A hierarchical model to prioritization of factors to increase adoption of eWallet transactions among customers and SMEs in Klang Valley, Malaysia.

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Abstract

Purpose – The purpose of this study intends to develop a hierarchical model through prioritization factors that could increase the adoption of eWallet transactions among customers and SMEs in Klang Valley, Malaysia.

Design/methodology/approach – Mixed method approach used in the present research. Initially, interviews were conducted to solicit information about the prioritization factors that could increase the adoption of eWallet. The interview findings used for questionnaire development to rank factors with respect of the increase adoption of eWallet. The survey result was analyzed using the analytic hierarchy process (AHP), a mathematical model and is synthesized using Super Decisions Software.

Findings – The study developed a hierarchical model and can be set as a benchmark for prioritizing factor to increase adoption of eWallet among customers and SMEs in Klang Valley, Malaysia. As a result, Security came up as the most crucial prioritization factors for both the customers and SMEs.

Practical Implications – The hierarchical model developed by this study is expected to provide valuable guidance to eWallet service providers, banking industry practitioners and financial institutions and also the similar companies to optimize their resources and energy to focus on the desired and the most influential factors.

Social Implications – In the long run, an expanding mobile payment eco-system in Malaysia's landscape will contribute to the country's robust economic development. Indeed, eWallet is a convenient method of payment even for laymen too.

Originality Value – This study is a first of its kind in using AHP to prioritize the factors that could increase the adoption of eWallet transactions among customers and SMEs in Klang Valley, Malaysia. The results can be used by eWallet service providers to increase adoption of their eWallet transaction.

Keywords eWallet, Analytic Hierarchy Process, Convenience, Super App, Trust, Promotion, Security, Rewards, Acceptability.

Paper type Research paper

1. Introduction

The study aims to develop a hierarchical model using the **Analytic Hierarchy Process (AHP)** to prioritize factors influencing eWallet adoption among customers and SMEs in Klang Valley, Malaysia. It explores critical factors such as **security**, **convenience**, and **promotions** to guide service providers in enhancing adoption. The focus is on supporting the growth of cashless payments in Malaysia.

2. Literature Review

The literature explores the evolution of payment methods in Malaysia, transitioning from paper-based to mobile-based systems. It highlights the growing importance of digital wallets and how they serve as convenient payment methods for consumers. Different studies stress the need for secure and trustworthy systems, as security concerns have been a key barrier to eWallet adoption. Factors like usability, rewards, and promotions also play a significant role in customer decision-making.

3. Research Methodology

The study adopts a mixed-method approach, incorporating both qualitative and quantitative data collection methods. Interviews with SMEs and customers were conducted to gather insights on the factors affecting eWallet adoption, followed by a survey with 271 respondents. The data was analyzed using the AHP, which allowed the prioritization of factors that influence eWallet adoption. The research focused on both customer and SME perspectives, ensuring a balanced view of the factors impacting both groups.

4.0 Data analysis and findings
4.1 Data analysis

The Analytic Hierarchy Process (AHP) consists of four stages:

1. Defining the problem and gathering relevant knowledge.
2. Structuring the decision hierarchy, creating a tree-like structure with goals and factors.
3. Comparing elements at each level using Pair-Wise Comparison Matrices (PCM).
4. Using the comparison priorities to weigh and calculate the overall priority for each factor until the final priorities are established. These stages were applied to prioritize factors for increasing eWallet adoption among customers and SME entrepreneurs in Klang Valley, Malaysia.

4.1.1 Step 1: problem identification

The issue revolves around the factors that will increase the adoption of eWallet transactions among the customers and the SME entrepreneurs in the Klang Valley, Malaysia. The decision problem is to prioritise the factors that will increase the adoption of eWallet transactions. It is expected that the prioritization of the factors will assist the stakeholders and shareholders of eWallet companies to make an effective and efficient decision making.

4.1.2 Step 2: structure the hierarchy

The second stage of the study constructs a two-level AHP hierarchy. **Level 1** focuses on prioritizing factors for increasing eWallet adoption among customers and SME entrepreneurs in Klang Valley, Malaysia. **Level 2** identifies six key factors for customers and five for SMEs, derived from interviews and thematic analysis, with no further alternatives explored.

