

# Selection of the Best E-Wallet in Klang Valley, Malaysia: An Application of the Analytic Hierarchy Process

**Rajan Amaloo and Rafikul Islam**

Department of Business Administration

International Islamic University Malaysia

Jalan Gombak, 53100 Kuala Lumpur, Malaysia

Email: [rislam@iium.edu.my](mailto:rislam@iium.edu.my)

# Introduction

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- ❑ When companies are in electronic commerce, choosing an electronic payment system (E-wallet) that will work well with the way they run their businesses, is a major concern.
- ❑ In Malaysia there are altogether 37 companies providing E-Wallet services
- ❑ This high number of availability of E-Wallets poses a decision-making problem on the selection of E-Wallet for making payment to merchants

# Objective

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- Among the 37 E-Wallet service providers, the top ones are: **Grabpay, Boost, Touch N Go, Lazada Wallet, and Samsung Pay.**
- The objective of the present work is to rank the above-mentioned E-Wallet service providers on the basis of seven criteria using the Analytic Hierarchy Process

# Literature Review

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- ❑ E-Wallets are developed as user-friendly and time-saving alternatives to traditional payment methods as a direct result of the widespread adoption of smartphones and other network technologies (Teng & Khong, 2021).
- ❑ Professionals are increasingly adopting mobile phones, while mobile payment usage has increased with time (Lai et al., 2022).
- ❑ Users of E-Wallets have the impression that the process of using the system itself is engaging, entertaining, and pleasurable, and this sense of having a positive experience leads to unforeseen wants to make purchases (Lai et al., 2022).

## Criteria to choose an E-wallet

| Criteria           | Meaning   |
|--------------------|---|
| 1. Convenience     | Convenience refers to the extent to which a customer feels that the web site is simple, intuitive, and user friendly. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)  |
|                    | Accessibility of information and simplicity of the transaction processes are important antecedents to the successful completion of transactions. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)                                     |
|                    | Enabling consumers to search for information easily and making the information readily accessible and visible. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)   |
| 2. Promotion       | Cash Back Promotion, Rebate Promotion, Promo Code, Discount, when using E-Wallets as payment option. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)   |
| 3. Security        | In the form of keeping customers safe from an invasion of their privacy, affects trust and satisfaction. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)   |
|                    | Carefully weigh the benefits of customization allowed by data collection against psychological costs to customers. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)   |
| 4. User Experience | Site makes use of the service effortless, and the small positive impact may depend on tolerance zones. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)   |
| 5. Pricing         | Transaction fees, service fees for using the E-Wallet as a payment option (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)  |
| 6. Selection       | Offer a wider range of product categories and a greater variety of products within any given category. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)   |
|                    | The customer has seamless access to the entire range of products carried by the alliance from the e-retailer's website. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd)  |
| 7. Trust           | The degree of confidence customers have in online exchanges, or in the online exchange channel.   |
|                    | Online trust includes consumer perception of how the website would deliver on expectation, how believable the website's information is, and the level of confidence in site channel. (Zaki, Chief Operating Officer, Sexcite.Sdn.Bhd) |

# Conceptual Framework



# Research Method

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- Data for the present research were obtained through distributing questionnaires among 30 experts. These experts were interviewed using the AHP structured questionnaires
- The questionnaire consists of two sections: First section - The pairwise comparisons for main criteria; Second Section: The pairwise comparisons for selected five E-wallets with respect to the seven criteria
- The participants included 12 IT managers and 18 specialists who were employed by various e-commerce enterprises

## Criteria Comparison Matrix

# Results

PCM for Criteria

|     | CON | PRO | SEC | UEX | PRI | SEL | TRU |
|-----|-----|-----|-----|-----|-----|-----|-----|
| CON | 1   | 5   | 1   | 1   | 3   | 3   | 1/5 |
| PRO | 1/5 | 1   | 1   | 1   | 1   | 1/3 | 1/5 |
| SEC | 1   | 1   | 1   | 1   | 1   | 1/3 | 1/5 |
| UEX | 1   | 1   | 1   | 1   | 1   | 1/3 | 1/5 |
| PRI | 1/3 | 1   | 1   | 1   | 1   | 1/3 | 1/5 |
| SEL | 1/3 | 3   | 3   | 3   | 3   | 1   | 1/5 |
| TRU | 5   | 5   | 5   | 5   | 5   | 5   | 1   |

2. Node comparisons with respect to The Selection of The~

Graphical Verbal Matrix Questionnaire **Direct**

|                 |         |
|-----------------|---------|
| Convenience     | 0.05083 |
| Pricing         | 0.03432 |
| Promotion       | 0.14639 |
| Security        | 0.01886 |
| Selection       | 0.2389  |
| Trust           | 0.07351 |
| User Experience | 0.43717 |

This is the direct data input area. Type in new direct data here, and/or Click the invert box invert priorities for this direct data.

