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Bridging the digital divide: The impact of technophobia on online shopping intention among Hanoi's seniors

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Abstract

As Vietnam faces rapid population ageing, elderly consumers remain significantly underserved by the booming digital commerce sector. This study addresses the widening digital divide by investigating the influence of technophobia on online shopping intentions among 408 seniors in Hanoi. Integrating the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), the research utilizes Partial Least Squares Structural Equation Modelling (PLS-SEM) to analyze data collected from late 2024 to early 2025.

The findings reveal that technophobia serves as a primary psychological barrier, significantly diminishing both perceived ease of use and usefulness. A critical "Awareness–Action Paradox" was identified: while elderly users acknowledge the benefits of e-commerce, technophobia acts as a psychological "veto" that suppresses actual behavioral intention. Furthermore, subjective norms and perceived behavioral control emerge as vital predictors, emphasizing the role of family influence in the Vietnamese collectivist context. These insights provide a culture-sensitive framework for policymakers and platforms to design inclusive digital ecosystems that mitigate technology-related anxiety and effectively bridge the digital gap for Vietnam's ageing population.

Keywords: Technophobia; Elderly Consumers; Online Shopping Intention; Awareness–Action Paradox

1. Introduction

Vietnam is currently witnessing one of the most rapid rates of demographic ageing in Southeast Asia. Based on data from the General Statistics Office, the population aged 60 and older is forecast to surpass 21 million by 2038, accounting for over 20% of the nation's inhabitants, with Hanoi exhibiting some of the most significant growth in elderly residency nationwide [1]. In parallel, the Vietnamese e-commerce landscape has undergone a dramatic transformation; during the first quarter of 2025, total transaction volumes soared to VND 101.4 trillion—a 42.29% year-on-year surge—propelled by dominant platforms including Shopee, Lazada, and Tiki [2]. This intersection of an ageing society and a hyper-digitised retail market creates a critical necessity to investigate why elderly citizens continue to face disproportionate exclusion from the digital economy, effectively forming a persistent digital divide.

Despite the sector's expansion, older consumers remain a significantly underserved segment within digital commerce ecosystems. Statistics from early 2024 indicate that a mere 9.9% of internet users in Vietnam were aged 55–64, while those over 65 represented only 9.3% [3]. A primary psychological hurdle for this demographic is technophobia, which manifests as anxiety, negative cognitive bias, and avoidance behavior toward digital tools. Weil and Rosen defined technophobia through three dimensions: anxiety during or when anticipating technology use, pessimistic beliefs regarding its consequences, and a behavioral tendency to postpone or avoid digital engagement [4]. For the elderly, these barriers are often exacerbated by age-related cognitive shifts, sensory impairments, and a lack of prior professional digital exposure [5]. Furthermore, a 2024 survey in the Vietnamese context revealed that nearly 50% of

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users over 55 had encountered online fraud, significantly intensifying their reluctance to engage in digital transactions [6].

The Technology Acceptance Model (TAM) provides a robust framework for analyzing technology adoption, suggesting that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the fundamental drivers of attitude and subsequent behavioral intention [7]. Extended versions of TAM have integrated social and self-efficacy factors from the Theory of Planned Behaviour (TPB), such as Subjective Norm and Perceived Behavioural Control; these are particularly relevant for seniors who frequently depend on family support for technical navigation [8]. Additionally, the E-Commerce Consumer Acceptance Model (ECAM) expands this scope by incorporating community-level influences and perceived risk [9]. Nevertheless, these theoretical models have not been sufficiently tailored to the unique barriers faced by elderly Vietnamese users, such as socially constructed value perceptions, cultural reliance on younger generations for technical tasks, and specific anxieties regarding digital trust that transcend basic usability issues.

While global literature has extensively explored technology anxiety among older populations [5,6,15], empirical quantitative research focused specifically on Vietnam—and the Hanoi context in particular—remain notably scarce. Most existing studies originate from Western or Chinese contexts, where cultural, institutional, and technological infrastructures differ markedly. This lack of localized evidence hampers the ability of policymakers and e-commerce stakeholders to implement interventions that respect Vietnam's collectivist family dynamics, generational digital divides, and prevailing trust deficits.

To address these gaps, this study identifies the critical factors shaping the online shopping intentions of Hanoi's elderly residents by testing an integrated TAM–TPB model that treats technophobia as a core antecedent variable. Specifically, the research assesses the mediating role of attitude between cognitive perceptions and intention, while evaluating how subjective norms and perceived behavioural control independently influence the formation of purchase intent. Moreover, the study investigates how demographic variables—such as age, gender, income, and prior experience—drive statistically significant variances in adoption. Ultimately, these findings provide an empirical basis for bridging the digital divide through targeted strategies for e-commerce platforms, families, and government bodies aiming to foster the digital inclusion of Vietnam's growing elderly population.

