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Behavioral Intentions in Cashless: The Role of Green Finance Perception in the Vietnamese Market

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ABSTRACT. The present research investigates consumers' behavioral intention towards cashless modes of payment in Vietnam with mediating factors such as green finance perception. Based on the theory of planned behavior and perceived benefits the study seeks to compare functional, economic, psychological and social benefits as factors influencing attitude, self-control beliefs and subjective norms, towards acceptance of cashless systems. The present study engaged a survey of 355 respondents and offered a measurement model and analysis results of the relation between the variables following the partial least squares-structural equation modeling (PLS-SEM). The findings indicate that attitude and behavioral control are the predictors of intention with significant influence, while green finance moderates the relationship between attitude and subjective norms to intention, but not behavioral control. Such findings suggest that publicizing the utilitarian and environmental advantages of cashless payment should be pursued. Finally, the study recommends that there should be specific marketing promotion to ensure that more people embrace green finance with the investigations being extended across people of different categories to increase efficiency.

1. INTRODUCTION

The financial ecosystem worldwide is undergoing a significant transformation, with cashless payment systems gaining increasing prominence [1]. This shift is particularly notable in developing countries like Vietnam, where advancements in digital infrastructure are facilitating the rapid adoption of cashless transactions. According to the State Bank's report in 2024, electronic payment channels leading the

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cashless trend include internet banking (up 57.85%) and mobile banking (up 68.54%). In particular, quick response (QR) code payments exploded with a growth rate of 892.95% [2].

Despite the evident benefits of cashless payments such as convenience, speed, and enhanced security cash remains a dominant mode of transaction in Vietnam [3]. While the Vietnamese government and financial institutions have promoted cashless systems as part of the broader goal of achieving a digital economy, a significant gap exists between policy efforts and consumer behavior. Understanding the behavioral intentions behind cashless adoption is therefore critical for promoting widespread acceptance and use [4].

One new driver of change in this direction is coming from environmental concerns, mainly green finance. Green finance means the financial business that has the objective of encouraging green results in terms of less carbon emissions or financing sustainable development [5]. With the rising concern for the environment in Vietnam, the perception of green finance gains is contributing to consumers' trend decisions to a greater extent [6]. Nonetheless, comparative studies and the extent to which green finance affects the intention to adopt cashless payments in Vietnam studies have not extensively researched this topic despite the increase in its importance.

To address this gap, the current study integrates perceived benefits with the theory of planned behavior (TPB) to analyze consumer behavioral intentions toward cashless payments [7]. Perceived benefits theory posits that individuals are more likely to adopt a product or service if they perceive it to provide significant advantages, whether functional, economic, psychological, or social [8]. In the context of cashless payments, these benefits include convenience, cost effectiveness, and relevant to this study environmental sustainability through green finance initiatives. Perceptions of these benefits are likely to shape positive attitudes toward cashless systems, making perceived green finance a key variable in understanding consumer behavior [9]. The theory of planned behavior complements this by explaining how behavioral intentions are shaped by three primary factors [10]: attitude toward the behavior, subjective norms, and perceived behavioral control. Attitudes are informed by the perceived benefits of cashless payments, while subjective norms reflect the influence of societal expectations, such as the growing emphasis on environmentally responsible behavior [11]. Perceived behavioral control relates to the individual's belief in their ability to use cashless systems effectively. Research design based on combining these two theories to investigate how perceptions benefits influence

attitudes, societal norms, and personal control, and the moderating of green finance, leading to a stronger intention to adopt cashless payment systems [9].

In general, this research seeks to fill the gap in understanding how green finance perceptions impact consumer intentions toward cashless payment adoption in Vietnam. By integrating perceived benefits and the theory of planned behavior, the study will provide comprehensive insights into the factors driving cashless adoption, contributing to both academic literature and practical efforts to promote sustainable financial behaviors in the Vietnamese market.

2. LITERATURE REVIEW

2.1. Background theory

This study aims to analyze the perceived benefits related to personal behavioral attitudes and assess the moderating role of perceived green finance in the relationship between individual behaviors and intentions toward cashless payments in Vietnam. In the context of technological adoption, perceived benefit to explain and predict customer intention to adopt new technology, introduced by [12], includes concepts such as functional, economic, psychological, and social benefits, which reflect how users perceive the advantages of adopting cashless systems [13]. These benefits influence behavioral attitudes, a key element of the theory of planned behavior, which, along with subjective norms and perceived behavioral control, users' confidence in their ability to use cashless payment, affects the intention to adopt such payment methods [14]. The moderating role of perceived green finance enhances this relationship by shaping how green finance perceptions influence these theory of planned behavior constructs and, in turn, the intention to use cashless payment systems [9]. This integrated framework provides a comprehensive model for understanding the drivers of cashless payment adoption in Vietnam. From the theoretical framework approach, measurement concepts are developed by hypotheses and determine the next structural analysis model.

2.2. Hypothesis development

2.2.1. The relationship between perceived functional benefits with attitude, behavioral control and subjective norms

Perceived functional benefits refer to the practical advantages that users perceive when adopting a new payment method, such as cashless payments by QR code [15]. These benefits, including speed, convenience, and security, directly shape a user's attitude toward cashless payments, as individuals are more likely to view a system positively when it enhances their day-to-day

transactions [16], [17]. Pre-research suggest that perceived functional benefits can create a more favorable attitude toward the adoption of technology by increasing perceived value and usefulness [18]. Additionally, functional benefits influence perceived behavioral control, as users who experience the ease of use and efficiency are more likely to feel confident in their ability to adoption and continue using cashless payments [19].

