International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 08 August 2025
DOI: 10.47191/ijcsrr/V8-i8-11, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

Prioritizing on - Demand Home Service Systems Through Analytical Hierarchy Process- A Consumer Perspective

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ABSTRACT: On-demand home services have transformed the manner in which individual's access and use home services. Technology has been instrumental in facilitating this change by offering platforms that link service providers with clients. This study aims to utilizing the Analytic Hierarchy Process (AHP) technique, is proposed to prioritize on-demand home service systems. This methodology is applied to top five on-demand home service systems **Urban Company, Zimmber**, **House joy, Mr.Right and Taskrabbit** by comparing the data from each criterion, the systems could also improve their services for better experience. Analytical Hierarchical Process (AHP) was utilized in order to determine the weights and decision of each factor to the study. The data was gathered through google forms survey questionnaires at Hyderabad, India. Based on the computed weighted alternatives, UrbanCompany is the top alternative, Housejoy as second one, Zimmber is at third position, MR.Right at fourth position,and Taskrabbit at last position.

KEYWORDS: Analytical hierarchy process(AHP), Home service platforms, On-demand home services.

1. INTRODUCTION

Home service applications (mobile apps, websites and other platforms) have transformed the way we handle household responsibilities, providing unmatched convenience for those with busy schedules. These applications link users to professional service providers, facilitating the booking and management of a diverse array of services, including cleaning, plumbing, electrical repairs, pest control, and appliance upkeep. In India, where urban living is becoming more frantic, home service applications are crucial for streamlining everyday tasks and guaranteeing that home maintenance is conducted effectively and dependably.
When considering the purchase of a physical product, numerous information sources exist regarding consumer buying behaviour.

However, due to the unique characteristics of service products, marketers are required to adopt a different strategy. The most significant attribute of a service product is its intangibility. Customers can be influenced to buy tangible goods through the provision of samples, or they may have the opportunity to see and utilize the product, all of which contribute to the decision-making process. In contrast, such options are not accessible when it comes to purchasing a service product.

When consumers select one service provider over another, and word-of-mouth plays a significant role in their decision-making, the intangibility of a service product renders it more susceptible to subjective judgments. Service marketers must communicate to customers the availability of the service and its origin. Prior to making a purchasing decision, a consumer desires to understand the various features, benefits, and advantages they will encounter, along with the convenience of the service. As wealth increases, customers prefer to pay for services instead of performing tasks themselves, as these services are often more affordable and their free time is increasingly valued. Although it may be difficult for customers to distinguish between service providers, perceptions regarding a company's professionalism and competence are also vital considerations when selecting a service product. Consequently, the reputation of a particular service company can be the deciding factor that persuades a customer to choose it over its competitors. Transparency and a solid service reputation are two effective strategies for service providers to differentiate themselves.

The home services market in India, which operates on an on-demand basis, is witnessing substantial growth due to various factors such as the rise in smartphone usage, hectic lifestyles, and a growing inclination towards convenience. This industry is transitioning from a disjointed, offline market to a more structured, technology-oriented ecosystem. It is anticipated that the market will expand from ₹5,070 billion in CY2024 to ₹8,350 billion by CY2029, reflecting a compound annual growth rate (CAGR) of 10-11% [1].

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2. OBJECTIVE OF THE STUDY

On-demand home Service systems enable a smooth connection between customers and a network of trustworthy contractors, guaranteeing dependable support for various home repair and maintenance tasks. Whether via the website or mobile application, customers can effortlessly request the assistance they require, assured that they are engaging with skilled professionals who have been vetted by home Services. Home service systems are committed to offering competitive pricing, positioning itself as an economical option for customers in need of help with home repairs and maintenance.

At the same time, the platform focuses on the advantages of qualified contractors, with the goal of expanding their customer base and fostering business growth. By increasing visibility and exposure to potential clients, contractors collaborating with Home Service system can improve their market presence and establish themselves as trustworthy service providers. Moreover, Home service systems place significant importance on ensuring customer satisfaction. By providing high-quality services and exceptional customer support, the platform promptly and professionally addresses any concerns raised by homeowners. With a dedication to fulfilling homeowner needs and ensuring contractor satisfaction, HomeServe cultivates a mutually beneficial environment for all parties involved.

