

## **Using AHP model to evaluate factor influencing mobile banking usage in Indian banks**

Lakhwinder Kaur Dhillon

*Department of Finance*

*Amity University*

*Noida*

*Uttar Pradesh*

*India*

---

### **Abstract**

The aim of this work is to develop Analytical Hierarch Model (AHP Model) in identifying the most influencing factor in mobile banking that influences the mobile banking users. The factors are identified through a systematic literature review and data is collected from experts in the banking industry with prior experience in Mobile Banking. Collected data is analyzed through the AHP model where pairwise comparison is done to distribute weights to different factors. An Excel template by Business Performance Management Singapore was utilized to calculate the weights. Through the study, it was found that security-related factors are the most influential factor in mobile banking usage (with weight 0.308). In the Sub criteria, Security, Ease of use, Perceived usefulness, and perceived efficiency were given the highest priority.

---

**Subject Classification:** G20, G41.

**Keywords:** *Analytic hierarchy model, AHP, Mobile banking, Pairwise comparison, Security, User interface, Convenience, Social inclusion.*

### **Introduction**

The banking sector is the core of any economy and due to technological advancement, this sector has transformed from brick and mortar to branchless banking. Mobile banking and internet banking are the two major components of advancement that was witnessed in the last two decades (Stuart J. et. al., 2003). Due to rapid advancement, banking is referred to as innovative banking (Malviya, S.,2016). Across the globe

---

*E-mail:* lkdhillion@amity.edu

the banking sector is growing rapidly, and the world is becoming more integrated as it facilitates the users with all the services without even visiting the branch. Due to ease of doing transactions and adaptability by the large strata, especially the marginalized section of the society, the role of government in regulatory framework is predominant (Klein, M. U and Mayer, C., 2016). In 2002, India launched mobile banking services through SMS banking and now it has become part of new generation banking platform as mobile banking is a provision in banking services that allows the customer to use mobile phone to avail services of the bank (Dikit S.V.2012). India is second largest economy of the world in terms of mobile phone usage and the scope of exploring this market for expanding the usage of mobile banking services is very high (Tiwari et. al., 2023; Shetty, K. U., & Kulal, A,2021). Almost ninety four percent of population has access to the mobile phone services (Das et. al., 2023;Sharma, G., & Kulshreshtha, K.,2019) After demonetization, the mobile banking services has reached a new height in term of its penetration (Thomas, R., & Chaterji, D. A.,2021) Mobile banking transaction value has reached 24,010,749.430 million on March 2023. In 2018, global mobile banking market was a \$715.3 million dollar market and is expected to reach \$1,8247 million by 2026, with expected compounded Annual Growth Rate of 12.2 percent during 2019-2026 (Global Mobile Banking Market, 2020)

## Review of Literature

Every bank in India has introduced mobile banking services, according to Malviya, S. (2016). The high penetration of mobile phone services in India is one of the key factors driving the growth of mobile banking services. Using a sample of Indian customers, Deepak Chawla and Himanshu Joshi (2017) determine the parameters impacting the adoption of mobile banking. 367 mobile phone users participated in an online survey, and the users were divided into groups using hierarchical cluster analysis. According to the variables impacting mobile banking, three clusters—technological adoption (TA) leaders, followers, and laggards—were constructed. According to the study, TA leaders exhibited the most positive attitude, with age playing a crucial role in this. A model with 6 factors—perceived usability, computer self-efficacy, social influence, perceived financial cost, security, and trust—was developed and tested on 855 bank customers by Sindhu Singh et. al. (2018) for “Predicting the intention to use mobile banking in India” to better understand the factors influencing the adoption of mobile banking in India. Neena Sinha and colleagues (2022) examined the “effectiveness of multichannel bank services for elderly bank consumers” and made an effort to comprehend