Moreover, functional benefits also affect subjective norms, where individuals may perceive that adopting cashless systems aligns with social expectations, particularly in a tech-forward society [17]. This social pressure can increase the intention to use cashless payments as it creates a sense of obligation or desire to conform [20]. As a result, the cumulative effect of functional benefits on attitude, behavioral control, and subjective norms ultimately strengthens users' intention toward cashless payment adoption, making it a critical factor in influencing behavioral intentions [21]. Thus, understanding the role of functional benefits is essential in promoting cashless payments in Vietnam.

2.2.2. The relationship between perceived economic with attitude, behavioral control and subjective norms

Perceived economic benefits relate to perceived cost and perceived financial gains believed to accompany subscription to a given system or technology like contactless payments [22]. Clearly, these benefits, including transaction cost and financial efficiency, have an impact on attitude toward cashless payment systems [23]. This aligns with related research indicating that when consumers see cashless payment systems as yielding savings or enhancing their financial understanding, they view these systems positively [24]. Consequently, this positive attitude strengthens their behavioral intention to employ these systems [25].

Moreover, other financial considerations influence perceived behavioral control because those users who believe that one can save more money with cashless systems and manage them to a greater extent will enjoy greater confidence in their own usage [26]. This sense of control overriding the decision increases their probability of using other cashless payment methods. Furthermore, economic returns define the perceived social pressure that influences the subject’s self and others [27]. If some users can think that besides the comfort, cashless payment is more profitable than cash, they can experience social pressure and join when peers and society in general can consider cashless payment as rational in terms of money [28]; [29].

Subsequently, attitude, behavioral control, and subjected norms positively explain the perceived economic benefits of cashless payments to increase the intention toward cashless payment adoption in the Vietnamese market.

2.2.3. The relationship between psychological with attitude, behavioral control and subjective norms

Psychological benefits refer to the emotional or mental advantages users experience when adopting a system, such as cashless payments. These benefits include feelings of security, trust, and peace of mind that arise from using secure, convenient, and reliable payment methods [30]. The perception of psychological benefits can positively influence users' attitude toward cashless payments [17]. When users feel that the payment system is safe and dependable, their attitude becomes more favorable, thus increasing the likelihood of adoption.

Moreover, psychological benefits also affect perceived behavioral control. Users who feel confident in the security of cashless systems are more likely to believe they can control and manage their financial transactions, further encouraging the adoption of cashless payments [31]. Additionally, psychological benefits can shape subjective norms by influencing users' perceptions of societal expectations [32]. For example, as cashless systems become more accepted and viewed as secure by society, individuals may feel pressure to conform and adopt these systems to maintain a sense of social belonging.

In summary, the perception of psychological benefits strengthens the relationship between attitude, behavioral control, and subjective norms, ultimately leading to a stronger intention toward cashless payment adoption in the Vietnamese market. Understanding the role of psychological benefits is crucial in promoting the wider acceptance of cashless systems.

2.2.4. The relationship between social benefits with attitude, behavioral control and subjective norms

Social benefits refer to the advantages individuals perceive in terms of their social standing, reputation, and group belonging when adopting a system like cashless payments [17]. In the context of cashless payments, these benefits often include a sense of modernization, being part of a tech savvy community, and gaining social approval for environmentally responsible behavior [11]. These perceived social benefits can strongly influence users' attitude toward cashless payment systems, as individuals may adopt these methods not only for practical reasons but also to enhance their social image [33]. The desire to be seen as progressive or environmentally conscious can lead to a more favorable attitude toward cashless payments.

Additionally, social benefits can impact subjective norms by increasing the social pressure to conform. As cashless payments become more widespread and socially accepted, individuals may feel a growing sense of obligation to adopt these systems to align with the behavior of peers, family, or society at large [34]. This aligns with the Theory of Planned Behavior (TPB), where subjective norms play a critical role in shaping behavioral intentions [35].

Furthermore, social benefits also influence perceived behavioral control. When users see that cashless payments are widely accepted and praised within their social circles, they may feel more empowered and confident in using these systems, reinforcing their control over adopting cashless payments [36].

In general, the perception of social benefits enhances the relationships between attitude, subjective norms, and behavioral control, ultimately increasing the intention toward cashless payments in the Vietnamese market. Understanding the role of social influences in promoting cashless payments is crucial for encouraging broader adoption in a socially conscious consumer base.

2.2.5. The moderating effect of perceived green finance into relationship between the components of TBP and intention toward cashless payments

Perceived green finance can be defined as the level of appreciation that individuals have over the environmental and sustainability gains that may be realized out of financial products and service or behaviors. Related to the concept of cost per click, when perceived as promoting the green financial services, such payment forms are viewed as environmentally friendly in contrast to the traditional cash operations which imply the use of paper and metal money [37]. The perceived green finance therefore acts as a moderation role by influencing on the components of attitude, subjective norms and perceived behavioral control that determines the intended of these payment systems among the components as noted by [38]. Perceived green finance is defined as the acknowledgment of values, environmental and sustainable, that emanate from financial operations and services which are least damaging to the environment [37]. If people think that usage of cashless payments is productive towards environmental conservation, then their positive attitude towards the systems is enhanced. The idea that cashless payments lead to paper or a physical resource being used less corresponds to environ- mentally friendly behavior, enhancing their positive attitude [9].