This study aims to identify the primary factors influencing consumer choices and satisfaction regarding applications, including aspects such as Economy, Service Quality, Technology, Privacy and security, availability of service choice. These criteria will be elaborated upon in the methods section. Understanding these factors can lead to strategies for bridging existing gaps. Enhancing business operations attracts more consumers and boosts profits. Additionally, this research will inform consumers about the companies, especially the leading applications, that they can trust for such services. Ultimately, the insights gained from this study will assist service systems in enhancing their offerings. Each comparison will be conducted using the analytical hierarchy process (AHP).

3. LITERATURE REVIEW

The on-demand home service system offers the most convenient and unrestricted method to complete our household tasks. The on-demand home service system benefits both users and service providers by helping them reach potential customers. Existing studies summarized general frame work on demand service platforms [2], operational issues related to on demand services [3], dynamic pricing of the on-demand services [4] pricing issues of on- demand services [5], sensitivity and provider independence [6], membership pricing and other pricing strategies [7], supply demand -matching problems of on demand services [8], consumer complaints on on-demand services [9]

AHP is a method for organizing and analysing complex decisions based on math and psychology. Previous literature [10] shows that many researchers have adopted AHP and fuzzy AHP methodology in various fields such as, security systems in social media platforms [11] selecting facility location [12], safety management system [13], project selection [14], e-government [15], risk assessment [16], and service quality [17].

4. METHODOLOGY

The Analytical Hierarchy Process (AHP) is a decision-support framework developed by Saaty.TL [18-22]. 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. [18-22] 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.

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3. Construct a set of pair-wise comparison matrices (size n×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, λ_{max}, to calculate the consistency index, CI as follows: CI=(λ_{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, **BPMSG**. [23], 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 research, primary data were collected through questionnaires distributed to online consumers. 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, five critical criteria were initially recognized for evaluation, considered essential for the assessment. The chosen criteria are elaborated upon below.

1.Economy: This includes the charge by the company which include transportation, labour and administration costs, price transparency, discounts and offers, cash back offers, reward points, minimum order amount, membership pricing.

2.Service Quality: this includes order accuracy, response of customer service, efficient staff, skilled technicians, post purchase reviews, quality material /tools as per consumer requirement, customer satisfaction.

3.Technology: This includes Time saving of ordering, scheduling the service, Timeliness of SMS, WhatsApp alert a calling feature for placing phone calls, Time taken for online tracking, user interface of apps, accessibility of the system, flexibility of payment system like debit card, credit card payments, UPI payment system, wallet facility, internet banking facility and cash on delivery facility.

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4.Privacy and security: The key factors in online transactions and order placements are privacy and security. This encompasses the customer's title, phone number, mailing address, bank statement, email address, password, and various other personal details. Due to numerous high-profile news reports regarding data breaches involving prominent companies, consumers are increasingly worried about the usage and handling of their sensitive information during online transactions. Therefore, the service delivery applications must provide assurances regarding privacy and security.

5.Availibility of service choices: Another significant criterion is the menu, which includes the availability of service options. The credibility of the on-demand home service system pertains to the degree of trustworthiness of the information, along with the reliability and accuracy of the platform. The credibility of such a system is affected by the consistency of the quality of services offered, the variety of services available, and their pricing

Subsequently, five leading on-demand home services systems **Urban Company, Zimmber**, **House joy, Mr.Right** and **Taskrabbit** in Hyderabad, India are compared based on the chosen criteria by organizing the decision-making process into a three-tier hierarchy consisting of Goal, Criteria, and Alternatives. Overview of this process is shown in the following **figure-1** and after structuring the goal in hierarchy, AHP process is applied to find the priority ranking of on-demand home services.