2. Methodology

The study employed a descriptive-correlational research design using a structured questionnaire as the primary data-collection instrument. This design was selected because the study aimed to describe the existing level of technophobia and its associated attributes among elderly residents, as well as to determine the relationships among the identified constructs. A quantitative approach was adopted to enable statistical testing of the proposed integrated TAM–TPB model.

2.1. Sampling Procedure and Respondents

A non-probability sampling strategy, combining convenience and quota sampling, was implemented to recruit participants from both physical and digital spaces. Physical recruitment took place at major public venues in Hanoi, including parks, cultural centres, and senior-citizen clubs, while digital recruitment utilized Google Forms distributed via dedicated elderly community groups on Facebook and Zalo. Quota controls were strictly applied to ensure a balanced representation across age subgroups (60–70; 70–75; and >75 years), gender, and prior online shopping experience.

The target population consisted of adults aged 60 and above residing in Hanoi's districts. Out of 500 questionnaires distributed between 1 November 2024 and 10 January 2025, 408 valid responses were retained after screening for incompleteness, yielding an effective response rate of 81.6%. This sample size significantly exceeds the minimum requirements for robust multivariate analysis and Partial Least Squares Structural Equation Modelling (PLS-SEM) [11,12]. The specific data collection sites are detailed in Table 1.

Table 1 Data collection sites in Hanoi

Legend	District / Community Venue	Location
1	Hoan Kiem District Elderly Club	Hoan Kiem, Hanoi
2	Ba Dinh Cultural Centre	Ba Dinh, Hanoi
3	Dong Da Park & Senior Community	Dong Da, Hanoi
4	Hai Ba Trung Residential Communal Area	Hai Ba Trung, Hanoi
5	Tay Ho Elderly Association	Tay Ho, Hanoi
6	Online channels (Facebook / Zalo groups)	Hanoi (multiple districts)

2.2. Measurement Instrument

The survey instrument comprised 31 items across seven constructs, all adapted from validated international scales and measured on a five-point Likert scale (1: Strongly Disagree to 5: Strongly Agree). To ensure linguistic and conceptual equivalence, the items underwent a double-translation process (English–Vietnamese–English) by experts in marketing and geropsychology. The final questionnaire utilized simplified language and enlarged font sizes to accommodate the specific needs of elderly respondents. A pilot test (n=50) conducted in October 2024 confirmed high internal consistency, with all Cronbach's Alpha coefficients exceeding 0.70. The measurement constructs, items, and their respective sources are summarized in Table 2.

Table 2 Measurement items and sources

Construct	Code	Items	Source
Technophobia	NS1	I feel anxious when using online shopping services.	Yap et al. (2023); Anderberg et al. (2019)
	NS2	I fear losing information by pressing the wrong key.	
	NS3	I sometimes fear I cannot use new technological devices.	
	NS5	I would be bolder with new devices if I had more support.	
Perceived Usefulness	HI1	Online shopping saves me a great deal of time.	Davis (1989)
	HI2	Online shopping enhances my efficiency.	
	HI3	Online shopping makes purchasing easier.	
	HI4	I find online shopping useful.	
Perceived Ease of Use	DSD1	Learning to use online shopping will be easy for me.	Davis (1989); Venkatesh & Davis (2000)
	DSD3	My interaction with online shopping will be clear and understandable.	
	DSD4	I find online shopping flexible in interaction.	
	DSD5	I will easily become proficient using online shopping.	
	DSD6	I find online shopping easy to use.	
Perc. Behavioral Control	KSHV1	I have sufficient knowledge to use online shopping platforms.	Yap et al. (2023)
	KSHV2	Someone is always available to help me with technology difficulties.	

	KSHV3	My financial situation does not limit my use of technology.	
	KSHV4	When I want to, I can easily access and use technology.	
Attitude	TD1	For me, online shopping is good.	Ajzen (2006)
	TD2	For me, online shopping is valuable.	
	TD3	For me, online shopping is enjoyable.	
	TD4	For me, online shopping is appealing.	
Subjective Norm	CCQ1	I shop online because my friends/retiree group do.	Ajzen (2006)
	CCQ2	I shop online because my family members do.	
	CCQ3	Most people important to me support my online shopping.	
Intention	YD1	I intend to shop online in the future.	Pavlou & Fygenson (2006)
	YD2	I predict I will shop online frequently.	
	YD3	I plan to continue using online shopping.	