In addition, subjective norms can be reinforced by perceived green finance. As environmental consciousness grows within society, individuals may feel increased social pressure to adopt

behaviors that are viewed as environmentally responsible, including cashless transactions [11]. The perception that cashless payments support green finance initiatives strengthens the influence of societal expectations on behavior.

Finally, perceived behavioral control can also be moderated by green finance perception, as individuals who recognize the environmental benefits may feel more confident and empowered in their choice to use cashless systems [39]. Thus, perceived green finance acts as a key moderating variable that enhances the effect of TPB components on the intention to adopt cashless payments in Vietnam.

Therefore, based on the literature review and the extended Theory of Planned Behavior (TPB) framework, as depicted in Figure 1, the proposed relationships highlight how perceived social benefits shape the formation of behavioral intention. These relationships include key constructs such as attitude, subjective norm, perceived behavioral control, and behavioral intention. Moreover, the role of green finance awareness acts as a moderating factor in the adoption of cashless payments, influencing these perceptions. This conceptual model has led to the development of research hypotheses, which are structured according to the analysis diagram, providing a clear roadmap for examining the impact of social benefits and green finance perceptions on payment behavior.

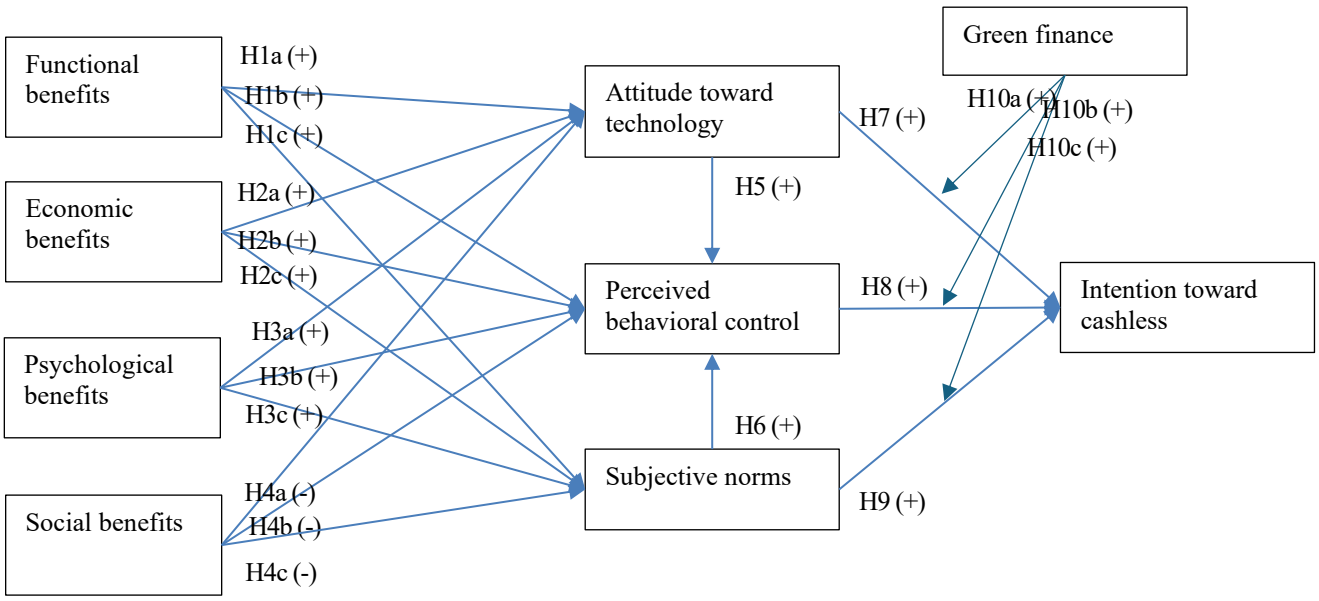

Figure 1. Research framework of social benefits, green finance, and cashless payment intentions

3. RESEARCH METHODS

3.1. Measurement tools

The study employed a structured questionnaire to measure variables related to consumers' behavioral intentions toward cashless payments, focusing on the role of green finance perception in the Vietnamese market. A five-point Likert scale ranging from "strongly disagree" to "strongly agree" was used for all variables except demographic characteristics.

Functional benefits were measured with four items, focusing on convenience, speed, and security of cashless payments [23]. Economic benefits included four items assessing perceived cost savings and improved financial management through cashless payments [26]. Psychological benefits comprised four items measuring trust, security, and peace of mind associated with using cashless payment systems [30]. Social benefits were measured through four items exploring how adopting cashless payments enhances social standing and societal approval [33].

The attitude toward the cashless payment technology was measured by six items which calculates consumers' valence attitude towards cashless payments system [23]. In this study, perceived behavioral control was measured with four questions which focused on consumers' self-efficacy to make payment with cashless methods [32]. Subjective norms were also captured through four items; these aim at assessing the pressure brought forth by society and standards in society [34].

Perceived green finance was measured using five items to capture awareness of environmental and sustainability benefits of cashless payments [37].

Finally, intention toward cashless payments was assessed with five items, measuring consumers' willingness to adopt, continue using, and recommend cashless payment systems [33]; [25]. These items included plans to use cashless payments in the future, recommending them to others, and considering cashless payments over traditional methods.

Demographic data, including gender, age, education, and job, were also collected to analyze their influence on consumers' behavior and perceptions. This comprehensive measurement framework provides a robust analysis of the factors driving cashless payment adoption in Vietnam.

