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Impact on effectiveness usage of biometrics towards internet banking continuance usage among Malaysians

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Abstract
Purpose: This research examines the determinants influencing Malaysians' intention to continue using Internet banking (INT) services using the Technology Acceptance Model (TAM) and the E-trust Model. The study examines perceived ease of use (PEOU), usefulness (PU), privacy (PP), security (PS), effectiveness of biometrics (PEOUBT), attitude, and trust as essential constructs.
Design/methodology/approach: A survey questionnaire was circulated to gather cross-sectional data from 300 valid Malaysian respondents to understand their willingness to continue using online banking services.
Findings: The findings indicate that PEOU and usefulness have a positive impact on the attitude; security, effectiveness have a positive impact on the trust; attitude and trust have a favourable impact on this intention. However, perceived privacy is negligible to the decision to trust.
Research limitations/implications: Limitations of the study should be taken into account. One limitation of the findings is the limited sample size, which restricts their generalisability. Second, online data collection may lead to inaccurate or socially acceptable responses. Third, the measurement tools used may have reliability and validity issues. To improve future research, the study recommends expanding the sample to include users from smaller banks, using more diverse sampling methods, adopting longitudinal research, and considering additional variables like service quality.
Practical implications: This study used the TAM and E-Trust models to explore what influences individuals' intentions to use Internet banking. Trust and attitude were key variables. The implications are substantial. Strategies include improving security, the user experience, collaboration with the government, education, transparency, and personalization. Implementing these strategies can encourage more Malaysians to use online banking.
Originality/value: The study explores the elements that drive intention by providing a TAM model that is better effective for capturing the difficulties connected to Malaysians' continued pursuit of Internet banking. The report will be helpful to scholars interested in Malaysians' intentions to utilise online banking.

Keywords: Internet Banking, Model of E-Trust, TAM

Introduction

Anouze and Alamro (2019) state that technology's rapid growth has transformed the banking sector in the 21st century. Online banking has greatly improved accessibility and convenience for users, allowing them to perform financial transactions ranging from online purchases to bill

payments and loan repayments. This advancement has significantly enhanced the overall standard of living by eliminating the need for physical visits to the bank.

The widespread usage of social media has significantly contributed to the global acceptance of online banking. Social media platforms have played a vital role in exchanging information and increasing awareness about the risks of face-to-face contact and the importance of minimising in-person interactions. Health professionals and specialists have utilised social media to distribute knowledge about the potential harm caused by physical contact and communication (Naeem & Ozuem, 2021). Internet banking offers numerous benefits to customers and banking staff (Naeem & Ozuem, 2021).

Malaysians widely use Internet banking to conduct various banking operations online. In June 2000, local commercial banks obtained authorization from the Central Bank of Malaysia to offer Internet banking services. Maybank was the first bank to enable customers to perform financial transactions online. Maybank's dedicated internet banking platform, Maybank2U, can be accessed at www.maybank2U.com. According to Vimalakumaran et al. (2020), Maybank influenced approximately 45,000 Internet banking customers at that time.

Malaysia started to use Internet banking in 2002. By 2008, over 4.5 million people had enrolled in Internet banking, representing 85.5% of adult Internet users. The yearly growth rate is 40.6%. These data show that Internet banking has become among commercial banking's most preferred services by clients in Malaysia and one of the most widely used services overall. In response to this trend, online banking companies constantly upgrade and expand their services to attract and retain customers.

Literature Review

Internet banking has become widespread, with individuals relying on it for their daily financial operations. The advancement of technology in the late 1980s and early 1990s, such as virtual accessibility to banks and the introduction of services like telephone banking, ATMs, debit cards, and Internet banking, has significantly impacted the financial industry. Various authors worldwide have published literature exploring the intention to continue using Internet banking (INT), offering different perspectives based on their research frameworks and theoretical backgrounds (Hernandez & Mazzon, 2007).

