddin, N. Nawi, and N. Zainol, "Cashless transactions: Intention and adoption of e-wallets," *Sustainability*, vol. 13, no. 2, p. 831, 2021. <https://doi.org/10.3390/su13020831>
- [21] A. Shankar and B. Datta, "Factors affecting mobile payment adoption intention: An Indian perspective," *Global Business Review*, vol. 19, no. 3, pp. S72–S89, 2018. <https://doi.org/10.1177/0972150918757>
- [22] D. Pal, C. Arpikanondt, T. T. Phan, and S. Fumikul, "Determinants of mobile payment continuance intention: An empirical investigation," *Journal of Retailing and Consumer Services*, vol. 68, p. 103008, 2022.
- [23] W. Bolt, N. Jonker, and C. Van Renselaar, "Incentives at the counter: An empirical analysis of surcharging card payments and payment behaviour in the Netherlands," *Journal of Banking & Finance*, vol. 34, no. 8, pp. 1738–1744, 2010.
- [24] Q. Zhao and S. Kurnia, "Value perception and willingness to pay for mobile payment: A cross-cultural analysis," *Information Systems Frontiers*, vol. 25, no. 3, pp. 987–1006, 2023.
- [25] VietnamCredit, *Top 4 E-Wallets in Vietnam: Market Analysis 2024*. Hanoi: VietnamCredit Research, 2024.
- [26] H. N. K. Giao, "Customer satisfaction toward payment card services in Ho Chi Minh City," *Journal of Economic Development*, no. 252, pp. 36–43, 2011.
- [27] P. T. N. Anh, D. T. T. Linh, D. N. Diep, and T. H. Mai, "Factors affecting Gen Z consumers' decision to use online payment services on e-commerce platforms in Hanoi," *Journal of Banking Science and Training*, no. 255, pp. 26–39, 2023.
- [28] K. E. Train, *Discrete Choice Methods with Simulation*, 2nd ed. Cambridge: Cambridge University Press, 2009.
- [29] G. L. Polites, E. Karahanna, and L. Seligman, "A research framework for consumer switching behavior: Insights from conjoint analysis," *Journal of the Association for Information Systems*, vol. 13, no. 6, pp. 456–478, 2012.
- [30] R. Kauffman, J. Liu, and D. Ma, "Platform competition and compatibility decisions in mobile payments: A conjoint analysis," *Information Systems Research*, vol. 35, no. 1, pp. 234–256, 2024.
- [31] T. Dahlberg, J. Guo, and J. Ondrus, "A critical review of mobile payment research," *Electronic Commerce Research and Applications*, vol. 14, no. 5, pp. 265–284, 2015. <https://doi.org/10.1016/j.elerap.2015.07.006>
- [32] B. Orme, *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*, 2nd ed. Madison, WI: Research Publishers LLC, 2010.
- [33] J. Salvatier, T. Wiecki, and C. Fonnesbeck, "Probabilistic programming in Python using PyMC3," *Journal of Computer Science*, vol. 2, p. e55, 2016. Doi: [10.7287/PEERJ.PREPRINTS.1686V1](https://doi.org/10.7287/PEERJ.PREPRINTS.1686V1)
- [34] W. Greene and D. Hensher, "A latent class model for discrete choice analysis: Contrasts with mixed logit," *Transportation Research*, vol. 37, no. 8, pp. 681–698, 2003. [https://doi.org/10.1016/S0191-2615\(02\)00046-2](https://doi.org/10.1016/S0191-2615(02)00046-2)
- [35] A. Vehtari, A. Gelman, D. Simpson, and P. Bürkner, "Rank-normalization, folding, and localization: An improved R-hat for assessing convergence of MCMC," *Bayesian Analysis*, vol. 16, no. 2, pp. 667–718, 2021. <https://doi.org/10.1214/20-BA1221>
- [36] D. Humphrey, M. Kim and B. Vale, "Realizing the gains from electronic payments: Costs, pricing, and payment choice", *Journal of Money, credit and Banking*, vol. 33, no.2, pp. 216–234, 2001. <https://doi.org/10.2307/2673882>.