3.2. Data collection and sample size

To participate in this study, the data collection process was adopted with an aim of having adequate sample size which is particularly important when employing quantitative analysis through PLS-SEM. An important consideration is sample size since if a researcher takes a sample that is much smaller than the required one, the conclusion could be misleading as well as decreases the ability of the model to generalize results.

Following the 10 times rule recommended by [40] the minimum sample size is determined by multiplying 10 by the number of observed variables within the scale structure with the most indicators or the number of paths directed into the scale structure with the most connections [41]. Based on this approach, the minimum sample size for the study was set at 280 respondents. This calculation was based on the most complex model structure in terms of paths and observed variables [42]. Additionally, PLS-SEM is well-suited for smaller samples when the minimum requirements are met, according to [43].

The study aimed to collect data from 500 respondents ultimately achieving a total of 355 valid responses yielding a 71% recovery rate. The sample was selected through non-probability sampling and data were gathered using a structured questionnaire. At shopping malls, the research team obtained permission from stores selling green finance products and offering cashless payment methods such as e-wallets, mobile banking, internet banking, and QR codes. Employing a sampling approach, the team first sought consent from consumers to introduce the research objectives, assuring them of data privacy and highlighting the benefits of participating. Only those who agreed to participate were provided with a questionnaire link via Google Forms [44]. The questionnaire was divided into two sections: one focusing on general demographic information and the other addressing specific items related to the study's research model. Despite falling slightly below the target sample size, the final sample was deemed sufficient for the analysis, aligning with the methodological recommendations for PLS-SEM.

3.3. Analytical techniques

The purpose of this research was to seek confirmatory evidence for a theoretical model in consideration of a given population of interest. This was achieved through an extensive methodical analysis of construct validity and reliability as methodologies [45]. Moreover, other types of analysis used were PLS-SEM, confirmatory factor analysis (CFA), and Cronbach Alpha reliability analysis. The present analyses were estimated with Smart-PLS 4.0 tool developed by [42].

The use of PLS-SEM enabled an in-depth analysis of the relationships specified in the theoretical framework through the calculation of path coefficients, t-statistics, standard errors, and squared multiple correlations. Furthermore, to guarantee the reliability and strength of the findings, a bootstrapping procedure involving 5,000 resamples was implemented utilizing the PLS-SEM method [46]. As a result, this technique yielded statistical significance for the path coefficients,

enhancing confidence in the study's findings and reinforcing the validity and reliability of the conclusions.

4. RESULTS

4.1. Sample characteristics

Table 1. Respondent demographics

Items	Type of respondents	Frequency	Percentage
Gender			
	Male	196	55.211
	Female	159	44.789
Age			
	18 - 30	85	23.944
	31 – 40	179	50.423
	41 - 50	81	22.817
	Up 50	10	2.817
Education			
	Bachelor's degree	129	36.338
	College	78	21.972
	Master's degree	70	19.718
	Other	16	4.507
	Ph. D	62	17.465
Job position			
	Employees	276	77.746
	Management	23	6.479
	Unemployed	56	15.775

Source: Author's data analysis, 2024

Table 1 presents the demographic distribution of the study participants [47]. This displays 355 responders, of whom 55.211% were female and 44.789% were male. The second part of the table displays the age distribution of the respondents, therefore displaying four age groups. With a percentage of 50.424% most of them fall between the age range of 31–40 years; the age group under 30 has the fewest responders, with a percentage of 23.944%. With 36.338% of respondents having a bachelor's degree, accounting for college 21.972%, the third part of the demographic table shows the educational level of most of the respondents. While the least have management with a percentage of 6.479% and jobless accounting for 15.775%, most respondents have employment position of employees with a percentage of 77.746%.

4.2. Inspection of measurement structures

Table 2. Evaluated variables and contributing factors

Items	Questionnaire	Cronbach's alpha	Factor loading	VIF
FB	Functional benefits	0.877		
FB1	Consumers perceive that using cashless payments via QR codes provides greater convenience in daily transactions.		0.859	2.324
FB2	Consumers feel that cashless payments are faster compared to traditional payment methods.		0.885	2.547
FB3	Consumers believe that cashless payments enhance security in their transactions.		0.887	2.513
FB4	Consumers perceive that adopting cashless payments aligns with current social expectations.		0.782	1.789
EB	Economic benefits	0.887		
EB1	Consumers perceive that using cashless payments reduces transaction costs		0.870	2.374
EB2	Consumers believe that cashless payments provide better financial management		0.864	2.347
EB3	Consumers feel confident that cashless payments are more cost-effective than traditional methods		0.862	2.270
EB4	Consumers perceive cashless payments as a financially advantageous option compared to other payment methods		0.862	2.317
PB	Psychological benefits	0.884		
PB1	Consumers feel that using cashless payments provides them with a sense of security		0.870	2.423
PB2	Consumers trust that cashless payment systems are reliable for their financial transactions		0.865	2.389
PB3	Consumers experience peace of mind knowing that cashless payments are safe and dependable		0.837	1.992
PB4	Consumers believe that cashless payments are widely accepted and contribute to their sense of social belonging		0.875	2.437
SB	Social benefits	0.846		
SB1	Consumers perceive that using cashless payments enhances their social status and image		0.846	1.933
SB2	Consumers feel that adopting cashless payments makes them part of a tech-savvy community		0.837	2.053
SB3	Consumers believe that cashless payments align with environmentally responsible behavior, improving their social approval		0.870	2.442
SB4	Consumers perceive social pressure to adopt cashless payments from peers, family, and society		0.753	1.546
AT	Attitude toward technology	0.869		
AT1	Consumers believe that cashless payment technology is beneficial and improves their daily transactions		0.852	2.146
AT2	Consumers perceive that using cashless payment technology is a positive experience		0.832	1.998