Table 4.1: The AHP customers factor and their definitions

No	Factor	Definition
1.	Convenience (C1)	Convenience refers to the simplicity and ease of using a mobile app, ensuring smooth access to information and transactions.
2.	Super App (C2)	A super app is a mobile platform that integrates multiple services, allowing users to perform various tasks like chatting, shopping, and banking from a single interface.
3.	Acceptability (C3)	Acceptability refers to how widely an eWallet is accepted by merchants and point-of-sale terminals.
4.	Promotion (C4)	Cashback, deals, and free gifts are all offered by eWallet services to encourage spending and payment via eWallet.
5	Security (C5)	Protecting customers from invasions of their privacy has an effect on their trust and satisfaction.
6.	Rewards (C6)	By offering rewards, such as loyalty points, a eWallet service entices customers to use it for daily transactions.

Table 4.2: The AHP SME entrepreneurs' factor and their definitions

| No	Factor	Definition
1.	Convenience (C1)	Convenience for merchants refers to how simple, intuitive, and user-friendly a mobile app is, with easy access to information and streamlined transaction processes.
2.	Super App (C2)	A super app is a mobile platform offering a variety of services, allowing merchants to manage administration, insurance, shipping, and financial needs all in one interface.
3.	Promotion (C3)	eWallet provides the lowest merchant discount rate (MDR) versus banks.
4.	Trust (C4)	The degree of confidence merchants have on online transactions as mode of receiving payments.
5	Security (C5)	Protecting merchants' privacy is crucial as it impacts their trust and satisfaction, requiring a balance between data collection benefits and potential psychological costs.
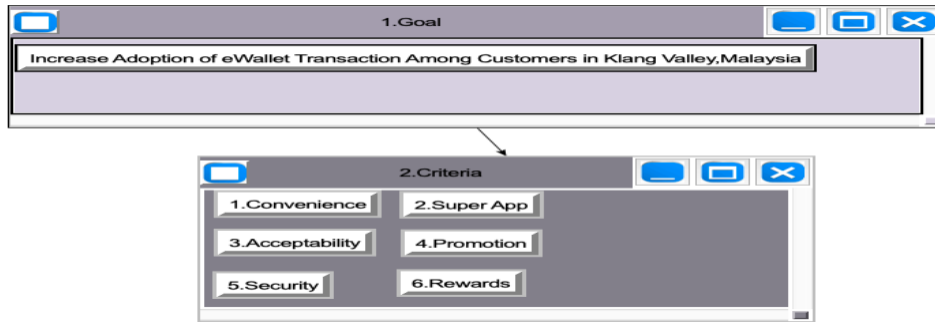
Figure 4.1: The AHP hierarchy model for the customers (adapted from the Super Decision Software)
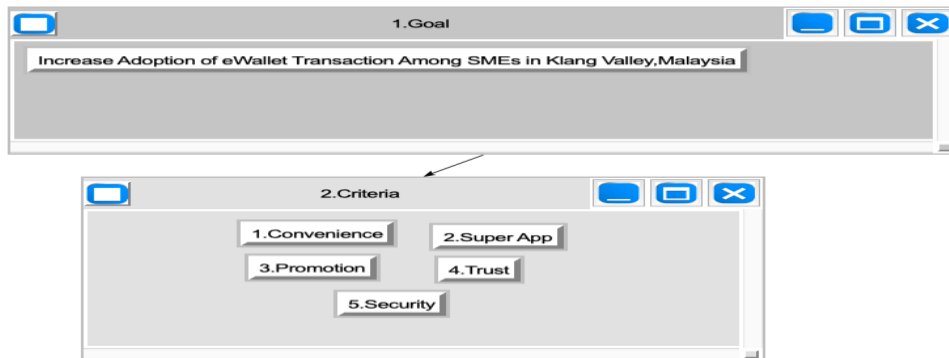

Figure 4.2: The AHP hierarchy model for the SME entrepreneurs (adapted from the Super Decision Software)

4.1.3 Step 3: construct a set of pair-wise comparison matrices (PCM)

In the third stage of the AHP process, respondents were asked to compare factors such as **Convenience**, **Super App**, **Promotion**, **Acceptability**, **Security**, and **Rewards** using Pairwise Comparison Matrices (PCMs) based on their relative importance to increasing eWallet adoption. The comparisons were made with respect to the main objective of the hierarchy, with judgments provided based on the respondents' experience and knowledge of eWallet usage in Klang Valley, Malaysia.

