



Prioritizing Indian E-Wallets Through the Analytic Hierarchy Process

Nikith Nannapaneni¹, Dr. A.V.S. PRASAD²

¹The Global Edge school, Hyderabad, Telangana

²SR Gayathri college, Hyderabad, Telangana

ABSTRACT: This study develops an Analytic Hierarchy Process framework for prioritizing online e-wallets in India. The framework evaluates competing criteria, including security, ease of use, transaction costs, service reliability, and merchant acceptance. E-wallet selection is organized hierarchically around the overall goal, evaluation criteria, and alternative platforms. Pairwise comparisons are used to determine criterion weights and rank the selected e-wallets, while consistency analysis assesses the reliability of the judgments. The proposed framework offers a systematic approach for comparing digital payment platforms, supporting informed consumer choices and helping fintech providers improve security, service quality, and user satisfaction. criteria weights and the final ranking of alternatives is PhonePe > Google Pay > Paytm > Amazon Pay > MobiKwik.

KEYWORDS: Analytic Hierarchy Process, E-wallets, Digital Payments, Consumer Preferences.

1. INTRODUCTION

This study evaluates five major e-wallets in India: PhonePe, Paytm, Google Pay, Amazon Pay, and MobiKwik. These platforms differ in security, ease of use, transaction costs, reliability, customer support, and merchant acceptance. Using the Analytic Hierarchy Process, the study compares and ranks these platforms according to these criteria and the preferences of Indian users.

Digital payments have expanded rapidly in India. Government initiatives to reduce cash use, rising smartphone ownership, affordable mobile data, improved internet access, and the integration of digital payments into everyday commerce have supported this growth. Consumers use e-wallets for money transfers, bill payments, mobile recharges, online shopping, and other financial activities. E-wallets have therefore become an important part of India's fintech ecosystem.

The growing number of e-wallets has made platform selection more difficult. Although most platforms offer similar basic services, they differ in security, interface design, transaction costs, speed, reliability, customer support, and merchant acceptance. Users must consider several factors simultaneously, and their priorities may differ. For example, one platform may be easy to use but costly, whereas another may offer broad merchant acceptance but lower reliability or security. E-wallet selection is therefore a multi-criteria decision rather than a simple comparison of features.

Selecting an appropriate e-wallet is important because it affects convenience, trust, satisfaction, and continued use of digital payments. A systematic comparison can help users identify the platform that best meets their needs. It can also help service providers understand the factors that strengthen their competitiveness. This study therefore uses AHP to structure the selection problem, measure the importance of each criterion, and rank the selected platforms. The following sections examine the Indian e-wallet market, the research problem, and the study objectives.

India offers a wide range of e-wallets. These include independent third-party applications such as Paytm and MobiKwik, ecosystem-based platforms such as Amazon Pay and PhonePe, and UPI-enabled services such as Google Pay. Many platforms also provide bill-payment and mobile-recharge services. They use cashback, coupons, and other promotions to attract and retain users. Users increasingly prefer platforms that provide smooth interoperability and fast transaction settlement.

Despite this growth, users continue to face several challenges, including cybersecurity risks, technical failures, unsuccessful transactions, network instability, privacy concerns, limited digital literacy, and weak grievance-redressal systems. Fast and transparent support for failed transactions is essential for continued use. Providers therefore need strong security, reliable infrastructure, and responsive customer service. These challenges demonstrate the value of systematically comparing competing platforms.



2. OBJECTIVE OF THE STUDY

The main objective of this study is to use AHP to evaluate and rank leading Indian e-wallets based on their performance and user-oriented features. It also identifies the importance of key selection factors, including payment security, ease of use, and merchant coverage, and develops a decision hierarchy based on user priorities (Jain, 2023). In addition, the study considers technological infrastructure, transaction reliability, and service accessibility as criteria for e-wallet selection. Organizing these criteria hierarchically enables users to compare platforms more systematically in India's competitive fintech market (Patel, 2025).