AT3	Consumers feel comfortable and confident when using cashless payment technology		0.838	2.014
AT4	Consumers believe that cashless payment technology is innovative and progressive		0.868	2.224
BC	Perceived behavioral control	0.883		
BC1	Consumers feel confident in their ability to use cashless payment systems effectively		0.842	2.146
BC2	Consumers believe they have sufficient knowledge to use cashless payments		0.883	2.702
BC3	Consumers perceive that using cashless payments is within their control and easy to manage		0.875	2.565
BC4	Consumers feel they can easily access and use cashless payment options when needed		0.841	2.048
SN	Subjective norms	0.882		
SN1	Consumers believe that their family and friends support the use of cashless payments		0.864	2.344
SN2	Consumers feel that most people important to them think they should use cashless payment systems		0.862	2.126
SN3	Consumers perceive social pressure to adopt cashless payments due to its increasing popularity		0.861	2.350
SN4	Consumers believe that using cashless payments helps them fit in with societal trends and expectations		0.850	2.185
GF	Perceived green finance	0.917		
GF1	Consumers believe that using cashless payments contributes to environmental sustainability		0.897	2.928
GF2	Consumers perceive that cashless payments reduce the use of physical resources like paper and metal money		0.890	3.041
GF3	Consumers feel that adopting cashless payments supports green finance initiatives		0.909	2.884
GF4	Consumers recognize that cashless payments align with environmentally responsible behavior		0.881	2.909
IC	Intention toward cashless	0.894		
IC1	Consumers intend to use cashless payments regularly in the near future		0.875	2.443
IC2	Consumers are willing to switch to cashless payment methods whenever available		0.874	2.505
IC3	Consumers plan to recommend cashless payments to others		0.854	2.166
IC4	Consumers expect to rely more on cashless payments over traditional methods		0.881	2.654

Source: Author's data analysis, 2024

The assessment of the suitability of the measurement items within each concept, as presented in Table 2, indicates that the coefficients utilized comprise Cronbach's Alpha, outer loading, and Variance Inflation Factor (VIF). The evaluation of internal consistency, as shown in Table 3, indicates that all Cronbach's Alpha values for the concepts are above 0.70, thereby affirming robust internal consistency reliability for all measures [48]. Additionally, the outer loading values

that surpass the threshold of 0.708 demonstrate the strong reliability of the reflective constructs within the scale measurement. The Variance Inflation Factor (VIF) was meticulously analyzed to identify any potential multicollinearity issues within the inner model. The examination showed no issues related to multicollinearity, with all VIF values staying under 5, aligning with the accepted standard [49].

The data analysis showed good validation evidenced by Cronbach alpha values varying between 0.846 and 0.917, factor loadings ranging between 0.753 and 0.909 and low VIF values which were below 3. The findings based on rigorous methodological processes signify the reliability and soundness of the measurement scales thereby an overall reliability to the research studies [42].

4.3. Differentiation and convergence testing

Table 3. Convergent validity - Fornell and Larcker

	CR	AVE	AT	BC	EB	FB	GF	IC	PB	SB	SN
AT	0.911	0.718	0.847								
BC	0.919	0.740	0.415	0.860							
EB	0.922	0.747	0.321	0.393	0.865						
FB	0.915	0.730	0.337	0.366	0.422	0.855					
GF	0.941	0.800	-0.205	-0.192	-0.207	-0.181	0.895				
IC	0.926	0.759	0.449	0.480	0.325	0.387	-0.206	0.871			
PB	0.920	0.743	0.328	0.416	0.380	0.434	-0.136	0.395	0.862		
SB	0.897	0.685	-0.340	-0.331	-0.239	-0.151	0.103	-0.227	-0.248	0.828	
SN	0.919	0.738	0.265	0.307	0.206	0.219	-0.101	0.377	0.254	-0.217	0.859

Source: Author's data analysis, 2024

Note: Functional benefits (FB), Economic benefits (EB), Psychological benefits (PB), Social benefits (SB), Attitude toward technology (AT), Perceived behavioral control, Subjective norms, Perceived green finance (GF), Intention toward cashless (IC), Composite reliability (CR), Average variance extracted (AVE)

Table 3 presents the results of the concurrent validity analysis, conducted using Fornell and Larcker's approach. The composite reliability, a preferred measure over Cronbach's alpha in PLS-SEM [49], exceeds the recommended threshold of 0.70. Furthermore, all standardized loadings for indicators surpass the benchmarks established by [50].

To assess construct validity, both convergent and discriminant aspects were thoroughly examined. Convergent validity, as measured by the average variance extracted (AVE), demonstrates strong evidence with values consistently exceeding 0.50, as shown in Table 3 and in accordance with Fornell and Larcker (1981).

Table 4 provides further support for discriminant validity, where the square root of each construct's AVE consistently exceeds the squared values of correlations between latent variables.

This indicates that each construct is distinct from the others, demonstrating a clear separation between the constructs.