Note: Items DSD2 and NS4 were removed after measurement model assessment (outer loadings < 0.40).

2.3. Data Analysis Approach

Data analysis was performed using SPSS 26.0 and SmartPLS 3.0. Initially, descriptive statistics were generated to profile the demographic characteristics and summarize construct means. The research then followed a two-step PLS-SEM evaluation process [12]. First, the measurement model was assessed for indicator reliability (outer loadings ≥0.70), internal consistency (Composite Reliability ≥0.70), and convergent validity (AVE ≥0.50). Discriminant validity was verified using both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio (<0.85). Second, the structural model was tested to evaluate path coefficients, explanatory power (R^2), and predictive relevance (Q^2) using 5,000 bootstrap resamples. Finally, demographic differences were examined using independent-samples t-tests and one-way ANOVA with Tukey HSD post-hoc comparisons to identify significant variations across age and experience groups

3. Results and Discussion

Table 3 The demographic profile of the respondents**.**

Variable	**Frequency**	**Percentage (%)**
Gender		
Male	167	40.9
Female	241	59.1
Total	408	100.0
Age		
60–70 years	244	59.8
70–75 years	123	30.1
Above 75	41	10.0
Total	408	100.0
Monthly Income		
Below 5 million VND	61	15.0

5–10 million VND	184	45.1
10–15 million VND	103	25.2
Above 15 million VND	60	14.7
Total	408	100.0
Online Shopping Experience		
Yes	294	72.1
No	114	27.9
Total	408	100.0

Of 408 respondents, 59.1% were female and 40.9% male. By age group, 59.8% were aged 60–70, 30.1% aged 70–75, and 10.0% above 75. The modal income bracket was VND 5–10 million/month (45.1%), followed by VND 10–15 million (25.2%), below VND 5 million (15.0%), and above VND 15 million (14.7%). Overall, 72.1% had prior online shopping experience.

Table 4 The descriptive statistics of all constructs.

Construct	**N**	**Mean**	**Std. Dev.**	**Items**
Technophobia (NS)	408	3.880	0.722	4
Perceived Usefulness (HI)	408	4.089	0.721	4
Perceived Ease of Use (DSD)	408	2.954	0.688	5
Perceived Behavioral Control (KSHV)	408	3.713	0.770	4
Attitude (TD)	408	3.616	0.726	4
Subjective Norm (CCQ)	408	3.889	0.743	3
Behavioral Intention (YD)	408	3.791	0.786	3

Perceived Usefulness recorded the highest mean (M = 4.089), indicating strong recognition of the benefits of online shopping among elderly respondents. In contrast, Perceived Ease of Use had the lowest mean (M = 2.954), revealing a clear awareness–action gap. Technophobia (M = 3.880) and Subjective Norm (M = 3.889) were also notably high, while Behavioral Intention (M = 3.791) remained below the level of perceived usefulness. These findings imply that although elderly respondents acknowledge the advantages of online shopping, psychological and ease-related barriers continue to limit their intention to adopt it.

Table 5 The Fornell-Larcker criterion matrix for discriminant validity assessment.

	CCQ	**DSD**	**HI**	**KSHV**	**NS**	**TD**	**YD**
CCQ	0.837						
DSD	−0.004	0.772					
HI	0.291	0.171	0.781				
KSHV	0.453	0.114	0.258	0.791			
NS	−0.102	−0.531	−0.339	−0.118	0.787		
TD	0.402	0.303	0.524	0.399	−0.250	0.784	
YD	0.563	0.167	0.340	0.536	−0.160	0.584	0.846

All constructs demonstrated satisfactory convergent and discriminant validity. Cronbach's Alpha values ranged from 0.787 (Subjective Norm) to 0.830 (Perceived Ease of Use), Composite Reliability from 0.863 to 0.883, and AVE from 0.596 to 0.716, all exceeding the recommended thresholds [10,12]. HTMT ratios were below 0.85 (maximum = 0.732 for the YD–TD pair), and the square root of AVE for each construct exceeded its highest correlation with other constructs.

Table 6 The direct path coefficients from the structural model (bootstrapping with 5,000 resamples)

Path	β (O)	Mean (M)	STDEV	T-stat.	p	2.5%	97.5%
NS → DSD	−0.531	−0.535	0.032	16.826	0.000	−0.587	−0.464
NS → HI	−0.346	−0.348	0.051	6.823	0.000	−0.440	−0.243
DSD → HI	−0.013	−0.014	0.050	0.266	0.790*	−0.114	0.081
DSD → TD	0.220	0.220	0.040	5.522	0.000	0.114	0.298
HI → TD	0.487	0.489	0.037	13.048	0.000	0.406	0.554
TD → YD	0.360	0.360	0.039	9.317	0.000	0.280	0.431
CCQ → YD	0.302	0.302	0.039	7.781	0.000	0.226	0.378
KSHV → YD	0.255	0.258	0.041	6.296	0.000	0.175	0.333

* $p > 0.05$, non-significant. All other paths $p < 0.001$.