3. LITERATURE REVIEW

The literature on e-wallet adoption has mainly used intention-based models, such as the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology. These models explain users' general attitudes but may not fully capture the trade-offs involved in choosing between financial applications. Recent studies have therefore used the Analytical Hierarchy Process to evaluate factors such as security, cost, and promotional benefits.

Studies in emerging economies often identify security and transaction reliability as important criteria because users remain concerned about digital financial risks. However, many studies focus on specific regions and do not fully reflect India's diverse, UPI-based payment system (Suci & Faiz, 2024). Although AHP has been used to assess mobile-banking services, few studies combine technical infrastructure with the high transaction volume of India's Unified Payments Interface.

Some studies also include pandemic-related factors, such as the usefulness of contactless payments. However, few combine these factors with differences between Tier 1 and Tier 2 users. Overall, the literature shows that e-wallet choice depends on security, trust, convenience, usability, transaction speed, cost, privacy, and promotional benefits.

Although AHP and other multi-criteria methods have been used to rank e-wallets, many studies focus on particular cities, user groups, or countries. Their findings may therefore not apply directly to India's diverse digital-payment market. Indian studies also often examine adoption intention or individual cause-and-effect relationships. Fewer studies evaluate platform performance factors—such as UPI interoperability, merchant coverage, transaction reliability, and service responsiveness—within one framework.

This study addresses this gap by developing an India-specific AHP framework for comparing leading e-wallets across technical, functional, economic, and user-related criteria. It combines established adoption factors with a clear ranking method to identify the platform offering the best overall value in India's competitive digital-payment market.

AHP is useful for evaluating e-wallets because platform selection involves several competing criteria. Instead of examining adoption through one causal relationship, AHP divides the decision into a hierarchy consisting of the overall goal, evaluation criteria, sub-criteria, and alternative platforms. Decision-makers compare criteria in pairs to determine their relative importance and then evaluate each alternative. This process clarifies trade-offs and provides a transparent basis for ranking platforms.

Previous studies have applied AHP and related multi-criteria methods to digital-payment selection. Jamli et al. developed an AHP model for e-wallet selection using usage, money transfer, money withdrawal, rewards, security, and user-friendliness as the main criteria. Security was the most important criterion, and Touch 'n Go was the preferred alternative. Similarly, an Indonesian study evaluated e-wallets based on price and promotion, ease of use, features, merchant availability, and security. It showed how consumer preferences can be used to rank competing wallets (Saripudin et al., 2023). Another AHP study of Indonesian micro, small, and medium-sized enterprises found that security was the highest-ranked criterion, while merchant-related factors received the lowest priority (Suci & Faiz, 2024).

AHP has also been applied to broader digital-finance services. Nabila et al. used AHP to rank acceptance factors for electronic wallets and digital cash. Ease of use was the most important factor for both technologies, while speed and cost-benefit were important secondary factors (Nabila et al., 2018). Gupta et al. used Fuzzy AHP to study payments-bank adoption, focusing on ease of use, facilitating conditions, and personalization. Their study shows how fuzzy AHP can address uncertainty in consumer judgments (Gupta et al., 2023). Other AHP-based and multi-criteria studies have evaluated electronic-banking and mobile-banking services using demographic, technical, service-related, and intention-based factors.

Although these studies examine different contexts, their hierarchical structures are similar. The first level defines the decision objective, such as selecting the most suitable wallet or identifying adoption factors. The second level includes broad criteria, such as security, usability, cost, functionality, service quality, and accessibility. Some studies add sub-criteria, including transaction



speed, withdrawal convenience, rewards, merchant coverage, interoperability, and grievance redressal. The final level contains the alternatives, such as wallet brands, payment banks, or mobile-banking applications.

The present study adapts this structure to the Indian e-wallet market. The hierarchy places e-wallet selection at the highest level, followed by five criteria: security, ease of use, transaction cost, service reliability, and merchant acceptance. These criteria reflect factors commonly emphasized in e-wallet and digital-payment research while also capturing platform performance. Security and ease of use represent perceived risk and usability; transaction cost reflects economic value; service reliability measures the quality and continuity of transaction processing; and merchant acceptance reflects the practical reach of each platform. The competing e-wallets form the lowest level and are evaluated against each criterion.