4.4. Testing hypotheses

Table 4. Path coefficients indicate the direct effects of the conceptual framework

Hypothesis	The direct effects	Path coefficients	Standard deviation	T statistics	P-values
H1a	FB -> AT	0.185	0.058	3.195	0.001
H1b	FB -> BC	0.108	0.052	2.099	0.036
H1c	FB -> SN	0.104	0.060	1.737	0.082
H2a	EB -> AT	0.132	0.059	2.230	0.026
H2b	EB -> BC	0.160	0.054	2.986	0.003
H2c	EB -> SN	0.072	0.053	1.366	0.172
H3a	PB -> AT	0.136	0.061	2.240	0.025
H3b	PB -> BC	0.180	0.053	3.405	0.001
H3c	PB -> SN	0.144	0.068	2.113	0.035
H4a	SB -> AT	-0.247	0.061	4.027	0.000
H4b	SB -> BC	-0.141	0.050	2.816	0.005
H4c	SB -> SN	-0.149	0.066	2.255	0.024
H5	AT -> BC	0.187	0.052	3.619	0.000
H6	SN -> BC	0.125	0.054	2.312	0.021
H7	AT -> IC	0.237	0.059	4.031	0.000
H8	BC -> IC	0.269	0.058	4.658	0.000
H9	SN -> IC	0.180	0.058	3.081	0.002
H10a	GF x AT -> IC	0.109	0.048	2.271	0.023
H10b	GF x BC -> IC	0.062	0.045	1.371	0.171
H10c	GF x SN -> IC	0.113	0.053	2.125	0.034

Source: Author's data analysis, 2024

Note: Functional benefits (FB), Economic benefits (EB), Psychological benefits (PB), Social benefits (SB), Attitude toward technology (AT), Perceived behavioral control (BC), Subjective norms (SN), Perceived green finance (GF), Intention toward cashless (IC), Composite reliability (CR), Average variance extracted (AVE)

The results of the relationship between benefitted, attitudes, subjective norm, and control belief on the intention of consumers in the Vietnamese market to employ contactless payment are illustrated in Table 4. The current study also investigates the beliefs of individuals regarding green finance in order to determine its moderating effect on the relationship between the adoption of electronic payments and other findings.

Firstly, the direct effects of perceived benefits show that functional, economic, and psychological benefits positively influence attitude toward technology and perceived behavioral control, with statistically significant path coefficients (e.g., FB -> AT, 0.185; EB -> BC, 0.160). However, the effect on subjective norms is weaker for functional and economic benefits. Interestingly, social benefits

negatively affect all three variables (e.g., SB -> AT, -0.247), indicating potential resistance when social expectations drive adoption.

Secondly, examining the mediating role of attitude, behavioral control, and subjective norms, we observe that all three variables significantly impact intention toward cashless payments (IC). Attitude toward technology (0.237, p = 0.000), perceived behavioral control (0.269, p = 0.000), and subjective norms (0.180, p = 0.002) all contribute to shaping consumers' intention to adopt cashless systems. This highlights the importance of individual perceptions and social influence in forming cashless payment behaviors.

Finally, perceived green finance (GF) plays a key moderating role, strengthening the relationships between attitude (0.109, p = 0.023) and subjective norms (0.113, p = 0.034) on intention. However, its moderating effect on behavioral control is insignificant (0.062, p = 0.171), suggesting that green finance perceptions enhance the influence of attitudes and social pressures but do not impact consumers' sense of control in adopting cashless payments.

Additionally, Table 5 below details the comprehensive relationships within the study's measurement structure, providing an in-depth look at the direct and indirect effects among the measured variables.

Table 5. Path coefficients indicate the indirect effects of the conceptual framework

Specific indirect effects	Path coefficients	Standard deviation	T statistics	P-values
SN -> BC -> IC	0.034	0.016	2.151	0.032
SB -> SN -> BC	-0.019	0.012	1.547	0.122
SB -> SN -> BC -> IC	-0.005	0.003	1.483	0.138
FB -> AT -> BC -> IC	0.009	0.005	1.942	0.052
PB -> SN -> BC	0.018	0.013	1.435	0.151
FB -> SN -> IC	0.019	0.013	1.411	0.158
EB -> AT -> BC -> IC	0.007	0.004	1.700	0.089
EB -> AT -> BC	0.025	0.014	1.822	0.069
EB -> SN -> IC	0.013	0.012	1.124	0.261
FB -> BC -> IC	0.029	0.016	1.785	0.074
EB -> BC -> IC	0.043	0.017	2.515	0.012
EB -> SN -> BC -> IC	0.002	0.002	1.095	0.273
FB -> AT -> BC	0.035	0.016	2.146	0.032
PB -> SN -> BC -> IC	0.005	0.003	1.417	0.157
PB -> AT -> IC	0.032	0.017	1.853	0.064
AT -> BC -> IC	0.050	0.017	2.915	0.004
SB -> AT -> IC	-0.058	0.020	2.902	0.004
FB -> SN -> BC -> IC	0.003	0.003	1.180	0.238

PB -> AT -> BC -> IC	0.007	0.004	1.652	0.099
SB -> AT -> BC -> IC	-0.012	0.005	2.351	0.019
PB -> SN -> IC	0.026	0.017	1.554	0.120
SB -> SN -> IC	-0.027	0.014	1.880	0.060
EB -> SN -> BC	0.009	0.008	1.102	0.271
EB -> AT -> IC	0.031	0.017	1.823	0.068
FB -> AT -> IC	0.044	0.018	2.493	0.013
FB -> SN -> BC	0.013	0.011	1.177	0.239
SB -> AT -> BC	-0.046	0.017	2.651	0.008
SB -> BC -> IC	-0.038	0.016	2.386	0.017
PB -> AT -> BC	0.025	0.014	1.799	0.072
PB -> BC -> IC	0.048	0.018	2.748	0.006

Source: Author's data analysis, 2024

Note: Functional benefits (FB), Economic benefits (EB), Psychological benefits (PB), Social benefits (SB), Attitude toward technology (AT), Perceived behavioral control (BC), Subjective norms (SN), Perceived green finance (GF), Intention toward cashless (IC)

The results of the study analysis have been synthesized and visually represented in Figure 2 below. This visual representation provides a clear and concise overview of the key findings, allowing for easier interpretation and understanding of the complex relationships between the variables.