their expectations. On 218 senior clients, the degree of their satisfaction was assessed using the hedonic adaptation theory and the expectation confirmation theory (ECT). The post adoption experience and the elements that favourably influence bank account holders were defined by the latent growth curve modelling approach. In their 2018 study, Richa Priya, Aradhana Vikas Gandhi, and colleagues focused on young Indians' grasp of key factors, including Users' contentment and behavioural desire to use the mobile banking service were strongly correlated with perceived utility, perceived use of convenience, and structural assurance. Evon Tan et. al. (2016) focused on the millennial generation in order to understand generation Y's intentions with regard to the adoption of mobile banking services using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The extended UTAUT model was tested using multiple regression analyses, along with a mediated regression analysis that looked at the role of performance expectancy (PE) in mediating the relationship between effort expectancy (EE) and behavioural intention. The findings indicated that social influence, perceived risk, and performance expectancy were in order of importance. According to Purnima S. Sangle et. al. (2011), customers' top concerns and factors when using and adopting mobile banking services are perceived utility value and cost. According to Monica Bhardwaj et. al. (2018), adoption of mobile banking is strongly influenced by social influence, perceived utility, and trust. According to Akansha et. al. (2021), the characteristics that have a positive influence on millennials' behavioural intentions about e-banking services include effort expectancy, trust, social influence, performance expectancy, and perceived risk. According to Rubiah A. Bakar et. al. (2017), perceived ease of use is the dependent variable, while security and privacy directly relate to mobile banking. Frederick Pobee (2022), the intention for adopting e banking or mobile banking services is significantly and positively influenced by factors such as performance expectancy, effort expectancy, social influence and facilitating conditions.

### Research Methodology

This study is designed to identify the factors influencing mobile banking adoption in Indian Banks using Analytical Hierarchy Model (APH Model). For the purpose of the study firsthand data was collected from banking industry expert through AHP Questionnaire 9x9 format and the weights were assigned for pairwise comparison Major variable that influences the adoption or use of mobile banking services were identified from secondary sources available in the form of existing research work. Analytic Hierarchy Model is used for Data analysis. With AHP Model,

qualitative data can be converted into quantitative data by putting weight on the decision criteria and then quantifying it. Through quantifying the decision criteria, a rational framework is formed to achieve the overall goal (Figure 1). Usually, Experts with a good amount of experience in that field are being told to estimate the magnitude of those factors through a pair wise comparison. Each expert compares the relative importance through the help of a specially designed questionnaire. AHP Model is useful in decision making for various kinds of industry like healthcare, education, e-commerce, manufacturing and many more. Through the model, it provides decision makers with a rational framework that helps them to structure a decision problem and achieve the overall goal. There are some defined steps in the AHP model. Firstly, a decision problem is decomposed into a hierarchy of sub problems and analyzed separately. Once the hierarchy is constructed, the decision maker evaluates the elements according to the importance and using their human judgments, evaluations are converted into numerical values to find out a quantitative solution (Table 1).

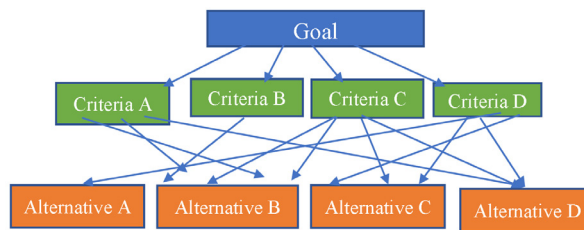


Figure 1

Table 1

| Objective                                                | Factors                | Sub Factors                                                                                                                       |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Factors influencing Mobile Banking Usage in Indian Banks | Security based Factors | <ul style="list-style-type: none"> <li>• Security</li> <li>• Integrity</li> <li>• Authentication</li> <li>• Awareness</li> </ul>  |
|                                                          | User Interface         | <ul style="list-style-type: none"> <li>• Convenience</li> <li>• Ease of use</li> <li>• Output Quality</li> </ul>                  |
|                                                          | Socio-Economic         | <ul style="list-style-type: none"> <li>• Perceived Usefulness</li> <li>• Cost</li> <li>• Social Influence</li> </ul>              |
|                                                          | Technicality           | <ul style="list-style-type: none"> <li>• Perceived Efficiency</li> <li>• Compatibility</li> <li>• Structural Assurance</li> </ul> |

### Measurement Matrices for AHP Model

The pair-wise comparison of all the criteria are according to 1 to 9 scale and the weights are given according to the following Table 2.

**Table 2**

| Weight                                     | Meaning                |
|--------------------------------------------|------------------------|
| 1                                          | Equal Importance       |
| 3                                          | Moderate Importance    |
| 5                                          | Strong Importance      |
| 7                                          | Very Strong Importance |
| 9                                          | Extreme Importance     |
| 2,4,6,8 can be used as intermediate values |                        |

**The next step is to find out the consistency.**

For that Consistency Index (CI) and Consistency Ratio (CR) are calculated

Formulas:

$$CI = \frac{\lambda_{\max} - n}{n - 1}$$

$$CR = \frac{CI}{RI}$$

For the study, A consistency ratio of 10% or below is considered as ideal, otherwise pair-wise comparison must be revised.

