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Towards Sustainable Digital Ecosystems: UTAUT Insights on myManjung App Adoption

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Abstract

In the forthcoming stages of technology application deployment for government services with regard to a developing country like Malaysia, the efficacy of e-government service initiatives hinges upon governmental support and community adoption. This investigation, grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) model, scrutinises the determinants influencing community acceptance of myManjung apps in e-government services identified in the extant literature. The model's effectiveness was assessed using a quantitative approach through 379 responses. The Statistical Package for the Social Sciences (SPSS) software examined the data. Correspondingly, the study's results suggest that the community's acceptance of myManjung apps is underpinned by Facilitating Conditions (FC), Social Influence (SI), Effort Expectancy (EE), Performance Expectancy (PE), as well as Behavioural Intentions (BI). Notably, the theoretical framework of UTAUT was expanded by integrating the construct with respect to Perceived Security (PS). This acceptance emerges as a pivotal determinant in implementing public policy education initiatives. These insights provide valuable recommendations for the Manjung Municipal Council in delineating strategies to enhance community acceptance of the myManjung apps. The results significantly advance technology adoption within public policy education and government services. Therefore, this study's findings carry noteworthy implications for technology learning, acceptance, and utilisation.

Keywords: - UTAUT, digital ecosystems, adoption

1. Introduction

The digital world has drastically changed due to rapid technological advancements, which have impacted how people and communities interact with information, services, and each other. Mobile applications have become a defining feature of this era as they offer various features that enhance everyday life (Ekşioğlu & Ural, 2022). For e-government initiatives to succeed, it is essential to have government support and citizen adoption (Taherdoost, 2018). That means government decision-makers should comprehend the factors that encourage using electronic service delivery channels as an alternative to traditional methods (Nazir & Khan, 2022). However, more research needs to be done in developing countries, especially among the municipal councils in Malaysia, to assess the factors influencing citizens to adopt e-government services. Besides that, achieving widespread adoption and

sustainable usage remains a challenge despite the potential benefits of these digital tools. For instance, Manjung Municipal Council for 2024 statistics show that 16,376 users had downloaded the myManjung apps compared to users' 28,576. It means that understanding the factors that affect the adoption of MyManjung apps among citizens within the context of sustainable digital ecosystems is essential for maximising the impact of myManjung apps and ensuring long-term viability.

The research used the Unified Theory of Acceptance and Use of Technology (UTAUT) model to assess the factors affecting e-government services adoption in the Manjung Municipal Council, where e-government services are still evolving. According to the research's findings, policymakers will better comprehend the elements influencing citizens' uptake of e-government services.

1.1 myManjung App

The Manjung Municipal Council is a thriving local statutory body in Perak, Malaysia. In response to the region's growing population and economic activities, the council has launched the myManjung app. It aims to boost community engagement and streamline communication, as shown in Fig. 1. The app is a digital platform that caters to the Manjung community and is crucial in developing a sustainable digital ecosystem in the region. It enhances people's general well-being by offering them necessary services. Digital applications such as myManjung can offer various benefits. Nevertheless, their adoption is not easily guaranteed. Users' perceptions, technological readiness, and socio-economic considerations can affect how people embrace these platforms (Ekşioğlu & Ural, 2022). Therefore, it is essential to identify the challenges and barriers to adopting device strategies that can improve user acceptance and maximise the app's impact on community engagement and sustainability.