NOTE: Any changes made in direct data take effect immediately and overwrite pre-existing data inputted in the other modes.

Figure 4: Node comparison with respect to the criteria The Selection of The Best E-Wallet in Klang Valley, Malaysia, highly scored criteria is User Experience with 0.43717.



PCM for Convenience

| CON | GP    | BT   | LW   | TNG  | SP   |
|-----|-------|------|------|------|------|
| GP  | 1.00  | 0.87 | 0.67 | 1.19 | 0.24 |
| BT  | 7/8   | 1.00 | 0.29 | 0.67 | 0.17 |
| LW  | 2/3   | 2/7  | 1.00 | 0.67 | 0.17 |
| TNG | 1 1/5 | 2/3  | 2/3  | 1.00 | 0.17 |
| SP  | 1/4   | 1/6  | 1/6  | 0.17 | 1.00 |

### 2. Node comparisons with respect to Convenience

Graphical
Verbal
Matrix
Questionnaire
Direct

|               |         |   |
|---------------|---------|---|
| Boost         | 0.23357 | <p>This is the direct data input area. Type in new direct data here, and/or Click the invert box invert priorities for this direct data.</p> <p><b>NOTE:</b> Any changes made in direct data take effect immediately and overwrite pre-existing data inputted in the other modes.</p> |
| Grabpay       | 0.23843 |   |
| Lazada Wallet | 0.14542 |   |
| Samsung Pay   | 0.32624 |   |
| Touch N Go    | 0.05634 |   |

Figure 10: Node Comparison with the respect to Convenience, the highest scored alternatives is Samsung Pay with 0.32624.

## PCM for Pricing

| PRI | GP       | BT       | LW       | TNG   | SP   |
|-----|----------|----------|----------|-------|------|
| GP  | 1        | 0.87     | 0.67     | 1.19  | 0.24 |
| BT  | $7/8$    | 1        | 0.67     | 1.19  | 0.24 |
| LW  | $2/3$    | $2/3$    | 1        | 1.19  | 0.24 |
| TNG | $1\ 1/5$ | $1\ 1/5$ | $1\ 1/5$ | 1     | 0.24 |
| SP  | $1/4$    | $1/4$    | $1/4$    | $1/4$ | 1.00 |

### 2. Node comparisons with respect to Pricing

Graphical
Verbal
Matrix
Questionnaire
Direct

|               |         |
|---------------|---------|
| Boost         | 0.14412 |
| Grabpay       | 0.09561 |
| Lazada Wallet | 0.14806 |
| Samsung Pay   | 0.54449 |
| Touch N Go    | 0.06772 |

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Click the invert box invert priorities for this  
direct data.

**NOTE:** Any changes made in direct data take  
effect immediately and overwrite  
pre-existing data inputted in the  
other modes.

Figure 9: Node Comparison with the respect to Pricing, the highest scored alternatives is Samsung Pay with 0.54449.

## PCM for Security

| SEC | GP  | BT   | LW   | TNG  | SP   |
|-----|-----|------|------|------|------|
| GP  | 1   | 1.07 | 0.39 | 0.95 | 0.49 |
| BT  | 1   | 1    | 0.39 | 0.95 | 0.49 |
| LW  | 2/5 | 2/5  | 1    | 0.95 | 0.49 |
| TNG | 1   | 1    | 1    | 1    | 0.49 |
| SP  | 1/2 | 1/2  | 1/2  | 1/2  | 1.00 |

### 2. Node comparisons with respect to Security

Graphical   Verbal   Matrix   Questionnaire   **Direct**

|               |         |
|---------------|---------|
| Boost         | 0.10068 |
| Grabpay       | 0.11227 |
| Lazada Wallet | 0.1427  |
| Samsung Pay   | 0.46482 |
| Touch N Go    | 0.17953 |

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Click the invert box invert priorities for this  
direct data.