Studies show that the younger generation has a highly favorable attitude and inclination towards Internet banking, as evidenced by studies on customer satisfaction and loyalty among youths in different countries (Jo & Mo, 2018). Furthermore, Patel & Patel (2018) found that perceived security, followed by PU, PEOU, and social influence, positively influence the INT. In addition, Lee & Kim (2020) emphasised the importance of trust, service quality, and the PEOU is a main determinant that positively affects customers' INT services.

Hypothesis Development

This study integrates the TAM with the Model of E-Trust (Yousafzai et al., 2009; Davis, 1989) to examine the intention of Malaysians to continue their usage of Internet banking. It incorporates variables from relevant studies (Featherman & Pavlou, 2003; Yousafzai et al., 2009; Suh & Han, 2002; Uzoka & Ndzinge, 2009; Cheng et al., 2006; Suh & Han, 2003; Bhattacherjee, 2001; Featherman & Pavlou, 2003). Previous research integrating TAM (Hameed & Nigam, 2022; Nguyen-Viet & Hutnh, 2021; Hossain et al., 2020) and the Model of E-Trust (Goudarzi, S. et al., 2015; Yousefi, N. et al., 2015) analysed the impact of several variables including PEOU, PU, PP, PS, and PEOUBT on the dependent variables. In summary, this study explores the factors affecting intention of Malaysians to continue in adopting Internet banking, considering multiple independent variables mediated by attitude and trust. Figure 1 illustrates the expected correlations among these variables.

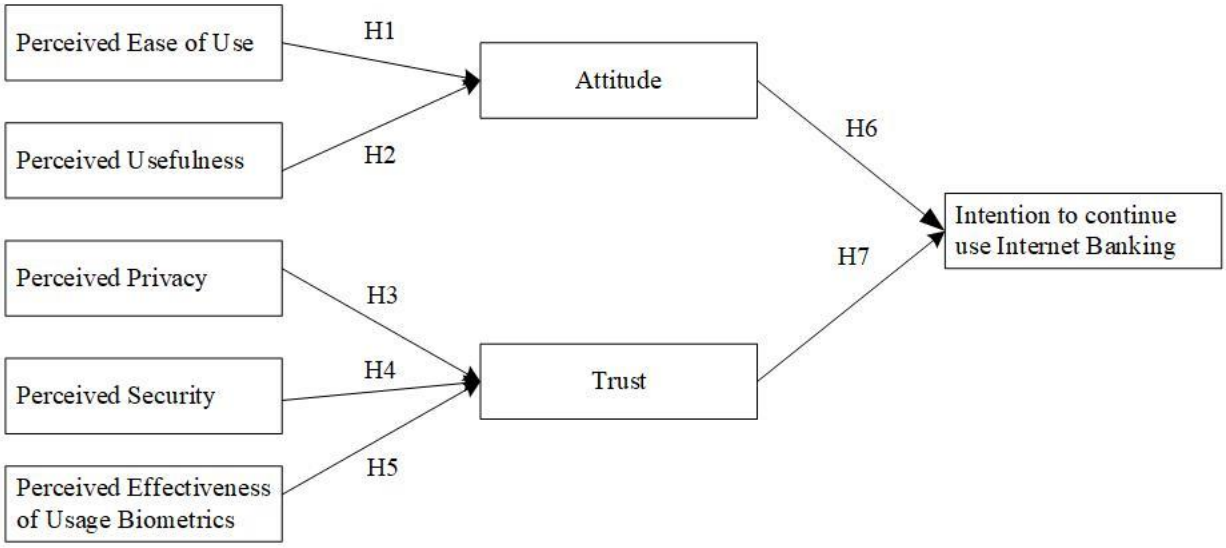

Figure 1: Research Framework

Perceived Ease of Use (PEOU)

PEOU significantly influences attitudes towards adoption of technology (Andavara et al., 2021), fostering positive attitudes and encouraging continued consumer intention and behaviour (Davis, 1989; Venkatesh & Davis, 2000). Empirical research has shown the influence of PEOU on consumer attitudes and acceptance of Internet banking (Thakur, 2018), indicating that users are more likely to embrace user-friendly technologies (Chauhan et al., 2019). In summary, users' continuous intention to utilise technology is positively influenced by their PEOU through their attitude (Chauhan et al., 2019).