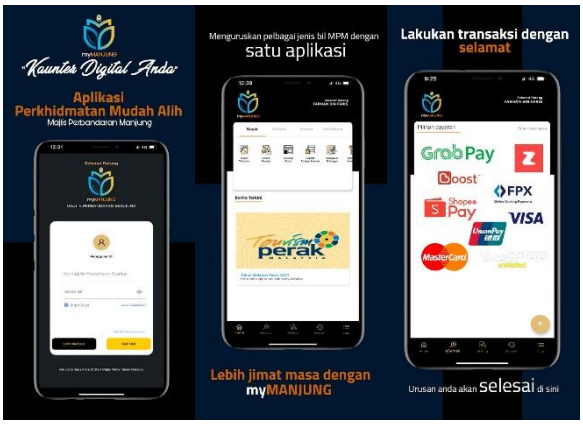

Fig. 1. myManjung apps

1.2 UTAUT

According to Verhoef et al. (2021), the implementation with regard to new technologies in organisations is driven by the growth of the e-commerce sector and emerging digital technologies, for instance, cloud computing, big data, Artificial Intelligence (AI), and robotics. Moreover, the rapid advancement of Information Communication Technology (ICT) has significantly altered how businesses operate. Additionally, Marikyan et al. (2023) study mentioned that applying these technologies in the workplace has redefined communication within and between organisations and has streamlined business processes to provide benefits such as increased productivity, improved employee well-being and greater customer satisfaction. Thus, companies spend massive amounts of money on technologies. This study uses UTAUT to explain and predict user acceptance and usage behaviour toward myManjung apps to achieve such benefits. Previous studies found that high-quality information is linked to positive organisational outcomes. Besides that, improvements in information usability and usefulness are the most influential factors in strategic benefits and institutional value (Alenezi et al. 2015; Palau-Saumell et al. 2019).

Another UTAUT framework, the Technology Acceptance Model (TAM), also explains user behaviour toward technology acceptance based on Perceived Usefulness (PU) and Perseived Ease of Use (PEOU). Nevertheless, UTAUT offers a more holistic and nuanced understanding of technology acceptance by incorporating a broader set of factors and moderating variables compared to the more focused TAM model (Kim & Kang, 2023; Sebastián et al. 2022). Note that the eight theories that form the basis of the UTAUT models are the Theory of Planned Behaviour (TBP), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Reasonable Action (TRA), the Diffusion Theory of Innovation (DOI), as well as the Social Cognitive Theory (SCT) (Berlak et al. 2021). This makes UTAUT a more robust and widely applicable framework for predicting and explaining user behaviour towards technology adoption. framework developed.

The UTAUT explains an information system user's intention to use and subsequent conduct. Subsequently, Venkatesh et al. (2003) developed this model, which incorporates social factors and human behaviours, to solve the shortcomings of the TAM. By considering both the behavioural desire to use and the actual usage of ICT, the UTAUT determines the critical factors for embracing ICT. On the other hand, Oye et al. (2014) further highlighted this model's significance in understanding user behaviour toward technology.

The theory proposes that four main factors assess an individual's purpose and use of a system. The following explanation can be used to describe these factors which are Performance Expectancy (PE), Effort Expectation (EE), Social Impact (SI) as well as Facilitating Conditions (FC):

i. PE resembles an individual's belief that the system will aid them in boosting their job performance.
ii. EE refers to the ease with which an individual believes the system is capable of helping them perform their job.
iii. SI is an individual's concern regarding the opinion of external parties.
iv. FC is individual knowledge as well as institutional resources.

For this study, another factor or predictor was added as a derivation of Extended UTAUT, namely Perceived Security (PS). It pertains to an individual's confidence level concerning the internet's ability to transmit sensitive information safely (Raffaghelli et al. 2022). Thus, the fifth predictor is as follows:

i. PS refers to individual trust and credibility toward sensitive information when using any financial management system.

Therefore, this research's main objective is to investigate the factors influencing the adoption with regard to the myManjung app. The research mainly focuses on understanding the UTAUT model's applicability in this digital ecosystem. By exploring users' perceptions and experiences, the research aims to provide actionable recommendations for enhancing app adoption and ensuring the community's continued use of digital services. Hence, it is substantial to acknowledge the factors that encourage app adoption. This strategy will optimize its functionality and guarantee the sustainability of the digital ecosystem it aims to establish.

1.3 Research Hypotheses and Design

The study employed the UTAUT model (Venkatesh et al., 2003) since its basis is due to the model's extensive empirical support as well as the theoretical soundness that it has garnered throughout the decades. The UTAUT model assumes four predictors of intentions, namely PE, EE, SI, and FC, and one extended predictor, PS. As shown in Fig. 2, the proposed research model tests the strength of hypothesised relationships and the effectiveness of predicting the community's intention to use the myManjung apps in the Manjung Municipal Council context. Each of these predictors of the UTAUT model, namely EE, FC, SI, PE, as well as PS, is discussed in the following sections.

a) Performance expectancy and behavioural intention

One notable variable in the UTAUT model is PE. This phrase encapsulates the user's belief that cutting-edge technology can enhance performance. When deciding whether to embrace a new ICT solution, a reasonable user will weigh the potential benefits and assess whether it can assist them in carrying out their tasks more efficiently (Rahadi et al., 2022; Yu, 2012). The greater the anticipated usefulness, the more inclined the user is to incorporate the new technology. Users can benefit significantly from using myManjung apps, which allow multiple merchants to accept or allow faster payments. Studies have discovered that the perceived usefulness of ICT products, including mobile entertainment content, mobile credit cards, mobile payments, and e-government services, significantly influences the intention to use them (Bakri et al., 2023; Gupta et al., 2019; Namahoot & Jantasri, 2023; Oye et al., 2014; Tomić et al., 2023; Yan et al., 2023; Zhang et al., 2023). The most pronounced effect is often observed in PE. Consequently, the hypothesis is proposed as below:

H1: Performance Expectancy (PE) significantly impacts the community's Behavioural Intentions (BI) to use myManjung apps.