Pair-wise comparison of factors with respect to the overall goal						
Factors	C1	C2	C3	C4	C5	C6
Convenience (C1)	1	1/7	1/7	$a = 5$	1	5
Super App (C2)	7	1	7	7	6	1
Acceptability (C3)	7	1/7	1	7	6	1
Promotion (C4)	$b = 1/5$	1/7	1/7	1	7	1
Security (C5)	1	1/6	1/6	1/7	1	1/7
Reward (C6)	1/5	1	1	1	7	1

Figure 4.3: Pair-wise comparison of factors with respect to the overall goal

Respondents were asked to compare pairs of factors, such as **C1 (Convenience)** and **C2 (Super App)**, by determining which is more important and how critical one is relative to the other. For instance, if **C1 (Convenience)** is much more important than **C4 (Promotion)**, it was rated as 5, with reciprocity (1/5) applied for the opposite comparison. This process was followed to establish all remaining PCMs in the hierarchy.

Factors to prioritise the factors to increase adoption of eWallet transactions among customers in Klang Valley, Malaysia.						
Factors	C1	C2	C3	C4	C5	C6
Convenience (C1)	1	¼	¼	2	1	2
Super App (C2)		1	4	4	3	1
Acceptability (C3)			1	4	3	1
Promotion (C4)				1	4	1
Security (C5)					1	¼
Reward (C6)						1

Figure 4.4: A sample of a complete set of PCM

Questionnaires with Pairwise Comparison Matrices (PCMs) were distributed to selected customers and SME eWallet users in Klang Valley, representing both public/private sector managers and SME entrepreneurs. To minimize bias, judgments from these groups were aggregated. The responses from 154 customers and 117 SMEs were combined into a single PCM for each factor using the **Geometric Mean Method**. This method ensures a representative judgment for all respondents, allowing for a comprehensive analysis of the prioritized factors.

PCM to prioritise the factors to increase adoption of eWallet transactions among customers in Klang Valley, Malaysia.						
Factors	C1	C2	C3	C4	C5	C6
Convenience (C1)	1	0.938	1.088	0.969	0.807	1.07
Super App (C2)		1	0.907	0.970	0.849	1.07
Acceptability (C3)			1	0.810	0.664	1.119
Promotion (C4)				1	0.998	1.105
Security (C5)					1	1.810
Reward (C6)						1

Figure 4.5: PCMs comprising the Geometric Means of group judgments

Stage 3 involves synthesizing Pairwise Comparison Matrices (PCMs) using the Geometric Mean and calculating the Consistency Ratio (CR) to determine the priority values of factors. The **Super Decision** software was employed, and all PCMs showed a CR of less than **0.1**, indicating consistent judgments. If the CR exceeds 0.1, revisions are required, but in this study, all judgments were consistent and undisputed. The priority values were established and presented in sections 4.2 and 4.5.

4.1.4 Step 4: Establishing the priorities

This section outlines the prioritization of factors for increasing eWallet adoption among customers and SME entrepreneurs in Klang Valley, Malaysia. It addresses the factors influencing both groups separately.

4.2 Prioritization of factors that will increase the adoption of eWallet Transactions among the customers in the Klang Valley, Malaysia.

Table 4.3, Figure 4.6, Figure 4.7 and Figure 4.8 present the prioritization and priority values of this factor for increase adoption of eWallet transactions among the customers in the Klang Valley, Malaysia.
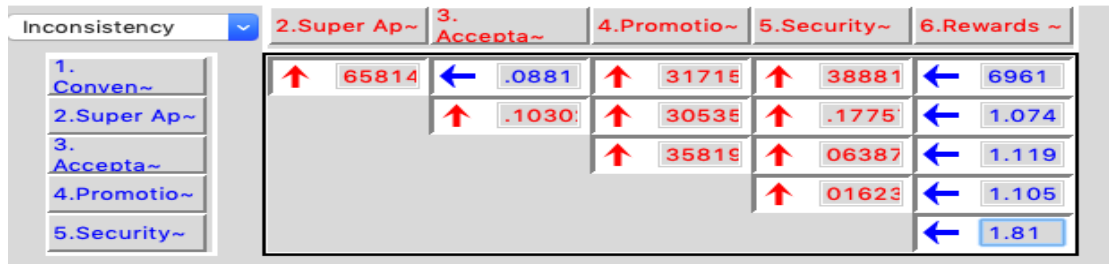
Figure 4.6: Node comparisons with respect to the increase adoption of eWallet transactions among the customers in the Klang Valley, Malaysia (Source: Super Decision software).
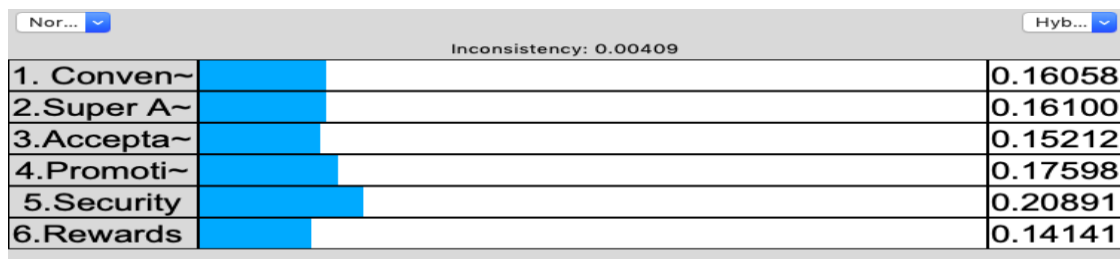