H1: Perceived ease of use is positively related to the attitude among Malaysians.

Perceived Usefulness (PU)

Prior research has demonstrated that PU has a beneficial impact on consumers' ATT and intentions towards adopting internet banking (Chauhan et al., 2019). Convenience is crucial in convincing consumers to embrace 24-hour, accessible internet banking over traditional methods (Chauhan et al., 2019). Ahmad et al. (2019) suggests a positive relationship between PU, attitudes towards internet banking adoption, and user intention. Higher PU of internet banking causes more positive attitudes and increased INT services (Safari et al., 2020).

H2: Perceived usefulness is positively related to attitude among Malaysians.

Perceived Privacy (PP)

Perceived privacy refers to a person's evaluated state with limited third-party access to their personal data (Chang et al., 2018). Perceived privacy assures customers that their personal information obtained through electronic transactions is secure and cannot be shared without consent. Lack of control over personal information accessibility leads to a lack of trust among online customers (Hoffman et al., 1999). Privacy loss undermines secrecy and confidentiality, crucial factors in building trust (Bansal et al., 2016).

H3: Perceived privacy is positively related to the trust among Malaysians.

Perceived Security (PS)

PS refers to the client's view of security threat protection (Yousafzai et al., 2003). Data breaches and the potential for data leakage or theft by hackers and cybercriminals make security

a primary concern in mobile banking (Lake & Lake, 2022). Security measures encompass confidentiality, accountability, authentication, reliability, non-repudiation, and fraud detection (Lake & Lake, 2022). Security remains crucial for consumers' online banking and e-commerce platform adoption (Martínez-Navalón et al., 2023). To foster user engagement in online transactions, individuals must feel confident about the security of their personal data, such as their name, credit card details, and account passwords. Without a sense of confidence in online banking security, consumers are unlikely to embrace such systems (Martínez-Navalón et al., 2023).

H4: Perceived security is positively related to the trust among Malaysians.

Perceived Effectiveness of Usage Biometrics (PEOUBT)

Biometrics refers to individual behavioural or physical features that can be measured and used to identify or confirm someone's identity (Woodward et al., 2001). It is a widely recognised method for identification and identity confirmation (Mahier et al., 2008). Uzoka and Ndzinge (2009) propose three fundamental methods for verifying an individual's identity: possession of a card (e.g., debit card), knowledge of a password or PIN, and presence of a unique and non-shareable characteristic of the person (e.g., fingerprint). Being an integral part of the user, the biometric characteristic is immutable, irreplaceable, and irretrievable. Hence, he biometric characteristic offers greater convenience compared to portable equipment that users are required to carry. The implementation of this technology effectively eradicates specific forms of attacks that are pertinent to cards or tokens. The banking industry has gradually adopted biometric identification technologies, replacing conventional systems, to enhance security and privacy, which are significant aspects of Internet banking (Santander, 2023). The adoption of biometric authentication methods by financial institutions contributes to the advanced protection of user data, including improving or replacing traditional alphanumeric passwords (Santander, 2023).

H5: Perceived effectiveness of usage biometrics is positively related to the trust among Malaysians.

Attitude (ATT)

PEOU and PU significantly impact attitudes towards technology systems (Andavara et al., 2021), which affect the intention to embrace internet banking (Carranza et al., 2021). Positive attitudes towardss internet banking lead to a higher intention, and favourable attitudes towardss continued usage are more likely among users with positive attitudes towards using technology (Safari et al., 2020). Product details, payment mode, privacy, delivery, and overall service quality influence consumer attitudes towards internet banking (Chang et al., 2018). A positive consumer experience increases the likelihood of adopting internet banking services, and attitudes play a significant part in customers' continued intention to use the technology (Dastjerdi et al., 2019).

H6: Attitude is positively related to intention to continue using Internet banking among Malaysians.