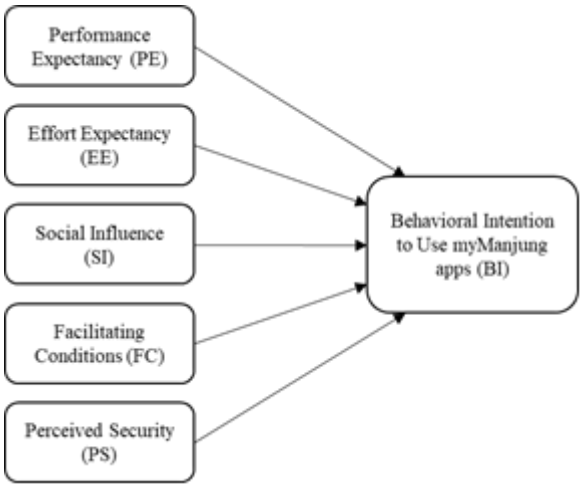

Fig. 2. Proposed research model (Venkatesh et al., 2003)

b) Effort expectancy and behavioural intention

EE refers to a crucial factor within the UTAUT model. Other than that, it determines a user's perception of the difficulty of utilising new technology, addressing the efforts essential to learn how to use it and understand its implications (Alkhwaldi & Eshoush, 2022; Rahadi et al., 2022; Wu et al., 2007). This subjective attitude is of great significance when it comes to adopting ICT products. Several research studies underline the importance of EE in adopting ICT products (Attuquayefio & Addo, 2014). It influences the intention to utilise GPS devices, e-commerce, and mobile payments. The intention and actual usage of the myManjung app by users rise as EE or ease of use decreases. Therefore, the hypothesis suggests that a simpler information system increases the likelihood of user acceptance of technology.

H2: Effort Expectancy (EE) significantly impacts the community's Behavioural Intentions (BI) to use myManjung apps.

c) Social influence and behavioural intention

Social influence resembles the influence of the views and thoughts of important people like friends, family, colleagues, and social groups on individuals' willingness to adopt myManjung app services (Alkhwaldi & Eshoush, 2022; K. J. Patel & H. J. Patel, 2018; Rahadi et al., 2022; Zhang et al., 2020). This influence is crucial in technological adoption behaviour and directly impacts BI. Many researchers have incorporated social influence into the TAM, with studies showing it to be a positive factor in

adopting new technology (Acheampong et al., 2017; K.J. Patel & H. J. Patel, 2018; Rahadi et al., 2022). The impact of social influence on technology usage is essential. However, some studies discover a minimal impact of social influence on BI (Merhi et al. 2019). Consequently, the given hypothesis is put forward:

H3: Social influence (SI) significantly impacts the community's Behavioural Intentions (BI) to use myManjung apps.

d) Facilitating conditions and behavioral intention

The term FC pertains to the degree of trust a user places in an organisation's infrastructure and operational tools to facilitate the use of a system (Venkatesh et al., 2003). Here's a rephrased version: This fosters a correlation with the notion of Perceived Behavioral Control (PBC) as outlined in the theory of perceived behavior. FC is determined by a user's evaluation of their capacity to acquire the necessary resources and assistance for utilising a system. Prior research has indicated that, similar to PE, FC serves as a substantial predictor of perceived usefulness (Almaiah et al., 2019; Dwivedi et al., 2019; Fan et al., 2020). Additionally, earlier studies have shown that FCs can foretell BI (Fan et al., 2020). Hence, it is logical to propose the hypothesis that FC is essential in the effective determination of a system.

H4: Facilitating Conditions (FC) significantly impact the community's Behavioural Intentions (BI) to use myManjung apps.

e) Derivation of extended UTAUT: perceived security and behavioural intention

PS pertains to an individual's confidence level in the internet's ability to transmit sensitive information safely (Raffaghelli et al., 2022). This confidence is particularly relevant to online banking, where confidentiality and secure financial transactions are paramount. Studies have shown that security and privacy are crucial factors in adopting myManjung apps, with many customers expressing doubt about the technology used (Gupta et al., 2019). Perceived credibility, which encompasses security and privacy, is a vital driver of users' intention to use e-government (Liu et al., 2022; Taherdoost, 2018). Ensuring secure transactions is critical for online banking as well as any e-government platform. Therefore, it is imperative to explore the hypothesis that secure transactions are indispensable to the success of myManjung app and e-government websites.