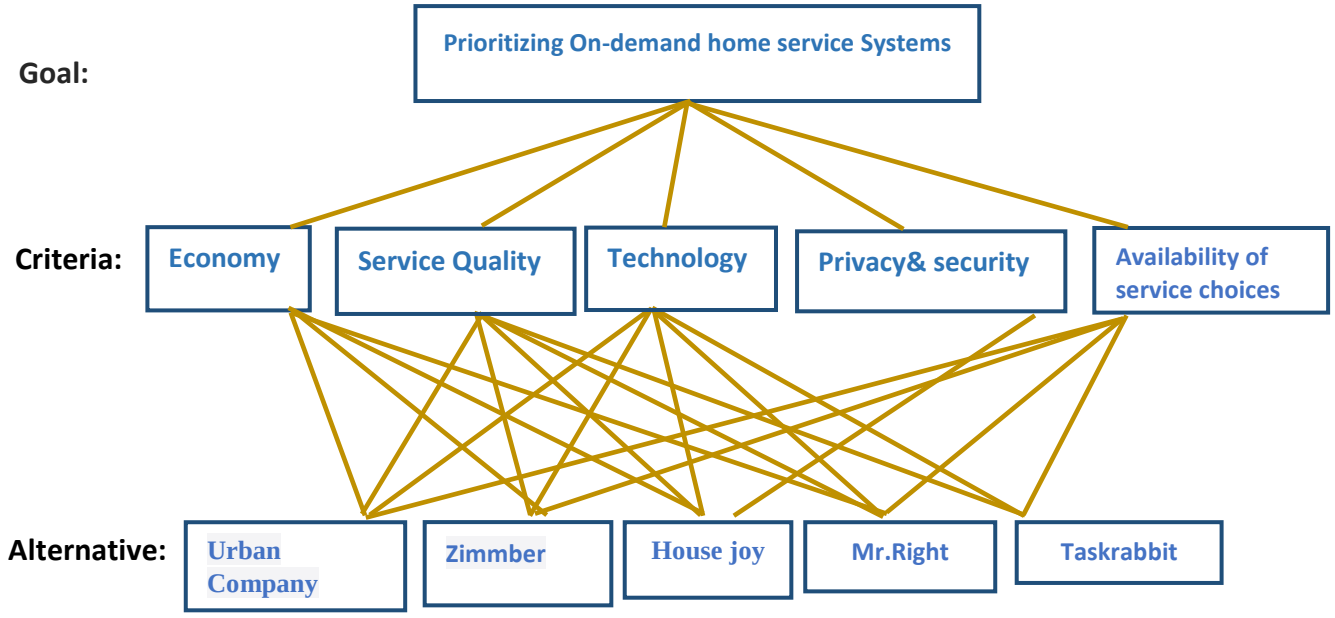

Figure-1: Proposed Model

The AHP calculations are given in table -3 to 9

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

	Economy	Technology	Service quality	Privacy and security	Availability of service choices	Priority vector
Economy	1	4	4	4	8	0.500
Technology	1/4	1	4	4	6	0.265
Service quality	1/4	1/4	1	2	3	0.111
Privacy & security	1/4	1/4	1/2	1	3	0.085
Availability of service choices	1/8	1/6	1/3	1/3	1	0.040
λ_{max} = 5.323 CR = 0.072 < 0.1						

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Table -4: Pairwise comparison matrix for "*Economy* "

	Urban Company	Zimmber	House joy	Mr.Right	Taskrabbit	Priority vector
Urban Company	1	3	3	4	6	0.433
Zimmber	1/3	1	2	3	5	0.232
House joy	1/3	1/2	1	6	5	0.214
Mr.Right	1/4	1/3	1/6	1	3	0.079
Taskrabbit	1/6	1/5	1/5	1/3	1	0.043
λ_{max} = 5.414, CR = 0.092< 0.1						

Table -5: Pairwise comparison for "service quality"

	Urban Company	Zimmber	House joy	Mr.Right	Taskrabbit	Priority vector
Urban Company	1	1/5	1/7	2	3	0.083
Zimmber	5	1	1/4	5	7	0.256
House joy	7	4	1	9	9	0.571
Mr.Right	1/2	1/5	1/9	1	2	0.055
Taskrabbit	1/3	1/7	1/9	1/2	1	0.037
λ_{max} = 5.234, CR=0.05<0.1						

Table- 6: Pair-wise comparison matrix for "*Technology*"