Trust (TRU)

Consumer trust in online banking can be divided into two categories: trust in the online banking service provider (banks) and technological trust (Yousafzai et al., 2003). Institutional trust refers to financial service providers' confidence in their clients based on prior experiences or positive reputations (Merhi et al., 2019). Technological trust is the level of acceptance expressed by users towards the internet or the medium used for banking transactions (Apau et al., 2019). In relation to internet banking, trust is reinforced by factors such as application and

website security, usability, reliability, and privacy policies. These essential variables play a crucial role in fostering the adoption and success of internet banking and determining the level of trust in it. The trust of bank users has been shown to impact e-banking usage directly (Kumar et al., 2023; Abu-Taieh et al., 2022; Zhang & Kizildag, 2018).

H7: Trust is positively related to the intention to continue using Internet banking among Malaysians.

Intention to continue using Internet banking (INT)

The success of a technology is often evaluated based on the intention to utilise it (Hossain et al., 2020). Behavioural intention measures an individual's willingness to try certain behaviours, influenced by their perceptions. Continuance intention behaviour refers to repurchasing or buying advanced products after initial usage (Normalini et al., 2019). Thus, consumers who successfully purchase products online are likely to keep going in utilising Internet banking services for future online transactions.

Methods

Data Collection

The survey included 300 respondents in Malaysia, and data on PEOU, PU, PS, PP, PEOUBT, ATT, TRU, and INT was obtained through the usage of online questionnaires like Google Forms.

Measures

Appendix questionnaire items showed the questionnaire items which adopted from the past published literature. This research used a 7-likert scale for the measurement of the questionnaire items. We adopted the past literature from Yousafzai et. al (2009); Featherman and Pavlou (2003); Suh and Han (2002); Suh and Han (2003); Uzoka and Ndzinge (2009); Cheng et al., (2006); Bhattacherjee (2001); and Chung and Skibniewski (2007) for the measures of PS, PP, PEOUBT, PU, PEOU, TRU, ATT, and INT.

Sample Profile

The demographic variables of the eligible participants in this investigation are presented in Table 1. The demographic characteristics consist of eight factors: gender, age, race, academics, occupation, experience with internet usage, internet banking experience, and preferred location for internet banking usage. The gender proportion of the respondents is 45.30% male and 54.70% female. Most of the respondents are female (54.70%), 20 to 29 years old (44.30%), Malay/Bumiputera (49.34%), and students (35.30%) with degree academic qualifications (47.70%). Furthermore, most of the respondents have 6 to 10 years (41.33%) of experience in Internet usage, 6–10 years of experience (42.67%) in using Internet banking, and selected home (56.30%) as their primary place for Internet banking usage. Hence, we could assume that the significant responses came from experienced Internet banking users who gave their opinions on their motivation towards the intention to adopt Internet banking.

Table 1: Respondents' Profile

Characteristics		Frequency	Percentage (%)
Gender	Male	136	45.30
	Female	164	54.70
Age	< 20	41	13.70

Characteristics		Frequency	Percentage (%)
(years old)	20 – 29	133	44.30
	30 – 39	80	26.70
	40 – 49	28	9.30
	> 50	18	6.00
Race	Malay / Bumiputera	148	49.34
	Chinese	100	33.33
	Indian	52	17.33
Academic	SPM or equivalent	24	8.00
	STPM or equivalent	43	14.30
	Certificate / Diploma	70	23.30
	Degree	143	47.70
	Post-Graduate	20	6.70
Occupation	Clerical Staff	67	22.30
	Housewife / Husband	14	4.70
	Professional	44	14.70
	Retired / Pensioner	14	4.70
	Self-Employed	16	5.30
	Student	106	35.30
	Technical Staff	39	13.00
Experience for Internet Usage			
(Years)	1-5	22	7.33
	6-10	124	41.33
	11-15	88	29.34
	16-20	51	17.00
	21-25	14	4.67
	26-30	1	0.33
Experience in using Internet Banking			
(Years)	1-5	131	43.67
	6-10	128	42.67
	11-15	17	5.67
	16-20	11	3.67
	21-25	13	4.33
Primary Place for Internet Banking Usage			
	Home	169	56.30
	Internet Café	41	13.70
	Office	85	28.30
	University	5	1.70