H5. Perceived Security (PS) has a significant positive impact on the community's Behavioural Intentions (BI) to use myManjung apps.

2. Methodology

2.1 Data Collection

The investigation employed empirical research to evaluate the variables influencing users' BI and their adoption of the myManjung apps. We surveyed active communities that utilise myManjung apps in order to accomplish this. Workers of the Manjung Municipal Council delivered the 23-item questionnaire, which was split into two sections, to users via WhatsApp and Telegram. The questionnaire had to be completed online, according to the participants. An effective response rate of 65.93% was obtained from the 500 total responses we received, of which 379 were found valid after eliminating invalid responses.

Table 1 displays the analysis results with regard to the respondents' demographic data, which included gender, age, ethnicity, monthly income, and usage of the myManjung app services utilising the Statistical Package for the Social Sciences (SPSS) 26.0. Likewise, the outcomes displayed that people aged 31-40 accounted for the most respondents (N=134), and frequent users accounted for a relatively high proportion (35.9%). Therefore, this sampling was reasonable.

Table 1. Demographic characteristics

Demographic Variable and Category		Frequency	%
Gender	Male	119	31.4
	Female	260	68.6
Age	19-20	16	4.2
	21-30	91	24.0
	31-40	136	35.9
	41-50	100	26.4
	50 and above	36	9.5
Ethnicity	Malay	333	87.9
	Chinese	26	6.9
	Indian	15	4.0
	Others	5	1.3
Monthly Income	Below RM1,000	25	6.6
	RM1,001-RM2,000	25	6.6
	RM2,001-RM3,000	67	17.7
	RM3,001-RM4,000	155	40.9
	Above RM4,001	107	28.2
Types of Service Usage	Assessments Rates	156	41.2
	Premises License	22	5.8
	Outlet Rental	26	6.9
	Day Hawker Permit	20	5.3
	Miscellaneous Compound	24	6.3
	Vehicle Compound	53	14.0
	Water Bill	21	5.5
	Others Bill	57	15.0

2.2 Instrument Development

In designing the questionnaire, the researchers reviewed the literature by foreign as well as domestic scholars relevant to the study and performed necessary adjustments and expansions, as shown in Table 2. Each measuring variable's item was expressed on a 5-point Likert scale. The respondents were anticipated to express their true attitudes in the following forms: strongly disagree, disagree, disagree, agree, or strongly agree.

Table 2. Measurement instruments

Construct		Items	Sources
Performance Expectancy (PE)	PE1	I can use the myManjung mobile payment platform independently without relying on the Manjung Municipal Council staff.	Bakri et al., 2023; Gupta et al., 2019; Namahoot & Jantasri, 2023; Oye et al., 2014; Tomić et al., 2023; Venkatesh et al., 2003; Yan et al., 2023; Zhang et al., 2023
	PE2	I can make payments faster if I use the myManjung mobile payment platform.	
	PE3	I can get the necessary information easily and quickly through the myManjung mobile payment platform.	
Effort Expectancy (EE)	EE1	Using the myManjung mobile payment platform is more convenient based on complete information.	Alkhwaldi & Eshoush, 2022; Rahadi et al., 2022; Venkatesh et al., 2003; Wu et al., 2007
	EE2	I know how to access and use the myManjung mobile payment platform easily.	
	EE3	I find the myManjung mobile payment platform easy to use through a clear guide.	
Social Influence (SI)	SI1	Other users often encourage me to use the myManjung mobile payment platform.	Alkhwaldi & Eshoush, 2022; K. J. Patel & H. J. Patel, 2018; Rahadi et al., 2022; Venkatesh et al., 2003; Zhang et al., 2020
	SI2	Another user informed me that learning to use the myManjung mobile payment platform is easy.	
	SI3	I was assisted by Manjung Municipal Council officers on how to use the myManjung mobile payment platform.	
Facilitating Conditions (FC)	FC1	I have enough technology equipment and time to use the myManjung mobile payment platform effectively.	Almaiah et al., 2019; Dwivedi et al., 2019; Fan et al., 2020; Venkatesh et al., 2003
	FC2	I quickly accessed the myManjung mobile payment platform when I needed it.	
	FC3	I have the skills and abilities to use the myManjung mobile payment platform effectively.	
Perceived Security (PS)	PS1	I feel safe using my credit card/debit card information through the myManjung mobile payment platform.	Gupta et al., 2019; Hossain, 2019; Liu et al., 2022; Raffaghelli et al., 2022; Taherdoost, 2018; Venkatesh et al., 2003; Widyanto et al., 2022
	PS2	I feel safe providing sensitive information about myself through the myManjung mobile payment platform.	
	PS3	The myManjung mobile payment platform is a secure system for conducting transactions.	
Behavioural Intentions (BI)	BI1	I use the myManjung mobile payment platform in the future.	Abbad, 2021; Chao, 2019; Merhi et al., 2019; Venkatesh et al., 2003; Zeebaree et al., 2022
	BI2	The myManjung mobile payment platform is practical and beneficial.	
	BI3	I am confident in using the myManjung mobile payment platform effectively.	

