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Determinants of Mobile Banking Adoption in Rural Gujarat: Evidence from Performance and Effort Expectancy

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Abstract
This research is looking into how rural Gujarat people adopt mobile banking, specially focusing on the roles of performance and effort expectancies. The research is founded essentially by the technology acceptance models where it examines the perceptions and various behavior of the users. What we have learned through the litterature review of diverse settings(insights) give us a lot of different setups which underline the importance of ensuring that technology is matched to what the user really needs, considering their socio-economic backgrounds. We adopted a quantitative method with the Confirmatory Factor Analysis and a Structural Equation Model to recognize the level of effectiveness of the measurement model itself. The results found that there is an intervening factor of socio-economic factors between expectancy of effort and expectancy of performance that eventually influences perception and adoption rates of the users. The research is making valuable contributions towards the promotion of inclusive financial solutions in rural areas where the socio-economic backgrounds of the rural populations are diverse. We are encouraging future studies to possibly study the qualitative approaches and other contextual aspects.

Keywords: Adoption of mobile banking, Rural Gujarat, Performance expectancy, Effort expectancy, Socio-economic factors

Introduction
Mobile banking has been a massive breakthrough into the financial services scenario that provides highly convenient and available solutions to the users in a wide range of demographics. Mobile banking is incredibly promising to close the gaps in financial inclusion of rural areas, where the traditional banking infrastructure may be quite limited. The essence of this research paper is this: this research paper is an empirical investigation, which aims at making a contribution to the existing body of knowledge by empirically investigating the user adoption towards mobile banking in rural Gujarat. We are also paying attention to the main roles of the performance expectancy and effort expectancy in forming the perceptions of the users and in their behaviors (Kyei & Agyemang Opoku, 2023).

There are several recent research papers and theses, which have explored the dynamics of the mobile banking adoption and placed an emphasis on those factors which are influencing the users in their decisions. According to previous research, conducted only recently, there is a big significance of performance expectancy, and it is all about the perceptions users have of the capabilities of the system, and how well the system fully satisfies the needs of users (Divya et al., 2021; Nayanajith et al., 2022). Also, the influence of an effort expectancy that is typically viewed as the perceived ease of use has been studied extensively with the context of technology adoption over the past few years accommodating the influence (Manel et al., 2022).

A lot of researchers have recently highlighted how observed accessibility is very significant in determining the attitudes and the main purposes of users towards adopting new technologies. It turned out that consumers like to adopt a technology in case they only find them easy, simple or accessible (Chowdhury, 2023). The research will seek to offer new information related to the defining factors of user adoption in this particular area (Acosta et al., 2020).

A series of recent research has been investigating the use of mobile banking in various rural contexts with great insight that it contributes significantly to the theoretical framework of user behavior. In a relevant example, certain in-depth research on rural mobile banking adoption stemmed out the perceived advantages and user-friendliness. Their results supported the importance of fit between technology and the needs of the users and reduction of the perceived effort (Gallego-Losada et al., 2024).

Research has been conducted in the Indian context to investigate the determinants of mobile banking adoption that focus on the impact of the socio-economic factors and perceived usefulness. Inspired in part by these studies, the present research is expected to yield a very nuanced image of how mobile banking adoption in rural Gujarat is subject to the influence of the unique socio-economic and cultural factors that might affect users perceptions (Lotter and Okoro, 2024; Maryaaranya et al., 2021).

Literature Review

The fast developing mobile banking has completely changed the landscape of the financial system, especially with respect to the rural area where a traditional banking system might be a constraint. It is of paramount importance to understand the determinants to user adoption of mobile banking in such areas with the aim of promoting financial inclusion. The purpose of this literature review is to synthesize the existing research with a great emphasis laid on the key constructs that influence user adoption, which are: performance expectancy, effort expectancy, perceived benefits, and socio-economic factors.