NOTE: Any changes made in direct data take  
effect immediately and overwrite  
pre-existing data inputted in the  
other modes.

Figure 8: Node Comparison with the respect to Security, the highest scored alternatives is Samsung Pay with 0.46482.

## PCM for Selection

| SEL | GP  | BT   | LW   | TNG  | SP   |
|-----|-----|------|------|------|------|
| GP  | 1   | 0.78 | 0.33 | 0.98 | 0.28 |
| BT  | 7/9 | 1    | 0.33 | 0.98 | 0.28 |
| LW  | 1/3 | 1/3  | 1    | 0.98 | 0.28 |
| TNG | 1   | 1    | 1    | 1.00 | 0.28 |
| SP  | 2/7 | 2/7  | 2/7  | 2/7  | 1.00 |

### 2. Node comparisons with respect to Selection

Graphical
Verbal
Matrix
Questionnaire
Direct

|               |         |
|---------------|---------|
| Boost         | 0.19384 |
| Grabpay       | 0.10803 |
| Lazada Wallet | 0.37986 |
| Samsung Pay   | 0.26307 |
| Touch N Go    | 0.05521 |

This is the direct data input area.  
Type in new direct data here, and/or  
Click the invert box invert priorities for this  
direct data.

**NOTE:** Any changes made in direct data take  
effect immediately and overwrite  
pre-existing data inputted in the  
other modes.

Figure 5: Node comparison with respect to Selection, the highest scored alternatives is Lazada Wallet with 0.37986.

## PCM for Trust

| TRU | GP   | BT   | LW   | TNG  | SP   |
|-----|------|------|------|------|------|
| GP  | 1.00 | 0.71 | 0.70 | 0.63 | 0.58 |
| BT  | 5/7  | 1    | 0.70 | 0.63 | 0.58 |
| LW  | 2/3  | 2/3  | 1    | 0.63 | 0.58 |
| TNG | 5/8  | 5/8  | 5/8  | 1    | 0.58 |
| SP  | 4/7  | 4/7  | 4/7  | 4/7  | 1.00 |

### 2. Node comparisons with respect to Trust

Graphical
Verbal
Matrix
Questionnaire
Direct

|               |         |   |
|---------------|---------|---|
| Boost         | 0.19302 | <p>This is the direct data input area.<br/>Type in new direct data here, and/or<br/>Click the invert box invert priorities for this<br/>direct data.</p> <p><b>NOTE:</b> Any changes made in direct data take<br/>effect immediately and overwrite<br/>pre-existing data inputted in the<br/>other modes.</p> |
| Grabpay       | 0.20628 |   |
| Lazada Wallet | 0.35349 |   |
| Samsung Pay   | 0.22634 |   |
| Touch N Go    | 0.02187 |   |
|               |         |   |

Figure 6: Node Comparison with the respect to Trust, the highest scored alternatives is ~~Lazada~~ Lazada Wallet with 0.35349.

## PCM for User Experience

| UEX | GP  | BT   | LW   | TNG  | SP   |
|-----|-----|------|------|------|------|
| GP  | 1   | 0.50 | 0.33 | 1.00 | 0.22 |
| BT  | 1/2 | 1    | 0.33 | 1.00 | 0.22 |
| LW  | 1/3 | 1/3  | 1    | 1.00 | 0.22 |
| TNG | 1   | 1    | 1    | 1    | 0.22 |
| SP  | 2/9 | 2/9  | 2/9  | 2/9  | 1.00 |

### 2. Node comparisons with respect to User Experience

Graphical

Verbal

Matrix

Questionnaire

**Direct**

|               |         |
|---------------|---------|
| Boost         | 0.3723  |
| Grabpay       | 0.06787 |
| Lazada Wallet | 0.12963 |
| Samsung Pay   | 0.22225 |
| Touch N Go    | 0.20795 |

This is the direct data input area.  
Type in new direct data here, and/or  
Click the invert box invert priorities for this  
direct data.






**NOTE:** Any changes made in direct data take  
effect immediately and overwrite  
pre-existing data inputted in the  
other modes.