Findings

Data Analysis

PLS-SEM using SmartPLS Version 4.1.0.2 (Ringle et al., 2022) was used to test the hypotheses developed in this study. PLS-SEM is a classical non-parametric method widely used in empirical research (Hair et al., 2020)

Measurement Model

First, we tested the validity of the measures used in the study for their convergence and discriminant validity. To test the convergent validity, we looked at the average variance extracted (AVE) and composite reliability for reliability. The AVEs were above 0.5, and the CRs were more outstanding than 0.7 (see Table 2), indicating that the measures were valid and reliable (Hair et al., 2022; Ramayah et al., 2018).

Discriminant validity defines the extent which a measurement does not accurately represent other variables. It is demonstrated by the poor correlations between the measure of interest and measurements of other constructs (Cheung & Lee, 2010). The square root of the AVE was more significant than the construct's inter-correlations with the other constructs in the model (Fornell & Larcker, 1981). The HTMT criteria is well recognised as the benchmark for evaluating the discriminant validity. The study adhered to the suggested HTMT threshold of 0.85 as published by Henseler et al. (2015). The results met the HTMT.85 criterion. As a result, suitable convergent and discriminant validity is present in the measurement model (see Table 3 and Table 4).

Table 2: Measurement Model

Construct	Item	Loadings	CR	AVE
Attitude	ATT1	0.859	0.909	0.713
	ATT2	0.809		
	ATT3	0.860		
	ATT4	0.850		
Intention	INT1	0.843	0.855	0.600
	INT2	0.760		
	INT4	0.588		
	INT5	0.875		
Perceived Ease of Use (PEOU)	PEOU1	0.879	0.946	0.815
	PEOU2	0.933		
	PEOU3	0.897		
	PEOU4	0.901		
Perceived Effectiveness of Usage Biometrics (PEOUBT)	PEOUBT2	0.680	0.866	0.521
	PEOUBT3	0.807		
	PEOUBT4	0.793		
	PEOUBT5	0.675		
	PEOUBT6	0.733		
	PEOUBT7	0.623		
Perceived Privacy (PP)	PP1	0.844	0.837	0.637

Construct	Item	Loadings	CR	AVE
	PP2	0.907		
	PP3	0.612		
Perceived Security (PS)	PS1	0.811	0.906	0.659
	PS2	0.816		
	PS3	0.826		
	PS4	0.793		
	PS5	0.814		
Perceived Usefulness (PU)	PU1	0.793	0.851	0.589
	PU2	0.795		
	PU3	0.812		
	PU4	0.662		
Trust	T1	0.906	0.936	0.786
	T2	0.859		
	T3	0.863		
	T4	0.917		

*Notes: PEOUBT1, INT3 and INT3_R were deleted due to low loadings.

Table 3: Fornell-Larcker Criterion

Construct	ATT	INT	PEOU	PEOUBT	PP	PS	PU	TRUST
ATT	0.844							
INT	0.715	0.775						
PEOU	0.712	0.755	0.903					
PEOUBT	0.562	0.462	0.470	0.722				
PP	0.022	0.193	0.152	0.356	0.798			
PS	0.673	0.599	0.627	0.581	0.063	0.812		
PU	0.715	0.770	0.817	0.594	0.192	0.596	0.768	
TRUST	0.680	0.697	0.616	0.679	0.071	0.788	0.661	0.887

Table 4. Discriminant Validity (HTMT)

	ATT	INT	PEOU	PEOUBT	PP	PS	PU	TRUST
ATT								
INT	0.850							
PEOU	0.793	0.879						
PEOUBT	0.665	0.586	0.532					
PP	0.084	0.228	0.121	0.431				
PS	0.775	0.709	0.699	0.682	0.116			
PU	0.851	0.997	0.960	0.738	0.234	0.711		
TRUST	0.768	0.814	0.672	0.782	0.065	0.884	0.764	