	Urban Company	Zimmber	House joy	Mr.Right	Taskrabbit	Priority vector
Urban Company	1	3	3	4	7	0.457
Zimmber	1/3	1	2	3	5	0.238
House joy	1/3	1/2	1	2	5	0.164
Mr.Right	1/4	1/3	1/2	1	3	0.098
Taskrabbit	1/7	1/5	1/5	1/3	1	0.043
λ_{max} = 5.150, CR = 0.033< 0.1						

Table -7: Pair-wise comparison matrix for "*Privacy and security*"

	Urban Company	Zimmber	House joy	Mr.Right	Taskrabbit	Priority vector
Urban Company	1	1/5	1/4	2	3	0.116
Zimmber	5	1	4	5	5	0.510
House joy	4	1/4	1	3	3	0.233
Mr.Right	1/2	1/5	1/3	1	2	0.082
Taskrabbit	1/3	1/5	1/3	1/2	1	0.060
λ_{max} = 5.351, CR = 0.07 < 0.1						

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Table -8: Pair-wise comparison matrix for "Availability of service choices"

	Urban Company	Zimmber	House joy	Mr.Right	Taskrabbit	Priority vector
Urban Company	1	4	3	5	4	0.469
Zimmber	1/4	1	2	3	5	0.224
House joy	1/3	1/2	1	2	5	0.163
Mr.Right	1/5	1/3	1/2	1	3	0.093
Taskrabbit	1/4	1/5	1/5	1/3	1	0.052
λ_{max} = 5.372, CR = 0.083< 0.1						

Table- 9: Final priority table

	Economy	Service quality	technology	Privacy and security	Availability of service choices	Final priority vector	Rank
	0.500	**0.265**	**0.111**	**0.085**	**0.040**		
Urban Company	0.433	0.083	0.457	0.116	0.469	**0.317842**	**1**
Zimmber	0.232	0.256	0.238	0.510	0.224	**0.262568**	**3**
House joy	0.214	0.571	0.164	0.233	0.163	**0.302844**	**2**
Mr.Right	0.079	0.055	0.098	0.082	0.093	**0.075643**	**4**
Taskrabbit	0.043	0.037	0.043	0.060	0.052	**0.043258**	**5**

5. RESULTS

The present study focuses on the comparative assessment of five on-demand home services systems in Hyderabad based on various factors, including Economy, Service Quality, Technology, Privacy and security and availability of service choices. The findings indicate that **Urban Company** ranks highest in terms of overall suitability among all evaluated systems, following **Hosejoy** emerges as the second most popular one, with **Zimmber** in third place, **Mr.Right** in fourth, and **Taskrabbit** in last position. The results highlight that **Urban Company** and **Housejoy** are the two leading on-demand home service systems.

6. CONCLUSION

The objective of this study is to evaluate and rank five leading on-demand home service platforms in Hyderabad, namely Urban Company, Zimmber, Housejoy, Mr. Right, and Taskrabbit, according to specific criteria. The criteria assessed include economy, service quality, privacy and security, technology, and the availability of services offered. Participants from Hyderabad, aged between 26 and 55, who have utilized these services at least once a month and have experience with all five companies, were engaged in this research. The findings indicate that the primary factor influencing customers' choice of on-demand home services is economy, while tecnologyy ranks as the second most important factor. In conclusion, the Analytic Hierarchy Process (AHP) model aids individuals in making informed decisions in complex scenarios. Future research could incorporate additional criteria and sub-criteria for a more comprehensive analysis. For subsequent studies, multi-criteria decision-making (MCDM) techniques such as PROMETHEE, Fuzzy PROMETHEE, AHP-ANP, FUZZY-AHP,VIKOR, TOPSIS, and Fuzzy TOPSIS may be utilized.

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Cite this Article: Deva, M., Prasad, A.V.S. (2025). Prioritizing on - Demand Home Service Systems Through Analytical Hierarchy Process- A Consumer Perspective. International Journal of Current Science Research and Review, 8(8), pp. 4039-4045. DOI: https://doi.org/10.47191/ijcsrr/V8-i8-11