Figure 7: Node Comparison with the respect to User Experience, the highest scored alternatives is Boost with 0.3723.

# Synthesized Results

Overall Synthesized Alternatives.

Here are the overall synthesized priorities for the alternatives. You synthesized from the network Super Decisions Main Window: Unnamed file 0

| Name          | Graphic   | Ideals   | Normals  | Raw      |
|---------------|---|----------|----------|----------|
| Boost         |  | 0.264683 | 0.144117 | 0.072059 |
| Grabpay       |  | 0.175602 | 0.095613 | 0.047807 |
| Lazada Wallet |  | 0.271925 | 0.148060 | 0.074030 |
| Samsung Pay   |  | 1.000000 | 0.544490 | 0.272245 |
| Touch N Go    |  | 0.124371 | 0.067719 | 0.033859 |

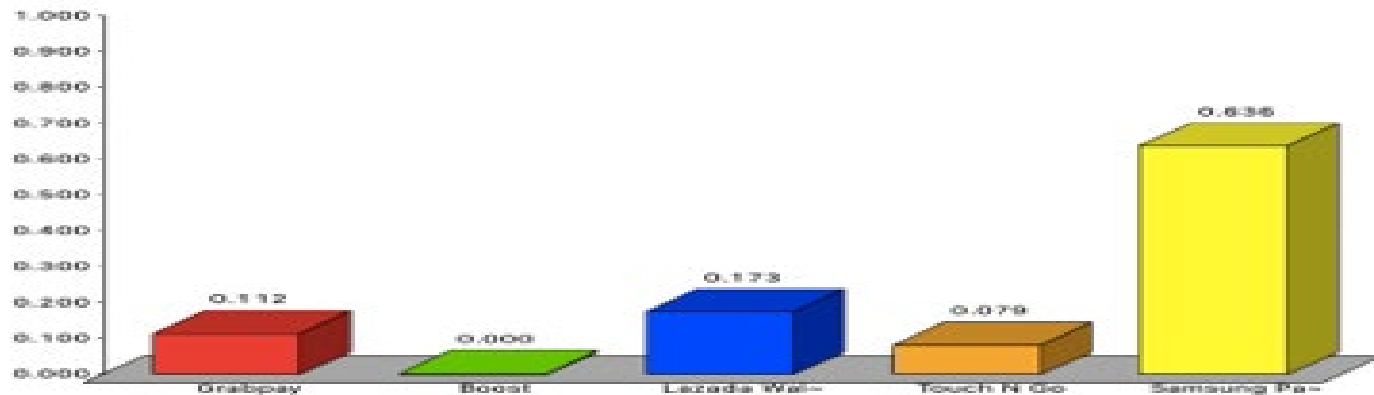


Figure 21: Overall Synthesized priorities for the alternatives goes to Samsung Pay with normal value of 0.544490.

# Alternative Rankings




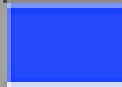

| Graphic   | Alternatives  | Total  | Normal | Ideal  | Ranking |
|---|---------------|--------|--------|--------|---------|
|  | Boost         | 0.0721 | 0.1441 | 0.2647 | 3       |
|  | Grabpay       | 0.0478 | 0.0956 | 0.1756 | 4       |
|  | Lazada Wallet | 0.0740 | 0.1481 | 0.2719 | 2       |
|  | Samsung Pay   | 0.2722 | 0.5445 | 1.0000 | 1       |
|  | Touch N Go    | 0.0339 | 0.0677 | 0.1244 | 5       |

Figure 12: Alternative ranking for the selection of the best E-Wallet in ~~Klang~~ Klang Valley, Malaysia. Rank No.1 goes to Samsung Pay.



# Conclusions

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- ❑ Usage of E-Wallets as a means for payment system is on the rise, not only in Malaysia, but in the whole world.
- ❑ By means of detailed working, this paper shows that Samsung Pay is the most desired E-Wallet in the Klang Valley of Malaysia. Note that the ranking of the selected E-Wallets is done on the basis of the seven criteria. Samsung Pay is not the best with respect to all the criteria, rather it is the best overall,
- ❑ It is concluded that the ranking is only a temporary one as the set of criteria may evolve over time and performance of the E-Wallet providers may change



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