Structural Model

To evaluate the structural model, we performed a bootstrap resample of 10,000 to report the percentile bootstrap to test the hypotheses generated (Becker et al., 2023) since the data was

not multivariate normally distributed. First, we looked at the R^2 values of the trust, which was 0.704, attitude was 0.560, and intention was 0.593, indicating that 70.4% of the variance of trust, 56% of the variance in attitude and 59.3% of the variance in intention can be explained by the modelled variables.

PEOU ($\beta = 0.384$, $p < 0.01$) and PU ($\beta = 0.401$, $p < 0.01$) positively correlated with Attitude and significant. These findings support H1 and H2 were supported. PS ($\beta = 0.573$, $p < 0.01$) and PEOUBT ($\beta = 0.382$, $p < 0.01$) were positively related to trust, while PP was not significant ($\beta = -0.101$, $p > 0.01$). These findings support H4 and H5, while H3 is not supported. Finally, Trust ($\beta = 0.393$, $p < 0.01$) and Attitude ($\beta = 0.447$, $p < 0.01$) positively correlated with Intention, which supported H6 and H7 of this study (see Table 5).

Table 5: Hypotheses Testing

Hypothesis	Relationship	Std. Beta	Std. Dev.	t-value	p-value	PCI LL	PCI UL	f^2	R^2	Decision Supported
H1	PEOU → ATT	0.384	0.072	5.347	0.000	0.265	0.499	0.112		Yes
H2	PU → ATT	0.401	0.076	5.295	0.000	0.275	0.522	0.122	0.560	Yes
H3	*PP → Trust*	*-0.101*	*0.064*	*1.582*	*0.057*	*-0.169*	*0.078*	*0.029*		*No*
H4	PS → Trust	0.573	0.053	10.877	0.000	0.478	0.653	0.707	0.704	Yes
H5	PEOUBT → Trust	0.382	0.061	6.266	0.000	0.279	0.483	0.277		Yes
H6	ATT → INT	0.447	0.064	6.958	0.000	0.333	0.547	0.265	0.593	Yes
H7	Trust → INT	0.393	0.054	7.309	0.000	0.305	0.481	0.204		Yes

Discussion and Conclusion

The results of our research demonstrate a significant correlation between two main factors: the PEOU and the variable attitude. This result is consistent with prior research, including studies by Do et al. (2023), Andavara et al. (2021) and Carranza et al. (2021), all of which highlight the correlation between PEOU and attitudes towards technology adoption and online banking. Technological advancements have made Internet banking more user-friendly, increasing users' comfort and confidence. This enhanced convenience positively affects their perception and overall attitude towards Internet banking. In summary, PEOU impacts attitudes towards internet banking.

The study proves the hypothesis that PU positively influence attitude among Malaysians, in line with previous studies by Anouze & Alamro (2019b), Carranza et al. (2021), Kassim & Ramayah (2015), Khalil et al. (2010), and Safari et al. (2020). This result is consistent with the prediction of the TAM model, as noted by Hoehle et al. (2012). Recognising the practical benefits and value of online banking, like convenience, ease of use, security, and personalisation, significantly influences users' attitudes towards Internet banking. It provides

easy access to various banking services and features, enabling tasks like fund transfers, bill payments, and account management without visiting a physical bank branch. This enhances users' attitudes towards continuing to use Internet banking.

Next, from the gathered findings obtained in the prior chapter, disprove H3, which is that PP is positively related to trust among Malaysians. Our study contradicts previous findings, which state a significant positive relationship exists between the constructs (Shivani Inder, 2022; Zhang et al., 2019; Shin, 2019). However, other studies (Vimalkumar, 2021; Normalini & Ramayah, 2017) have yielded similar results, suggesting that PP is not a significant factor affecting trust in Internet banking. The inconsistency in the result can be attributed to mediating factors. Variables such as security assurances, website design, customer service, or the bank's reputation may mediate the relationship between PP and trust. Solely focusing on PP may overlook the influence of these mediating variables, leading to inconsistent findings.