Figure 4.7: Results of the increase adoption of eWallet transactions among customers in the Klang Valley, Malaysia (Source: Super Decision software).

Table 4.3: Prioritization and priority values of the increase adoption of eWallet transactions among the customers in the Klang Valley, Malaysia.

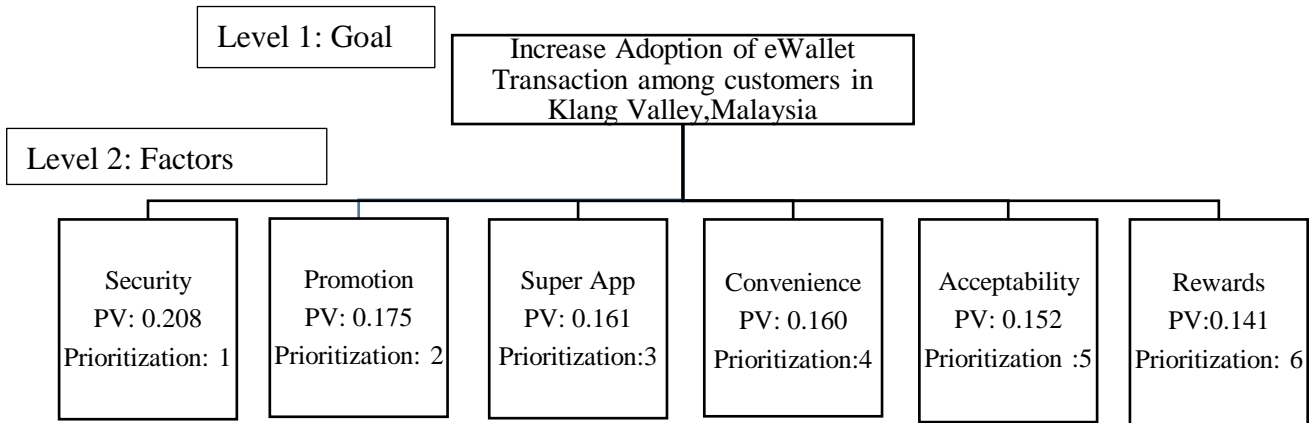| Factors (CR = 0.00409)	Priority value	Prioritization
Convenience *(C1)*	0.160	4
Super App *(C2)*	0.161	3
Acceptability *(C3)*	0.152	5
Promotion *(C4)*	0.175	2
Security (C5)	0.208	1
Rewards *(C6)*	0.141	6

Figure 4.8:AHP hierarchical model for increase adoption of eWallet transaction among customers in Klang Valley, Malaysia with respect to prioritization value (PV) and prioritization.

The analysis shows that **Security** is the top priority (0.208) for customers adopting eWallets in Klang Valley, followed by **Promotion** (0.175) and **Super App** (0.161). The least important factors are **Convenience** (0.160), **Acceptability** (0.152), and **Rewards** (0.141). The consistency of customer responses is confirmed with a CR value of 0.00409.
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4.3 Prioritization of factors that will increase the adoption of eWallet Transactions among the SME entrepreneurs in the Klang Valley, Malaysia.