This application of AHP contributes to the literature in three ways. First, it compares complete e-wallet platforms rather than isolated adoption factors. Second, it combines behavioural factors, such as trust and usability, with operational factors, including reliability, cost, and merchant reach. Third, it identifies the platform with the most balanced performance across several dimensions rather than ranking platforms based on a single attribute. AHP therefore provides a systematic method for examining e-wallet choice in India's diverse and competitive digital-payment market.

Despite extensive multi-criteria research in digital finance, evidence on the prioritization of competing e-wallets in India remains limited. Existing studies often examine consumer adoption factors separately, with limited agreement on how these factors affect the competitive position of major Indian platforms (Gupta et al., 2021). Although prior research has examined adoption factors for Indian payments banks (Goel et al., 2019) and general mobile-wallet use, few studies have measured the relative importance of these criteria when comparing competing e-wallets.

AHP addresses this gap by providing a structured method for assigning weights to decision criteria and incorporating expert judgments. However, Indian studies comparing mobile-wallet providers have mainly used fuzzy TOPSIS or other hybrid multi-criteria methods rather than a clear AHP hierarchy. The main research gap is therefore the lack of an AHP-based model that both prioritizes key selection criteria and ranks competing e-wallets according to Indian consumer needs.

To address this gap, the present study develops and evaluates an integrated hierarchy for Indian e-wallet selection. The model measures the importance of security, ease of use, transaction cost, service reliability, and merchant acceptance, while also ranking competing e-wallet platforms according to these criteria.

4.METHODOLOGY

The Analytical Hierarchy Process (AHP) is one of the multi-criteria-decision methods(MCDM) and the decision-support framework developed by (Saaty.TL). Its main aim is to assess the relative importance of a defined set of alternatives using a ratio scale, which is based on the decision-maker's judgment. This methodology highlights the importance of the intuitive assessments made by the decision-maker and the need for consistency when comparing alternatives during the decision-making process. Since decision-makers depend on their expertise and experience to make judgments and ultimately decisions, the AHP framework is well-suited to their behavioural tendencies. A significant benefit of this method is its capacity to systematically arrange both measurable and non-measurable factors, providing a structured yet relatively simple approach to addressing decision-making issues. Additionally, by logically breaking down a problem from a broader viewpoint to more specific details, one can create links between the smaller components and the larger context through straightforward paired comparison judgments. (Saaty.TL) outlined the following steps for implementing the AHP:

1. Define the problem and determine its goal.
2. Structure the hierarchy from the top (the objectives from a decision-maker's viewpoint) through the intermediate levels (criteria on which sub-sequent levels depend) to the lowest level which usually contains the list of alternatives.
3. Construct a set of pair-wise comparison matrices (size $n \times n$) for each of the lower levels with one matrix for each element in the level immediately above by using the relative scale measurement shown in Table 1. The pair-wise comparisons are done in terms of which element dominates the other.
4. There are $n(n-1)/2$ judgments required to develop the set of matrices in step 3. Reciprocals are automatically assigned in each pair-wise comparison.
5. Hierarchical synthesis is now used to weight the eigenvectors by the weights of the criteria and the sum is taken over all weighted eigenvector entries corresponding to those in the next lower level of the hierarchy.

6. Having made all the pair-wise comparisons, the consistency is determined by using the eigenvalue, $\lambda_{\max}$, to calculate the consistency index, CI as follows: $CI = (\lambda_{\max} - n) / (n - 1)$, where n is the matrix size. Judgment consistency can be checked by taking the consistency ratio (CR) of CI with the appropriate value in Table 2. The CR is acceptable, if it does not exceed 0.10. If it is more, the judgment matrix is inconsistent. To obtain a consistent matrix, judgments should be reviewed and improved.
7. Steps 3-6 are performed for all levels in the hierarchy.