Performance Expectancy (PE):

Acting like a key driver of any technology adoption, combining with an array of research suggesting this link to be probably crucial (Farzin et al., 2021; Liao et al., 2021; Tiwari et al., 2021). The influence of positive perception towards the usefulness of a system significantly impacts whether people will finally accept it or not (Singu & Chakraborty, 2022). A range of recent frameworks highlights how mobile banking system capabilities can correspond with the day to day needs of people, particularly the rural users that want simple things (Dhingra and Gupta, 2020; Mitchell et al., 2024; Mulia et al., 2021). It has been observed that this performance is even more cherished by the younger generations (Abu-Taieh et al., 2022; Dam, 2023). Similarly, user acceptance would be pushed heavily as long as the banking system can provide certain tangible benefits or some quick monetary feedback (Singh & Srivastava, 2020; Hamakhan, 2020).

Effort Expectancy (EE):

When we discuss the here so-called perceived ease of use it is being called effort expectancy which plays an extremely important role in order to shape their basic attitudes towards the adoption of technology (Le et al., 2020). Intuitive interfaces, as well as some form of intuitive design, are known to have a positive effect on the perceived accessibility of the users. This further supports the rationale behind the exceptional significance of this construct in the process

of mobile banking adoption. As it has been demonstrated in the research, the biggest win in the finance sector is to reduce its perceived effort (Mufingatun et al., 2020; Pratama and Renny, 2022; Yeh et al., 2023). Conversely, not all researchers came up with the same conclusion based on the specifics of the application used (Andrianto, 2020; Arviana et al., 2022). However, in the majority of cases, this ease of work is very sought after (Wibowo and Arviansyah, 2023; Mondres, 2020; Laras, 2024).

Perceived Benefits (PB):
Recent publications deal with the numerous perceived advantages that mobile banking offers to the table (Jebararajakirthy & Shankar, 2021). Evidence continuously proves that users would be more inclined to adopt mobile banking when they are in fact experiencing actual benefits. These may be improved financial handing, tailored services, or improved transaction convenience (Jiale, 2022; Ciunova-Shuleska et al., 2022; Li et al., 2022). The online convenience dimension such as post-possession convenience and search convenience makes the banking experience even richer (Samsudeen, 2020; Shankar et al., 2020). It gives instant authentic feedback to the customers anytime (Shankar & Rishi, 2020; Khan et al., 2022). People are more willing to adopt the practice faster even in rural areas as long as they perceive a benefit such as not having to travel miles to a check clearing British branch (Ong and Chong, 2023; Gupta and Dhingra, 2022).

Socio-Economic Factors (SEF):
The socio-economic variables literally swing in updating the attitudes and behaviors of the users of mobile banking. It is observed in numerous recent cases that income level, education of the user and what occupation they do, are all highly influential factors to mobile banking adoption (Ramadhanty and Faturohman, 2021; Kumar et al., 2020). This remains extremely accurate of those regions that are developing. Things like digital literacy and access to smartphones directly relates to their economic conditions (Celestino et al., 2024; Susilo & Dizon, 2023; Debuque-Gonzales et al., 2023). To succeed in tailoring banking solutions that address specific needs of a rural population, we have to investigate the factors listed here, first in depth (Demirgues-Kunt et al., 2020; Demirgues-Kunt et al., 2022). This creates financial knowledge barrier with a significant difference between low-income brackets (Anne, 2024; Santos, 2023).

Conclusion
The collective approach of the research results represents the superior role of performance expectancy, effort expectancy, perceived benefits, and socio-economic factors towards influencing the user adoption of mobile banking particularly in rural regions. The need to understand and respond to the factors is critical to developing effective strategies to encourage financial inclusion and to alter the mobile banking solutions, to meet the unique needs of the rural population in Gujarat (Kaur et al., 2020).

Sr. No	Name of Construct	Author Detail
1	Performance Expectancy	Farzin et al. (2021); Liao et al. (2021)
2	Effort Expectancy	Le et al. (2020); Pratama and Renny (2022)
3	Perceived Benefits	Jebarajakirthy and Shankar (2021); Jiale (2022)
4	Socio-Economic Factors	Ramadhanty and Faturohman (2021); Kumar et al. (2020)

H_1: Socio-Economic Factors mediate the relationship between the Effort Expectancy and the Performance Expectancy.