The results show that Technophobia had significant negative effects on both Perceived Ease of Use (β = −0.531, $p < 0.001$) and Perceived Usefulness (β = −0.346, $p < 0.001$). Perceived Ease of Use positively influenced Attitude (β = 0.220, $p < 0.001$), while Perceived Usefulness exerted a stronger positive effect on Attitude (β = 0.487, $p < 0.001$). Attitude, in turn, significantly predicted Behavioral Intention (β = 0.360, $p < 0.001$). Subjective Norm (β = 0.302, $p < 0.001$) and Perceived Behavioral Control (β = 0.255, $p < 0.001$) also showed significant positive relationships with Intention. The path from Perceived Ease of Use to Perceived Usefulness was non-significant (β = −0.013, p = 0.790). These findings indicate that cognitive perceptions and social factors play important roles in shaping elderly consumers' online shopping intention in Hanoi.

Table 7 The key indirect effects from the mediation analysis.

Indirect Path	β	T-stat.	p	2.5% CI	97.5% CI
HI → TD → YD	0.175	7.600	0.000	0.130	0.220
DSD → TD → YD	0.079	4.604	0.000	0.049	0.115
NS → HI → TD → YD	−0.061	5.020	0.000	−0.088	−0.039
NS → DSD → TD → YD	−0.042	4.411	0.000	−0.062	−0.025

Attitude fully mediated the relationships between Perceived Usefulness and Intention (β = 0.175, $p < 0.001$) and between Perceived Ease of Use and Intention (β = 0.079, $p < 0.001$). Technophobia exerted significant negative indirect effects on Intention through two main pathways: NS → HI → TD → YD (β = −0.061, $p < 0.001$) and NS → DSD → TD → YD (β = −0.042, $p < 0.001$). The combined indirect effect of Technophobia on Intention was approximately −0.103, confirming a cascading negative influence.

Table 8 The summary of hypothesis testing results**.**

H	Hypothesis	β	T-stat.	p	Decision
H1	Technophobia → Perceived Usefulness (−)	−0.346	6.823	0.000	Supported
H2	Technophobia → Perceived Ease of Use (−)	−0.531	16.826	0.000	Supported
H3	PEOU → PU (+)	−0.013	0.266	0.790	Rejected

H4	PU → Attitude (+)	0.487	13.048	0.000	Supported
H5	PEOU → Attitude (+)	0.220	5.522	0.000	Supported
H6	Attitude → Intention (+)	0.360	9.317	0.000	Supported
H7	Subjective Norm → Intention (+)	0.302	7.781	0.000	Supported
H8	PBC → Intention (+)	0.255	6.296	0.000	Supported
H9	PU → Attitude → Intention (mediation)	0.175	7.600	0.000	Supported
H10	PEOU → Attitude → Intention (mediation)	0.079	4.604	0.000	Supported

Of the ten proposed hypotheses, nine were supported. The only rejected hypothesis was H3 (Perceived Ease of Use → Perceived Usefulness).

4. Conclusion

This study investigated the factors influencing e-commerce adoption among elderly residents in Hanoi through an integrated TAM–TPB framework. The findings confirm that while traditional cognitive factors like Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) remain important, technophobia serves as a primary psychological barrier that widens the digital divide. Most proposed hypotheses were supported, with the notable exception of the link between PEOU and PU, suggesting that for Vietnamese seniors, the perceived utility of a platform is driven more by social trust and external information than by the technical simplicity of the interface itself.

A significant contribution of this research is the identification of the Awareness–Action Paradox: although elderly users acknowledge the benefits of online shopping, technophobia acts as a "psychological veto" that prevents this recognition from translating into actual behavior. Furthermore, the significant impact of Subjective Norms underscores the collectivist nature of Vietnamese culture, where family influence plays a decisive role in technology adoption. The fact that age—rather than income—differentiates intention levels further reinforces that the digital divide in Hanoi is rooted in psychological and generational barriers rather than financial constraints.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no financial or non-financial conflicts of interest in relation to this article.

Statement of ethical approval

The survey was conducted under voluntary participation with full information disclosure and data confidentiality.

Statement of informed consent

Informed consent was obtained verbally and/or via the survey introduction from all individual participants included in the study prior to data collection

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