Table- 1: The saaty's scale of relative importance

Relative importance	Definition	Description
1	Equally importance	Two factors equally influence the objective
3	Moderate importance	Experience and judgement slightly favour one factor over another
5	Strong importance	Experience and judgement strongly favour one factor over another
7	Very strong importance	One decision factor is strongly favoured over another, and its supremacy is established in practice
9	Extreme importance	The evidence favouring one decision factor over another is of the highest possible orders of validity
2,4,6 and 8	Intermediate values between adjacent values	When compromise is required

Fortunately, there is no need to implement the steps manually. Professional commercial software, Expert Choice, developed by Expert Choice, is available in the market which simplifies the implementation of the AHP's steps and automates many of its computations.

Table 2: Average random consistency (RI)

Size of matrix	1	2	3	4	5	6	7	8	9	10
Random consistency	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

In this study, we identified five critical criteria for evaluation, which were considered essential for the assessment. The chosen criteria are elaborated upon below. In this study, primary data were gathered using questionnaires that were distributed to customers aged between 20 and 50 in Hyderabad, with the responses represented as pairwise comparison matrices. A structured questionnaire was utilized to aid in the data collection process for the study. The design of the questionnaires was meticulously developed to guarantee the utmost accuracy in the information gathered and to improve the understanding of the respondents. Following this, the Analytic Hierarchy Process (AHP) was implemented on the collected data to achieve the goals of the present research. In this study, we identified five critical criteria for evaluation, which were considered essential for the assessment. The chosen criteria are elaborated upon below.

The evaluation framework uses five criteria: security, ease of use, transaction cost, service reliability, and merchant acceptance. Together, these criteria represent the main security, usability, financial, accessibility, and service factors that influence e-wallet choice.

Security is important because e-wallets store users' personal and financial information. This criterion covers user authentication, transaction verification, data protection, privacy, fraud prevention, and the security of stored funds. Perceived security influences

trust, satisfaction, and continued use, especially when users are concerned about unauthorized access or failed transactions. Strong security measures can reduce perceived risk and encourage continued adoption.

Ease of use refers to how easily users can understand and operate an e-wallet. It includes simple registration, an intuitive interface, clear navigation, convenient payment procedures, and easy balance management. Users are more likely to adopt platforms that require little technical knowledge and minimize complexity. In the AHP model, this criterion represents usability and accessibility.

Transaction cost refers to the expenses associated with using an e-wallet. These may include transfer fees, withdrawal charges, service fees, minimum-balance requirements, and other costs paid by users or merchants. Lower costs can increase an e-wallet's perceived value, whereas high or unexpected charges may discourage use. Users generally assess payment services by comparing their benefits with the costs involved.

Service reliability refers to an e-wallet's ability to process transactions accurately, consistently, and without interruption. It includes system availability, transaction speed, successful payment completion, accurate balance updates, and the resolution of failed or delayed transactions. Technical problems can reduce user confidence and satisfaction. Effective grievance-redressal systems are also necessary to resolve transaction failures and maintain trust.

Merchant acceptance refers to the extent to which an e-wallet can be used across businesses, online marketplaces, service providers, and payment channels. A broad and diverse merchant network increases the platform's practical value by enabling payments in different settings. This criterion includes merchant coverage, compatibility with e-commerce platforms, and support for widely used payment infrastructures. An e-wallet with limited acceptance may provide less value, even when it offers attractive features or promotions