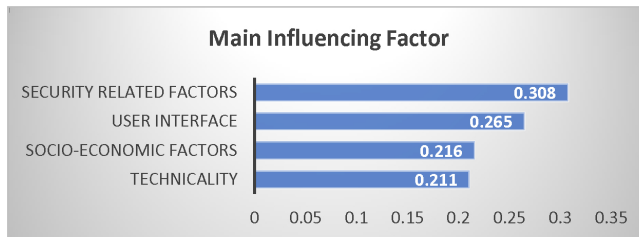
### Analysis

Through systematic literature review, 4 major factors influencing mobile banking in Indian Banks i.e., Security, User Interface, Socio-Economic and Technicality were identified. Now, these factors will be deeply analyzed with the help of AHP Model. There are sub factors to the above mentioned identified factors. The Data was collected through a pair wise questionnaire from Banking industry experts. An updated Excel Template prepared by Business Performance Management Singapore, APH MODEL was applied to analyze and interpret the objectives of the study.

Firstly, the main influencing factor needs to be found out through pair wise comparison of Following Criteria

- Security Related Factors
- User Interface
- Socio-Economic Factors
- Technicality

Through Excel Template formulated by Business Performance Management Singapore, the following results came out.



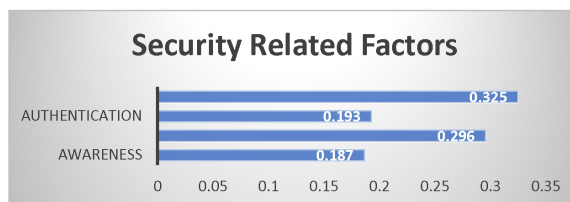
**Figure 2**

The most important factor influencing Mobile Banking Usage came out to be (Figure 2) Security Related Factors with weight (0.308), the second most influencing factor was User interface with weight (0.265) followed by Socio-Economic Factors (0.216) and Technicality (0.211)

After that, the main sub influencing factor under each main factor needs to be found out through pair wise comparison of Following Criteria

### **Security Related Factors**

- Security
- Integrity
- Authentication
- Awareness

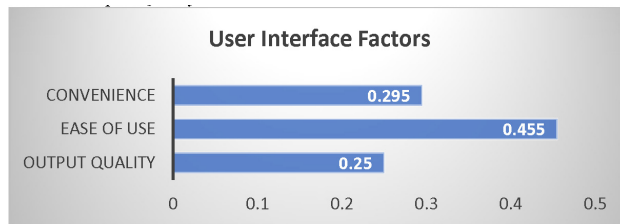


**Figure 3**

Among Security Related Factors (Figure 3), Security was the main concern for respondents with the highest weightage i.e., 0.325 followed by integrity (0.296) and authentication (0.193). Surprisingly, awareness came out to be the least concerned factor with 0.187 weightage.

### User Interface

- Convenience
- Ease of Use
- Output Quality

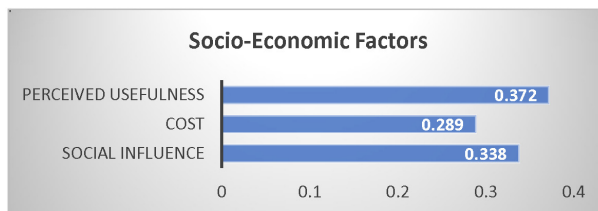


**Figure 4**

Among User Interface (Figure 4), As Expected from Indian Context, Ease of Use got the highest weightage (0.455) followed by convenience (0.295) and output quality (0.250)

### Socio-Economic Factors

- Perceived Usefulness
- Cost
- Social Influence

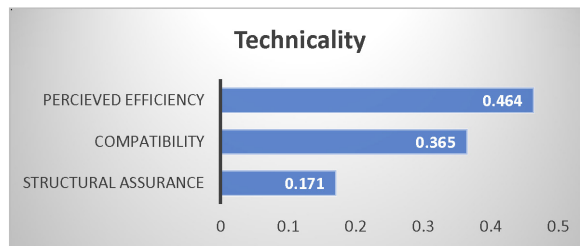


**Figure 5**

Among Socio-Economic Factors (Figure 5), Perceived Usefulness was the top priority choice for most of the respondents with the highest weight of 0.372 followed by Social Influence (0.338). Cost Factor was the least concern for respondents with the lowest weight of 0.289.

### Technicality

- Perceived Efficiency
- Compatibility
- Structural Assurance



**Figure 6**

Among Technically (Figure 6), Perceived Efficiency came out to be a clear winner with highest weight of 0.464 followed by compatibility (0.365). Structural Assurance didn't bother most of the respondents therefore depicted the lowest weight of 0.171.