3. Result and Discussion

3.1 Model Measurements

The consistency of the items was evaluated via Cronbach's alpha reliability analysis (refer to Table 3). Here, the four cut-off reliability scores correspond to low (0.50 and below), moderate (0.50–0.70), high (0.70–0.90), as well as excellent (0.90 and above) (Taber, 2018). The dependability of the PE is excellent. All the variables in our model exhibit excellent dependability, and so do the other item combinations. Next, Principal Component Analysis (PCA) pairs with the varimax rotation approach were utilized to create construct validity. Upon solving the factors, the original variables' variance is calculated as a commonality. Each original variable's variation should be at least partially explained by the factor solution. Thus, for each variable, the communality value needs to be at least 0.50 (Aroian et al., 2017). This demonstrates the survey tool's construct validity in those types. Convergent validity guarantees that the constructs must be connected, as Table 3 illustrates:

Table 3. Validity and Reliability measures

Constructs	Item	λ	AVE	Cronbach's alpha
Performance Expectancy (PE)	PE1	0.79	0.66	0.93
	PE2	0.90		0.92
	PE3	0.74		0.91
Effort Expectancy (EE)	EE1	0.53	0.41	0.90
	EE2	0.73		0.90
	EE3	0.64		0.90
Social Influence (SI)	SI1	0.68	0.55	0.90
	SI2	0.75		0.90
	SI3	0.79		0.90
Facilitating Conditions (FC)	FC1	0.81	0.63	0.90
	FC2	0.79		0.90
	FC3	0.80		0.90

Perceived Security (PS)	PS1	0.78	0.60	0.90
	PS2	0.80		0.90
	PS3	0.72		0.90
Behavioural Intentions (BI)	BI1	0.70	0.55	0.90
	BI2	0.79		0.90
	BI3	0.74		0.90

3.2 Correlation, Mean, and Standard Deviation

For each study combination, the descriptive analysis of the item means, and standard deviations is displayed (Table 4). The study's average PE score is (M = 4.30, SD = 0.68), EE is (M = 4.75, SD = 0.50), SI is (M = 4.80, SD = 0.51), FC is (M = 4.80, SD = 0.52), PS is (M = 4.83, SD = 0.46). BI is (M = 4.84, SD = 0.45). The responses of all respondents are nearly "agree" for all items (PE, EE, SI, FC, PS, and BI), while the mean is nearly 4, which is a respectably high number.

Table 4. Correlation matrix that exists between independent variables

	PE	EE	SI	FC	PS	BI
PE	1					
EE	0.32	1				
SI	0.17	0.63	1			
FC	0.08	0.71	0.75	1		
PS	0.08	0.70	0.79	0.80	1	
BI	0.07	0.71	0.76	0.80	0.80	1
Mean	4.30	4.75	4.81	4.80	4.83	4.84
S.D.	0.68	0.50	0.51	0.52	0.49	0.45

3.3 Regression and Hypotheses Test

Examining the links between each component was essential to ascertain the measurement model's reliability as well as validity. The predictive variables EE, PE, SI, FC, as well as PS were regressed against the dependent variable BI. The independent variable significantly predicts BI, $F(5, 373) = 227.17$, $p < 0.001$, implying that the five factors under study greatly influence BI. Additionally, the $R^2 = 0.75$ portrays that the model can account for 75.3% of the variance in BI through its explanations.