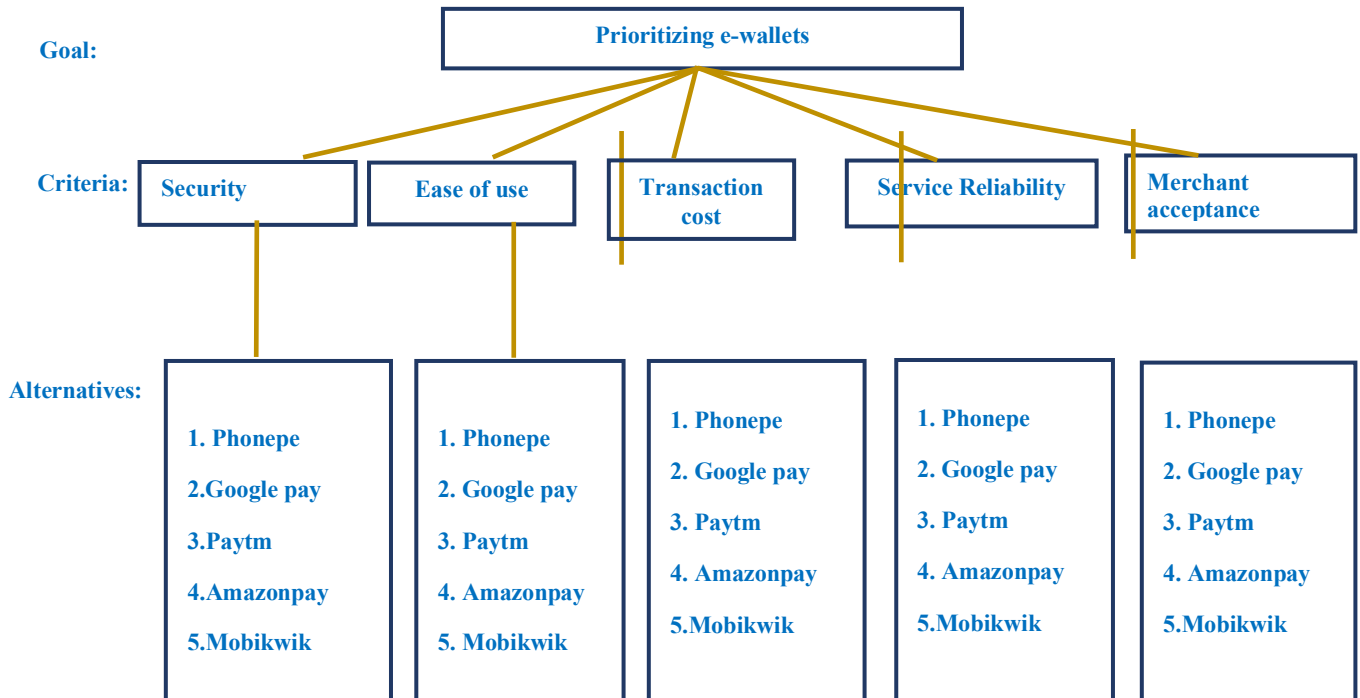


Figure-1: Proposed Model

The AHP calculations are given in table 3 to 9

Table- 3: Pair-wise comparison matrix for all criteria

	Security	Ease of use	Transaction cost	Service reliability	Merchant acceptance	Priority vector
Security	1	2	3	2	3	0.361
Ease of use	1/2	1	2	2	3	0.249
Transaction cost	1/3	1/2	1	2	2	0.166
Service reliability	1/2	1/2	1/2	1	2	0.138
Merchant acceptance	1/3	1/3	1/2	1/2	1	0.086
$\lambda_{\max} = 5.161, CI=0.040, CR = 0.04 < 0.1$						

Table -4: Pairwise comparison matrix for “security “

	Phonepe	Google pay	Paytm	Amazon pay	Mobikwik	Priority vector
Phonepe	1	2	3	3	4	0.398
Google pay	1/2	1	2	2	3	0.242
Paytm	1/3	1/2	1	2	2	0.160
Amazon pay	1/3	1/2	1/2	1	2	0.122
Mobikwik	1/4	1/3	1/2	1/2	1	0.079
$\lambda_{\max} = 5.092, CI=0.023, CR = 0.02 < 0.1$						

Table -5: Pairwise comparison for “Ease of use”

	Phonepe	Google pay	Paytm	Amazon pay	Mobikwik	Priority vector
Phonepe	1	2	2	4	3	0.371
Google pay	1/2	1	3	2	2	0.253
Paytm	1/2	1/3	1	2	2	0.165
Amazon pay	1/4	1/2	1/2	1	2	0.118
Mobikwik	1/3	1/2	1/2	1/2	1	0.094
$\lambda_{\max} = 5.235, CI=0.059, CR=0.05<0.1$						

Table- 6: Pair-wise comparison matrix for “Transaction cost”