Need and Gap of the Research

The existing body of research on mobile banking adoption has been quite insightful however a number of gaps need to be explored. The new mobile technologies that incorporates the use of artificial intelligence needs to be explored to understand the precise effects on the user acceptance of the service in the case of rural Gujarat (Kamal et al., 2025). Also, the need to understand how privacy and security concerns can impact adoption rates and focus on building trust is substantial. Assessing the effectiveness of user education programs and examining the impact of external factors such as government policies and infrastructure development are essential to comprehensively understand and enhance mobile banking adoption in rural Gujarat (Karthika et al., 2022). Resolving these research gaps will aid in a far more holistic approach to understanding and help develop strategies to promote inclusive mobile banking solutions in the region.

Scope of the Study

This research will also include an in-depth discussion of the mobile banking adoption in rural Gujarat and in particular, the roles of the performance expectancy and the effort expectancy. By exploring the dynamics of user perceptions and behaviours in rural areas, this research aims to provide valuable insights to the existing knowledge. The socio-economic and cultural influences that can impact mobile banking adoption are investigated in the study where it provides a very comprehensive overview of the challenges and the opportunities in this area (Khatun, 2024).

Methods

The methodology employed in this study is quantitative in that it aimed at investigating the demographic variables among 393 respondents. The variables considered in the analysis include Gender, Marital Status, Age, Education and Annual Family Income. The calculation of the frequencies is done using IBMS SPSS Statistic Version 26 and the descriptive statistics including percentages and frequency distributions are computed to examine the nature of the sample population. Utilizing AMOS 26 software will allow analyzing and visualizing data efficiently, thus increasing the dependability of the methodology used in the study.
This research employed the use of four constructs:

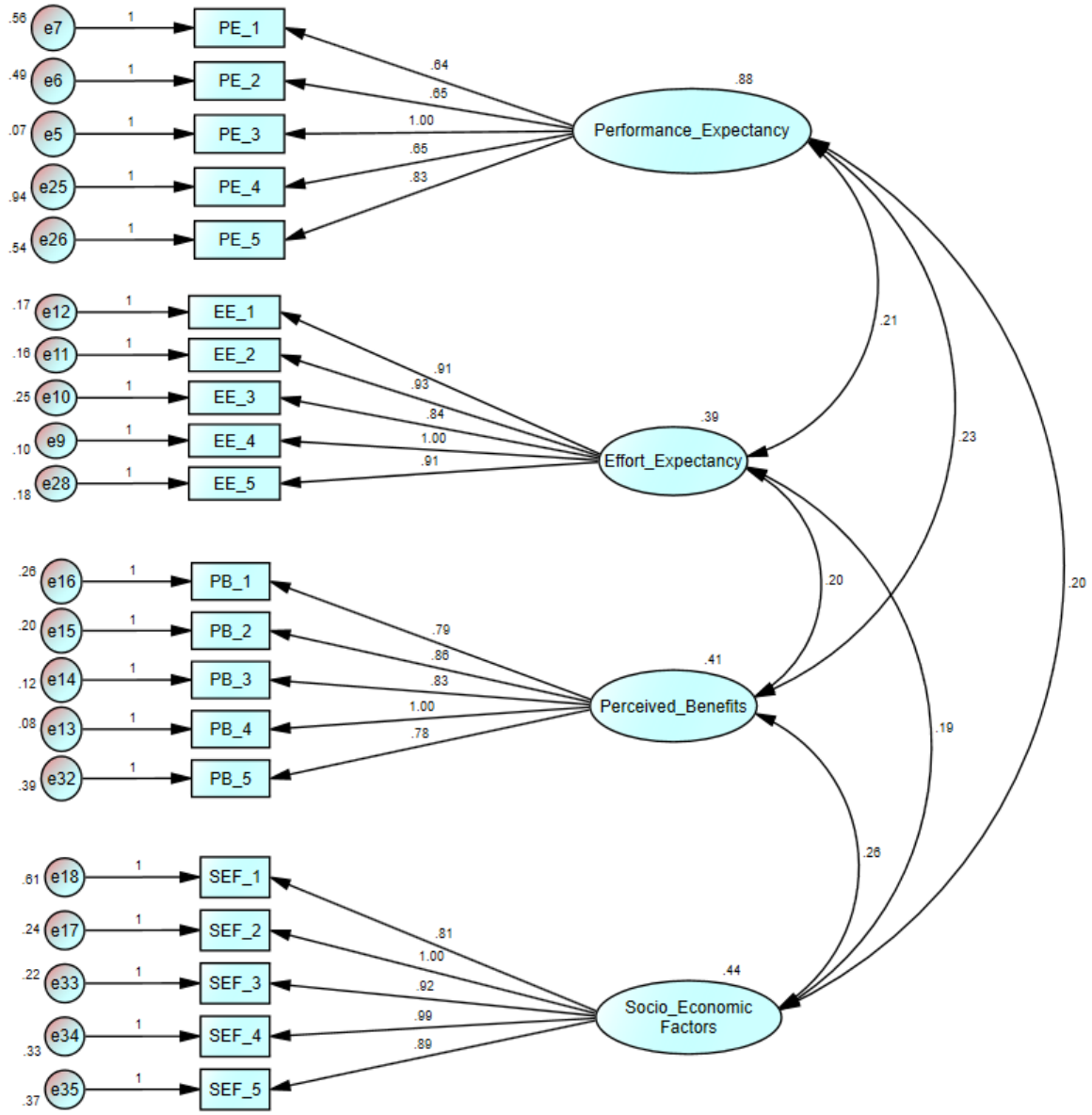
1. Performance Expectancy
2. Effort Expectancy
3. Perceived Benefits
4. Socio-Economic Factors