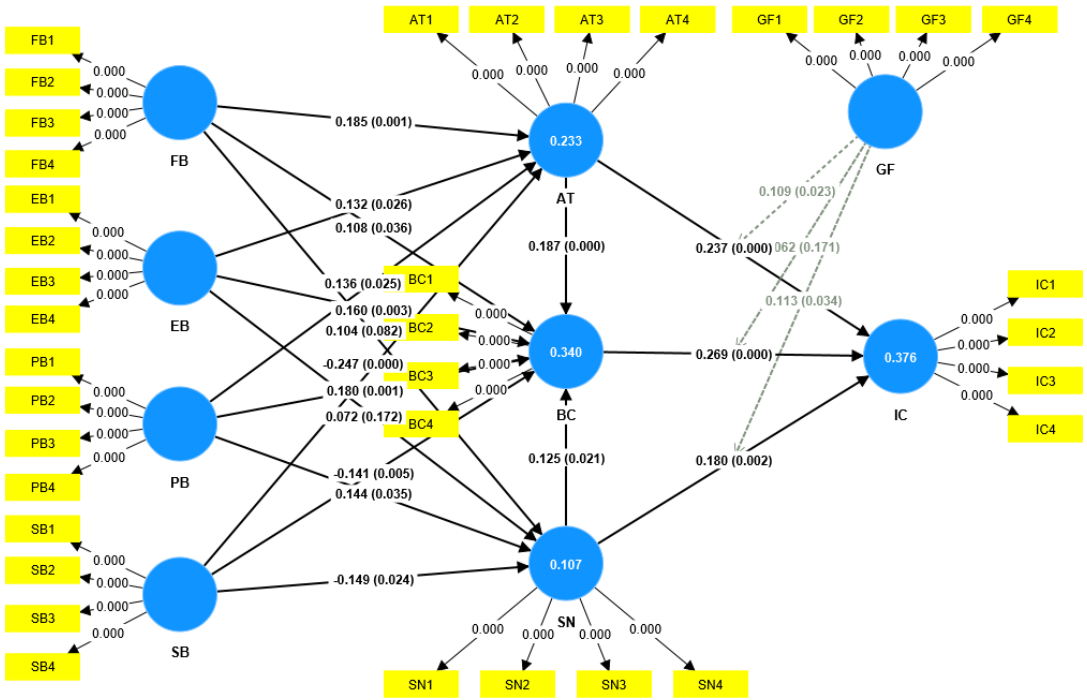

Figure 2. The path analysis of consumer's intention toward cashless

Source: Author's data analysis, 2024

Note: Functional benefits (FB), Economic benefits (EB), Psychological benefits (PB), Social benefits (SB), Attitude toward technology (AT), Perceived behavioral control (BC), Subjective norms (SN), Perceived green finance (GF), Intention toward cashless (IC)

5. DISCUSSION

Technological advancement hence sets the future of the provision of cashless banking services to be vibrant and continuously deeply innovative. Fluent with the ever-improving technological infrastructure and more customer friendly attitudes towards paying with cashless means of payment, it is predicted that the uses of these methods for operating cashless systems will become well integrated and more secure as well.

The purpose of this research was to examine Vietnamese consumers' behavioral intentions to accept cashless payment methods which introduced the moderating variable of perceived green finance by [51]. In particular, the study aimed at confirming the original hypotheses relating to perceived functional, economic, psychological, and social benefits and their impact on the essential components of the theory: attitude toward technology, perceived behavioral control, as well as subjective norms. This work also investigated the moderating role of green finance perception on the relationships between these variables and consumers' intention toward cashless payments (IC).

The study also showed that functional, economic, and psychological benefits were positively influencing attitude toward technology and perceived behavioral control [21]; the path coefficients yielded reasonably high values (FB -> AT, 0.185, $p = 0.001$; EB -> BC, 0.160, $p = 0.003$). Nevertheless, the influence on subjective norms was lower, which numbered some advantages such as functional and economic that did not reveal any statistical sign ($p > 0.05$) and, thus, have a limited functionality increase [19]. However, social benefits had negative impacts on attitude toward technology, perceived behavioral control and subjective norms, suggesting that receipt of social pressure may diminish perceived control and result in technology resistance, in this case the adoption of cashless payments [34]. In addition, attitude toward technology, perceived behavioral control, and subjective norms were positively related to intention toward cashless payments (IC) (AT -> IC = 0.237, $p = 0.000$; BC -> IC = 0.269, $p = 0.000$).

The results suggest that consumers are more likely to adopt cashless payment systems when they perceive them as convenient, cost-effective, and secure. These findings support existing theories, as benefits related to functionality, economic advantages, and psychological comfort have been shown to shape attitude and behavioral control in previous studies [23]; [17]. The negative impact of social benefits is an unexpected finding and may indicate that in certain cultural contexts, conforming to social norms might reduce an individual's personal agency in adopting new

technologies. This contrasts with other studies that suggest social pressures typically encourage adoption behaviors [34].