Furthermore, the previous chapter's study results reveal that H4, or felt security, is positively associated with trust among Malaysians. Previous research has emphasised that security is a crucial factor in implementing internet banking compared to traditional banking (Martínez-Navalón et al., 2023). Perceived security refers to the customer's sense of security while conducting online transactions. Consequently, the finding supports the notion that perceived security is vital in developing trust among users on e-banking platforms (Salimon et al., 2018). As the security of a system increases, users' reliability and trust in e-banking platforms also increase. Several studies have demonstrated a positive relationship between PS and trust and the continuous usage of online banking. The trust of a consumer can be positively impacted by a higher perception of security levels (Sánchez, 2018).

This research also reveals there exists a substantial correlation between perceived effectiveness of biometric usage and trust among Malaysians. Studies by Ogbanufe (2023), Do et al. (2023), and Santander (2023) highlight the benefits and user willingness to trust biometrics in organisations. When biometrics are implemented in transactions, users feel more confident and willing to use the service due to enhanced privacy and security. The increasing adoption of biometrics, particularly in the banking sector, demonstrates user acceptance and the desire to protect their data (Fedorov et al., 2023). Research by Kurylo et al. (2021) further supports these findings, showing that biometric systems enhance trustworthiness among citizens. In conclusion, the perceived effectiveness of biometrics strongly influences consumer trust and intent to use banking services.

The study also has proven H6, which is the attitude, has a positive correlation with the INT. Referring to prior scholarly investigations by Mohamad et al., (2023), Liana et al. (2023), Kulondwa et al. (2020), Teka & McMillan (2020), Hernandez & Mazzon (2007), and Eriksson et al. (2005), they support the findings of this research. A positive attitude towards Internet banking will lead to the user's continuous service usage. This positive attitude, characterised by openness to new ideas, encourages the adoption of Internet banking over traditional banking methods. In addition, to build an effective and positive attitude, commercial banks should formulate a strategy where customers who use Internet banking can influence their friends to use it and then produce a positive attitude towards it. (Mohamad et al., 2023). Marketing efforts, such as advertising and promotion, have proven effective in shaping consumer attitudes towards Internet banking (Anouze & Ahmed, 2019). Thus, attitude plays a significant role in influencing Malaysians' INT.

Furthermore, the preceding chapter reveals that H7 is backed by data analysis, which shows that trust is positively associated to Malaysians' INT. Previous researches, such as Abu-Taieh et al. (2022), which highlight the positive influence of perceived trust on behavioural intention, support the results obtained. Similarly, Kumar et al. (2023) have demonstrated there exists a direct correlation between trust and the practical utilisation of mobile banking services.

Enhancing customers' trust in the service is crucial for promoting the widespread adoption of mobile banking. Research by Bashir & Madhavaiah (2014) and Zhang et al. (2018) further supports this, emphasising that perceived trust is the most influential factor in shaping positive attitudes towards mobile banking. In conclusion, a user's trust directly impacts their INT.

Theoretical Implications

The TAM and Model of E-Trust by Davis (1989) and Yousafzai, Pallister, & Foxall (2009) are implemented in the study to address the stated research questions. By including trust and attitude as additional variables. This work seeks to comprehend the elements that correlate with individuals' INT. The computed R2 value of 0.593 indicates that the constructs trust, and attitude explains about 59.3% of the observed variation in the dependent variable.

These findings align with prior research. Yousafzai, Pallister, and Foxall (2003) highlighted that an users' INT has a correlation towards trust, while Hernandez & Mazzon (2007) found that attitude influences individuals' inclination to adopt Internet banking. The consistency with previous research results increases the reliability and validity of the study's results.