In a bid to understand the relationship between effort expectancy and performance expectancy comprehensively, the study explores the mediating role of socio-economic factors in the relationships between effort expectancy and performance expectancy. The responses in the form of Likert scale titled between 1-Strongly Disagree and 5-Strongly Agree can be used to quantify the opinions of the participants which could provide a subtle insight into how the participants perceive things (Tikku, 2023). The sample is selected based on Gujarat, with the consideration to the regional and cultural peculiarities of the region. Moreover, the study will assess the role of demographic factors in these constructs to give high-quality results on how demographic factors contribute to these constructs in the context of rural Gujarat in context of

mobile banking. Ethics are very much important during the research process in order to save the validity and reliability of the research. It is done to ensure informed consent by participants, the protection of confidentiality of data acquired in a study, and the consideration of ethical principles when conducting a study. The potential limitations including the sample bias and response biases are mentioned and discussed in order to eliminate the impact of these limitations on the outcomes of the study. Through a powerful research methodology encompassing the use of quantitative data collection, statistical analysis using the IBM SPSS Statistics Version 26, and the observance of ethical considerations, the study will aim to contribute to valuable knowledge on the subject of user adoption towards mobile banking in rural Gujarat with a specific focus on the roles of the performance expectancy and effort expectancy (Bhavsar, 2022).

Data Analysis

CFA Model:



Reliability and Validity:

Factors	Estimate	AVE	CR
Effort_Expectancy	0.808	0.659	0.906
	0.822		
	0.723		
	0.892		
	0.805		
Performance_Expectancy	0.626	0.511	0.834
	0.652		
	0.964		
	0.530		
	0.727		
Perceived_Benefits	0.700	0.601	0.881
	0.774		
	0.834		
	0.910		
	0.626		
Socio_Economic_Factors	0.566	0.530	0.847
	0.805		
	0.791		
	0.753		
	0.698		

The convergent validity assessments for the four constructs presented strong results. For Effort Expectancy, the estimate factor loadings ranged from 0.723 to 0.892. The AVE (Average Variance Extracted) is 0.659, which indicates that approximately 65.9% of the variance in the observed variables is based on the latent construct. The CR (Composite Reliability) is 0.906 which indicates a high reliability as it exceeds the recommended threshold of 0.70. For Performance Expectancy, factor loadings varied from 0.530 to 0.964, which indicates a moderate to strong correlation between the observed variables and the latent construct. The AVE is 0.511, indicating approximately 51.1% variance is based on the latent construct. The CR is 0.834, which demonstrates good reliability.