	Phonepe	Google pay	Paytm	Amazon pay	Mobikwik	Priority vector
Phonepe	1	2	3	2	2	0.368
Google pay	1/2	1	3	2	1/2	0.269
Paytm	1/3	1/3	1	1/2	1/3	0.150
Amazon pay	1/2	1/2	2	1	1/2	0.127
Mobikwik	1/2	2	3	2	1	0.086
$\lambda_{\max} = 5.265, CI=0.066, CR = 0.06 < 0.1$						

Table -7: Pair-wise comparison matrix for “Service reliability”

	Phonepe	Google pay	Paytm	Amazon pay	Mobikwik	Priority vector
Phonepe	1	1/5	2	4	3	0.258
Google pay	5	1	3	2	2	0.396
Paytm	1/2	1/3	1	2	2	0.160
Amazon pay	1/4	1/2	1/2	1	1/4	0.088
Mobikwik	1/3	1/2	1/2	4	1	0.098
$\lambda_{\max} = 5.350$, $CI=0.088$, $CR = 0.08 < 0.1$						

Table -8: Pair-wise comparison matrix for “Merchant acceptance”

	Phonepe	Google pay	Paytm	Amazon pay	Mobikwik	Priority vector
Phonepe	1	1/5	1/4	2	3	0.172
Google pay	5	1	1/2	2	2	0.278
Paytm	4	2	1	2	2	0.344
Amazon pay	1/2	1/2	1/2	1	1/4	0.102
Mobikwik	1/3	1/2	1/2	4	1	0.104
$\lambda_{\max} = 5.403$, $CI=0.101$, $CR = 0.09 < 0.1$						

Table- 9: Final priority table

	Security	Ease of use	Transaction cost	Service reliability	Merchant acceptance	Final priority vector	Rank
	0.361	0.249	0.166	0.138	0.086		
Phonepe	0.398	0.371	0.368	0.258	0.172	0.3475	1
Google pay	0.242	0.253	0.269	0.396	0.278	0.2735	2
Paytm	0.160	0.165	0.150	0.160	0.344	0.1754	3
Amazon pay	0.122	0.118	0.127	0.088	0.102	0.1117	4
Mobikwik	0.079	0.094	0.086	0.098	0.104	0.0887	5

5. RESULTS

The present study focuses on the comparative assessment of five Indian e-wallets PhonePe, Paytm, Google Pay, Amazon Pay, and MobiKwik based on various factors including Security, Ease of use Transaction Cost, Service reliability and Merchant acceptance. The findings indicate that Phonepe(0.3475) ranks highest in terms of overall suitability among all evaluated systems, following Google pay(0.2735), emerges as the second most popular one, with Paytm (0.1754) in third place, Amazonpay(0.1117) in fourth, and Mobikwik(0.0887) in last position. The results highlight that Phonepe and Google pay are the two most popular e-wallets. The findings indicate that security is the most important criterion, followed by ease of use, transaction cost, service reliability, and merchant acceptance. PhonePe performs particularly well in terms of security, ease of use, and transaction cost, which contributes to its overall leading position. Although Google Pay demonstrates superior performance in service reliability and merchant acceptance, it ranks second because PhonePe receives higher overall priority across the most influential criteria. The consistency ratios for the pairwise comparison matrices remain below 0.10, confirming that the judgments used in the AHP analysis are acceptably consistent. Overall, the results suggest that users prioritize secure, user-friendly, and cost-effective digital payment services. E-wallet providers should therefore focus on strengthening transaction security, improving ease of use, reducing costs, enhancing service reliability, and expanding merchant acceptance to improve their competitiveness and user satisfaction.

6.CONCLUSION

Future evaluations should incorporate fuzzy logic to better account for the inherent subjectivity in user-perceived satisfaction metrics, as current models may oversimplify nuanced linguistic variables. Furthermore, for upcoming research, multi-criteria decision-making (MCDM) techniques such as PROMETHEE, Fuzzy PROMETHEE, AHP-ANP, VIKOR, TOPSIS, Fuzzy AHP, and Fuzzy TOPSIS may be utilized.

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