Practical Implications

The implications for managers and policymakers are significant. Several strategies were identified to enhance the frequency and intention of Internet banking usage among Malaysians. These included strengthening system security through advanced technologies and proactive measures, improving the user experience by investing in intuitive interfaces and responsive customer service, fostering collaboration with the government to establish effective policies and regulations, educating individuals about the benefits and safety precautions of Internet banking, promoting transparency in terms of fees, privacy policies, and security measures, and leveraging technological advancements to personalize experiences and offer innovative financial management tools. Implementing these strategies can create an environment that encourages Malaysians to embrace the advantages of online financial services.

Limitations and Future Research

The research admits constraints to the study that need to be considered. The findings' generalizability is constrained by the very small sample size acquired. Another limitation is the reliance on online data collection, which introduces the possibility of respondents providing inaccurate or socially acceptable responses. Additionally, the measurement tools used in the study may have had shortcomings, questioning their reliability and validity.

To enhance future research, several recommendations are made. Firstly, expanding the sample population to include users from medium and small banks can improve the generalizability of the findings. Adopting a multi-stage and cluster sampling process can contribute to a more diverse and representative sample. Additionally, employing a longitudinal research methodology and considering additional variables such as service quality can provide further expansion on the research topic. Overall, while the results obtained through this research are satisfactory, recognizing and addressing these limitations and implementing the recommended improvements can enhance the comprehensiveness and precision of getting knowledge about the study subject.

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Appendix: Questionnaire Items

Constructs	Questionnaire Items	Sources
Perceived Ease of Use	It is easy for me to learn how to utilize this Internet banking site. I find it easy to get this Internet banking site to do want I want it to do. My interaction with this Internet banking site is clear and understandable. I find this Internet banking site easy to use.	(Suh & Han,2002)
Perceived Usefulness	Using this Internet banking site enhances the productivity of my banking activities. Using this Internet banking site has a critical role in supporting my banking activities. Using this Interent banking site enables me to accompish banking activities more quickly. I find this Internet banking site useful for my banking activities.	(Suh & Han,2002)
Perceived Security	While using Internet banking, I believe that the security system will confirm my identity before disclosing account information. While using Internet banking, I believe that the security system will confirm my identity before processing transactions. While using Internet banking, I believe that the security system provides a secure environment in which to bank. While using Internet banking, I believe that the security system does not allow unauthorized access to the account. While using Internet banking, I believe that the security system stops any unauthorized changes to a transaction.	(Yousafzai et al.,2009)
Perceived Privacy	Internet hackers (criminals) might take control of my checking account if I used Internet banking. What are the chances that using Internet banking will cause you to lose control over the provacy of your payment information? My signing up for and using an Internet banking lead to a loss of privacy for me because my personal information would be used without my knowledge.	(Featherman & Pavlou, 2003)
Perceived Effectiveness of Usage Biometrics	Using biometrics us more secure and reliable than traditional forms (single factor) of security. By using biometrics, authentication factor cannot be recreated (unique) By using biometric system can reduce cyber crime Using biometrics will effectively and efficiency identify Internet banking users. By using biometrics, there are no privacy concerns.	(Uzoka & Ndzinge, 2009)

Constructs	Questionnaire Items	Sources
	It is likely that the biometrics will add value to the online banking industry. By using "Mykad" as authentication token in Malaysia will reduce security fraud issues.	
Attitude	Using Internet banking is a good idea. I feel that using Internet banking is pleasat. In my opinion, it is be desirable to use Internet banking. In my view, using Internet banking is a wise idea.	(Cheng et al.,2006)
Trust	My Internet banking site is trustworthy. My Internet banking site keeps its promise and commitments. I trust my Internet banking site. I trust my bank.	(Suh & Han, 2003; Yousafzai et al., 2009)
Intention to continue using Internet banking	I intended to continue using Internet banking services rather than discontinue its use. My intentions are to continue using Internet banking services than use my any alternative means (traditional banking). If I could, I would like to discontinue my use of Internet banking services. I intend to continue using Internet banking services whenever I need it. I intend to continue using Internet banking services feature since it good.	(Bhattacherjee, 2001; Chung & Skibniewski, 2007)