For Perceived Benefits, factor loadings were between 0.626 and 0.910. This indicates a moderately strong association. The AVE is 0.601, which suggests that about 60.1% variance in observed variables is based on the latent construct. The CR of 0.881 demonstrates good reliability. Lastly, for Socio-Economic Factors, factor loadings were from 0.566 to 0.805, indicating a moderate relationship. AVE is 0.530 (approximately 53.0% variance), and CR is 0.847, demonstrating good reliability. In summary, all constructs show satisfactory levels of convergent validity with strong factor loadings, adequate AVE values and reliable CR values

which indicates that the CFA model effectively captures the relations among the observed variables and the latent constructs (Gupta, 2021).

Quality measurement:

Factors	Effort_Expectancy	Performance_Expectancy	Perceived_Benefits	Socio_Economic_Factors
Effort_Expectancy	**0.812**			
Performance_Expectancy	0.357	**0.715**		
Perceived_Benefits	0.494	0.381	**0.775**	
Socio_Economic_Factors	0.468	0.318	0.619	**0.728**

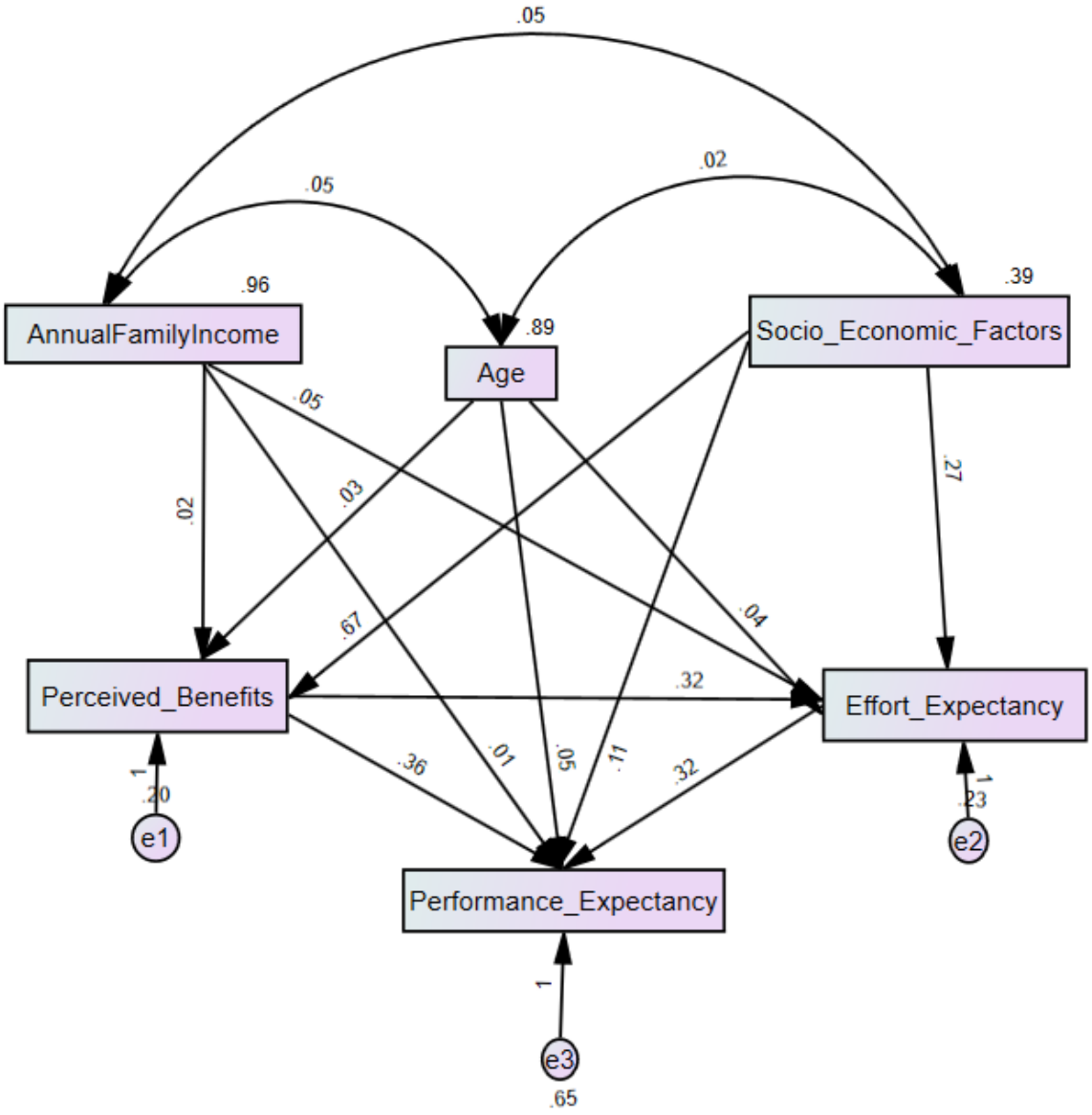
Discriminant validity assessments showed AVE square roots on the diagonals. For Effort Expectancy, the value is 0.812. The correlation between Effort Expectancy and Performance Expectancy is 0.357, which is less than 0.812, so discriminant validity is established here. Perceived Benefits had correlations of 0.494 and 0.381 with the aforementioned constructs, both less than its own AVE square root of 0.775. Finally, Socio-Economic Factors had correlations of 0.468, 0.318, and 0.619, which are all smaller than its AVE square root of 0.728. Hence, all four constructs are highly distinct from each other (Ingale, 2024).