Additionally, we examined coefficients to determine the influence with regard to each factor on the criterion variable (BI). H1 assessed whether PE significantly impacted the community's BI in using myManjung apps. The results showed that PE significantly negatively impacted BI (B = -0.54, t = -2.97, p = .00), supporting H1. On the other hand, H2 evaluated whether EE significantly impacted the community's BI in using myManjung apps. The findings demonstrated that EE positively impacted BI (B = 0.20, t = 5.84, p = .00), consequently supporting H2. H3 assessed whether SI significantly affected the community's BI when using myManjung apps. The results revealed that SI positively impacted BI (B = 0.21, t = 5.32, p = .00), thus supporting H3. Consequently, H4 examined whether FC significantly affected the community's BI in using myManjung apps. The results indicated that FC positively impacted BI (B = 0.22, t = 5.29, p = .00), supporting H4. H5 investigated whether PS significantly affected the community's BI when using myManjung apps. The findings showed that PS positively impacted BI (B = 0.25, t = 5.25, p = .00), thus supporting H5. The results are listed in Table 5.

Table 5. Regression and hypotheses test

Hypotheses	Regression Weights	B	t	p-value	Results
H_1	PE → BI	-0.05	-2.30	0.00	Supported
H_2	EE → BI	0.21	5.84	0.00	Supported
H_3	SI → BI	0.21	5.32	0.00	Supported
H_4	FC → BI	0.22	5.30	0.00	Supported
H_5	PS → BI	0.25	5.25	0.00	Supported
R	0.753				
F(5, 373)	227.173				

Note. *p < 0.05. PE, EE, SI, FC and PS

4. Conclusion

The study examined the factors impacting the adoption of myManjung apps, illuminating the influences driving community acceptance of e-government services within the Manjung Municipal Council. Rooted in the UTAUT model, the results show that SI, FC, PE, EE, as well as BI substantially shape community acceptance of myManjung apps. Furthermore, the study extends the theoretical framework with regard to UTAUT by integrating the construct of PS to capture the nuances specific to the Malaysian setting.

The study results show that PE positively influences BI, indicating that users think myManjung apps can improve their job performance. Similarly, EE demonstrates a positive relationship with BI, implying that users find myManjung apps easy to use. SI also positively impacts BI, indicating that users follow others using myManjung apps. FC correlate positively with BI, revealing that users feel confident utilising myManjung apps because of adequate organisational support. Lastly, PS positively correlates with BI, highlighting the significance of safe and secure transactions for users' acceptance of myManjung apps.

These findings carry notable implications for technology learning, acceptance, and utilisation, offering valuable recommendations for the Manjung Municipal Council. Strategies to improve community acceptance of myManjung apps include fostering awareness campaigns, providing training programs, and strengthening technical support mechanisms. As a result, the Manjung Municipal Council vigorously campaigns for myManjung apps by providing a mobile counter to each district of Manjung. Manjung municipal councils also give discounts to users who do payment transactions using the myManjung apps. To ensure myManjung app systems are updated, collaboration with an ICT consultant has been developed. Ultimately, these endeavours aim to ensure the sustained growth and development of a robust digital ecosystem in the Manjung Municipality.

This study's contributions extend beyond the realm of the Manjung Municipal Council, contributing to broader discussions surrounding technology adoption within public policy education and government services. Therefore,

establishing trust among citizens in the early stages of implementing myManjung apps, especially mobile payment, is crucial. It is crucial to guarantee security and reduce the risks linked to mobile payments for the platform's sustainability. To better understand the practical effects with respect to user privacy concerns on behavioural intention, the present study suggests an extended UTAUT framework by incorporating perceived security. These results aligned with those observed in past studies (Widyanto et al., 2022).

4.1 Limitations and Future Perspectives of Research

It should be noted that the current analysis has certain limitations, just like with any other empirical study. Firstly, while data was collected from various locations in the Manjung Municipal Council to understand the subject matter comprehensively, some Municipal Councils in the State of Perak may not have been well-represented. Moreover, most respondents were from the southwestern part of Perak district, which may have resulted in some bias. Secondly, an overwhelming majority (68.6%) of the respondents were females. Therefore, the results are mainly relevant to this gender, which is supposedly more familiar with mobile payment and technology. This could affect the accuracy and reliability with respect to the results, as the behavioural intention of males may be different from that of females. Lastly, the data was acquired relatively quickly in December 2023, and the researchers did not conduct long-term tracking.

Hence, future studies may expand upon these findings by examining additional variables, conducting longitudinal studies, and applying the UTAUT model across diverse settings worldwide. Such explorations would deepen our understanding of technology adoption dynamics and inform evidence-based policies and practices.

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