These results are consistent with previous studies that emphasize the importance of functional and psychological benefits in driving technology adoption [16]; [19]. The positive effects of economic benefits on both attitude and perceived behavioral control align with research showing that cost savings and financial management are key motivators for consumers [26]. However, the negative relationship between social benefits and attitude is contrary to the findings by [11], which suggested that social approval typically encourages the use of new payment methods. This difference could be culturally specific, as the Vietnamese context may prioritize individual choice over social pressure in technological adoption.

This study's limitation is its dependence on data provided by individuals, which may create biases since individuals could inaccurately describe or exaggerate their activities and attitudes [52]. Additionally, the study used non-probability sampling, limiting the generalizability of the findings to the broader Vietnamese population. Future studies could mitigate these limitations by using actual transaction data to validate reported behaviors and employing probability sampling techniques to ensure a more representative sample.

In conclusion, the study provides valuable insights into the factors influencing consumers' intentions to adopt cashless payments in Vietnam, emphasizing the importance of perceived functional, economic, and psychological benefits in shaping positive attitudes and confidence in cashless systems. The research highlights the complex role of social benefits, which in this case negatively influenced adoption, a finding that contrasts with some prior studies. Finally, the study's exploration of green finance perception as a moderating factor suggests that environmental awareness can strengthen the relationship between consumers' attitudes and their intention to adopt cashless payment systems. These findings contribute to the literature on technology adoption [23]; [17]; [33]; [34], offering both theoretical and practical implications for promoting cashless systems in environmentally conscious markets.

6. CONCLUSION

This study explored the behavioral intentions of Vietnamese consumers toward adopting cashless payment systems, focusing on the moderating role of perceived green finance (GF). The demographic distribution of participants demonstrated a diverse range of genders, ages,

education levels, and income categories, with younger and more educated individuals showing a stronger propensity for cashless payment adoption. This demographic variation highlights the broad relevance of the findings across different societal groups in Vietnam.

Analysis of the results generated by the tool disclosed the following findings. Firstly, functional, economic and psychological benefits affected both attitude toward perceived behavioral control and technology and perceived behavioral control respectively which stated that when consumer perceived cashless payments as useful as having a positive and cost effective, their attitude to technology and control over its use will also be positive. Nonetheless, subjective norms did not depend on such gains to a similar extent, meaning that perceived Norms from relevant others may not be as significant as perceptions of the benefits accrued from using the innovation.

Crucially, the study found that perceived green finance (GF) moderated the relationships between attitude toward technology and subjective norms with intention toward cashless payments (IC), but not with perceived behavioral control. This indicates that when consumers recognize the environmental benefits of cashless payments, their attitudes and the social pressure they feel to adopt the technology become stronger predictors of intention. However, this awareness does not significantly influence their perceived control over using cashless payments. The absence of a moderating effect on perceived behavioral control suggests that while green finance shapes personal and social attitudes, it does not enhance users' sense of confidence in managing the technology itself.

These findings highlight the importance of targeting environmental sustainability messaging to improve attitudes and social norms, while focusing on practical benefits to strengthen perceived control. Overall, this research provides valuable insights for businesses and policymakers aiming to promote cashless payment adoption in a market increasingly concerned with green finance.

7. IMPLICATIONS (PRACTICAL, SOCIAL, FUTURE RESEARCH)

The study reveals several practical, social, and research implications regarding behavioral intentions toward cashless payments in the Vietnamese market, considering green finance perception as a key moderating factor.

First, from a practical standpoint, the results show that the demographic profile of respondents, particularly those in the 31–40 age range (50.424%) and employed (77.746%), as well as the 55.211% female respondents, indicates that marketing strategies should be tailored specifically

toward these groups. Financial institutions and businesses can focus on emphasizing the functional and economic benefits of cashless payments, such as convenience and cost-effectiveness, to encourage adoption [9]. Furthermore, incorporating green finance messaging, which highlights the environmental benefits of cashless systems, can further appeal to environmentally conscious consumers [11]. These insights suggest that companies should segment their market and deliver targeted messages based on age, employment, and gender to maximize adoption rates.

Secondly, the study has important social implications. The weaker influence of functional and economic benefits on subjective norms and the negative effect of social benefits suggests that relying on social pressure alone may not effectively encourage cashless payment adoption. Instead, policymakers and social advocates should focus on fostering a supportive social environment that encourages voluntary adoption rather than applying direct pressure. By promoting green finance initiatives through public awareness campaigns, both the social and environmental benefits of cashless payments can be emphasized [53]. Such campaigns can help create a normative social framework where cashless payments are not only seen as convenient but also as a socially responsible and environmentally friendly choice [9]. This shift in strategy can promote broader societal acceptance of cashless systems.

Lastly, the conclusions provide implications for the subsequent research in the field. The analysis shows that attitude contributes to intention to adopt cashless payments: 0.237, $p = 0.000$; perceived behavioral control: 0.269, $p = 0.000$; and subjective norms: 0.180, $p = 0.002$. However, the boost given from the moderating effect of green finance enhances the influence of attitude and subjective norms on intention but has no change on behavioral control ($t = 0.062$, $p = 0.171$). Future studies should examine why green finance perception increases the attitudes and social pressure but has no effect on consumer self-efficacy for using cashless technologies [37]. Furthermore, more research could analyze how the awareness of green finance impacts different demographics in relation to the employment of cashless payment systems including the young or those with low levels of education to analyze how factors in the environment affect cashless payment usage among the segments [54].

These insights demonstrate the need for targeted marketing, a shift in social strategies, and further exploration of how green finance can be integrated with behavioral control factors to encourage broader adoption of cashless payment systems in the Vietnamese market.

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