Table 4.4, Figure 4.9, Figure 4.10 and Figure 4.11 present the prioritization and priority values of the increase adoption of eWallet transactions among the SME entrepreneurs in the Klang Valley, Malaysia.
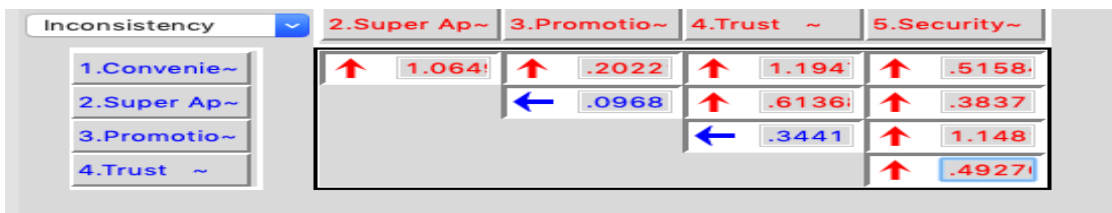

Figure 4.9 Node comparisons with respect to the increase adoption of eWallet transactions among the SME entrepreneurs in the Klang Valley, Malaysia (Source: Super Decision software).

Figure 4.10 Results of the increase adoption of eWallet transactions among the SME entrepreneurs in the Klang Valley, Malaysia (Source: Super Decision software).

Table 4.4: Prioritization and priority values of the increase adoption of eWallet transactions among the SME entrepreneurs in the Klang Valley, Malaysia.

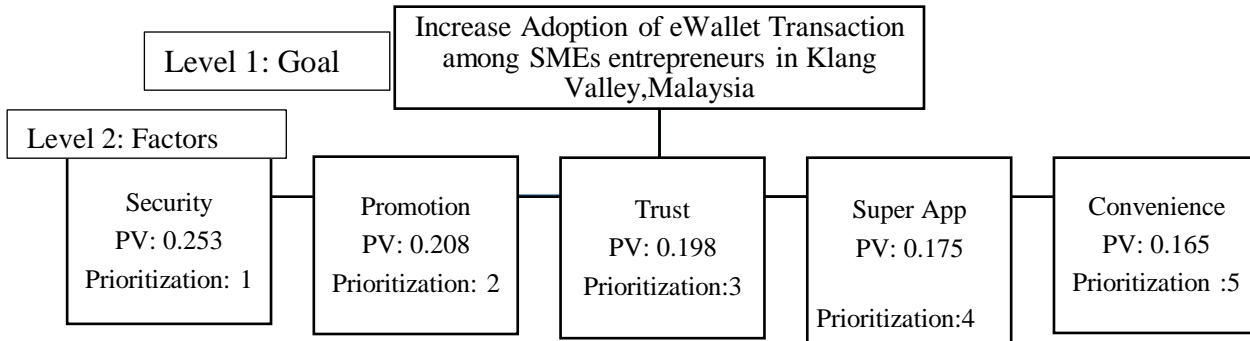| Factors (CR = 0.00409)	Priority value	Prioritization
Convenience *(C1)*	0.165	5
Super App *(C2)*	0.175	4
Promotion *(C3)*	0.208	2
Trust *(C4)*	0.198	3
Security (C5)	0.253	1

Figure 4.11: AHP hierarchical model for increase adoption of eWallet transaction among SMEs entrepreneurs in Klang Valley, Malaysia with respect to prioritization value (PV) and prioritization.

The study found that for SME entrepreneurs in Klang Valley, **Security** was the top priority (0.253), followed by **Promotion** (0.208) and **Trust** (0.198). **Super App** (0.175) and **Convenience** (0.165) were the least prioritized factors. The consistent responses (CR value of 0.01299) affirm the reliability of these rankings.

4.5 Summary on the prioritization of factors that will increase the adoption of eWallet transactions among the customers and the SME entrepreneurs in the Klang Valley, Malaysia.

The study confirms that **Security** is the top priority factor for both customers and SME entrepreneurs in adopting eWallet transactions in Klang Valley, Malaysia. Ensuring robust data security is essential for eWallet systems to prevent misuse and foster trust. eWallets must continuously update security features to maintain their effectiveness.

5. Discussion:
Both customers and SMEs prioritize security for eWallet adoption, with promotions and super apps also playing key roles in attracting users, especially younger consumers.

6. Managerial Implications:
eWallet providers should enhance security, create targeted promotions for customers and SMEs, and develop super apps to gain a competitive advantage.

7. Limitations and Future Research:
The study's sample lacks non-working groups, so future research should include diverse participants and explore government policies and security aspects of eWallet adoption.

8. Conclusion:
The hierarchical model identifies security, promotions, and super apps as key factors for optimizing eWallet adoption and supporting Malaysia's economic growth.