## Conclusion

Mobile Banking services are a very crucial and convenient service that every mobile user tries to use. Worldwide, there are around 1.9 billion users of Mobile Banking in which China region accounted for around 50 percent, i.e., 800 million. In Indian Context, around 68 percent of People have smartphones but still only 31 percent have implemented Mobile Banking Application, Rest 32 and 14 percent only use the digital payment option and SMS option respectively. There are few predominant factors that influence the users to opt for mobile banking services and Security Related Factors are the top priority for Mobile Banking Usage in India. Awareness regarding mobile banking services is not a concern but user interface is a priority along with Technicality, Perceived Efficiency and Compatibility.

## References

- [1] Bhardwaj M, Aggarwal R. Understanding Dynamics of Mobile Banking Adoption by Youth: Empirical Evidence from India. *FIIB Business Review*. 5(2) : 46-56 (2016).
- [2] Chawla, D. and Joshi, H., "Consumer perspectives about mobile banking adoption in India – a cluster analysis", *International Journal of Bank Marketing*, Vol. 35 No. 4, pp. 616-636 (2017).
- [3] Dikit S.V. & Shringarpure A.A. & Pathan F.N, "Strategies to make Mobile Banking Popular in India," *Advances In Management, Advances in Management*, vol. 5(12), December (2012).

- [4] Klein, M. U., & Mayer, C. Mobile Banking and Financial Inclusion: The Regulatory Lessons (2016, April 20). Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1846305](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1846305).
- [5] Malviya, S. Mobile Banking Current Status in India (2016, June 22).
- [6] Mer A, Virdi AS. Modeling Millennials' Adoption Intentions of E-banking: Extending UTAUT with Perceived Risk and Trust. FIIB Business Review. (November 2021).
- [7] Priya, R., Gandhi, A.V. and Shaikh, A., "Mobile banking adoption in an emerging economy: An empirical analysis of young Indian consumers", *Benchmarking: An International Journal*, Vol. 25 No. 2, pp. 743-762 (2018).
- [8] Pobe F. Non-Probabilistic Approach to e-Banking Adoption: The Moderating Impact of Trialability. Management and Labour Studies. (November 2021).
- [9] Rubiah A.B et. al., "Perceived case of use security and privacy of mobile banking", *International Journal of Business, Economics and Law*, Vol. 13, Issue 2 (August) pp 56-62 (2017).
- [10] Sangle, P.S. and Awasthi, P., "Consumer's expectations from mobile CRM services: a banking context", *Business Process Management Journal*, Vol. 17 No. 6, pp. 898-918 (2011).
- [11] Sharma, G., & Kulshreshtha, K. Mobile Wallet Adoption in India: An Analysis (2019, June 13).
- [12] Singh, S. and Srivastava, R.K., "Predicting the intention to use mobile banking in India", *International Journal of Bank Marketing*, Vol. 36 No. 2, pp. 357-378 (2018).
- [13] Sinha, N. and Singh, N., "Revisiting expectation confirmation model to measure the effectiveness of multichannel bank services for elderly consumers", *International Journal of Emerging Markets*, Vol. ahead-of-print No. ahead-of-print (2022). <https://doi.org/10.1108/IJOEM-03-2021-0361>.
- [14] Shetty, K. U., & Kulal, A., Financial Inclusion through Mobile Banking in India (2021, March 11).
- [15] Tiwari S., Agarwal P., Singh R.: The impact of digital transformation on workforce engagement in Indian banking sector. *Journal of Information and Optimization Sciences*. 44(1): 171-178 (2023), DOI: 10.47974/JIOS-1305.

- [15] Das D., Kumar N., Ahmed M., Sarma D.: Learning through smart-phone during pandemic in Assam, India : Evidence from panel data. *Journal of Information and Optimization Sciences*. 44(1): 179-194 (2023), DOI: 10.47974/JIOS-1306.
- [16] Stuart J. Barnes, Brian Corbitt. Mobile banking: concept and potential, *International Journal of Mobile Communications*, Vol.1 No.3 (2003).
- [17] Tan, E. and Leby Lau, J., "Behavioural intention to adopt mobile banking among the millennial generation", *Young Consumers*, Vol. 17 No. 1, pp. 18-31 (2016).
- [18] Thomas, R., & Chaterji, D. A., Renaissance in M-Banking a Study on Latest Developments in Mobile Banking for Selected Banks in India (2021, March 17). Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3776567](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3776567).