CFA Model Interpretation:

Measure	Model fit	Threshold
CMIN/DF	2.613	< 3 great; < 5 acceptable
CFI	.939	> .95 great; > .90 acceptable
SRMR	.058	< .08
RMSEA	0.064	< .08

The Confirmatory Factor Analysis (CFA) model fit values are applied to evaluate how well the anticipated model fits the observed data (Sharma et al., 2022). CMIN/DF is 2.613. The ratio is less than 3, which is considered great, suggesting the model fits the data well. CFI is 0.939. It is in the acceptable range and greater than 0.90, indicating a good fit consistent with the observed data. SRMR is 0.058. Being less than 0.08, this is considered good. Discrepancies are within an acceptable range. RMSEA is 0.064. Less than 0.08 is considered good, representing a fine average error of approximation. Overall, the CFA model demonstrates a favourable fit based on the provided fit indices (Musyaffi et al., 2022).

Structural Equation Model Output



The path analysis provides a valuable insight into the relationships between key constructs. The standardized indirect effects show the mediating role of Socio-Economic Factors between Effort Expectancy and Performance Expectancy. The indirect effect of Socio-Economic Factors on Effort Expectancy is estimated to be 0.225 with a significant p-value of 0.001 which indicates a strong influence of socio-economic conditions on the perceived ease of using mobile banking services. This implies that as socio-economic factors improve the individuals in the rural Gujarat are more likely to see mobile banking as easier to use (Shaikh et al., 2023).

At the same time, the indirect effect of Socio-Economic Factors on Performance Expectancy is estimated to be 0.271 with a significant p-value of 0.001. This highlights the crucial role of socio-economic conditions in shaping users' perceptions of the capabilities and benefits of mobile banking. As socio-economic factors improve the individuals are more inclined to believe that mobile banking systems offer enhanced performance and align with their financial

needs. These findings suggest that addressing socio-economic factors can positively influence both the perceived ease of use and perceived benefits which contributes to the increased adoption of mobile banking services in rural areas (Alnemer, 2022).

Effect		Standardized Weight	P value
Indirect Effect	Socio-Economic Factors → Effort Expectancy	0.225	0.001
Indirect Effect	Socio-Economic Factors → Performance Expectancy	0.271	0.001

Findings

The results of this study reveal the correlation among Socio-Economic Factors, Effort Expectancy and Performance Expectancy. The demographics of the participants have a balanced representation of both genders with a 52.9 percent male population as compared to a 47.1 percent female population, which fosters a diverse image on the study variables. It is important to note that, the age distribution gives a substantial number (45%) in the bracket of 49-58 which is succeeded by 26.2% in the bracket above 58 which gives us varied insight. The participant level of educational qualification in the study of these constructs is with 61.6% having High School/Diploma which is an indicator of literate but not high educational qualification (Yapabandara & Nagendrakumar, 2022). The analysis of income levels indicates that a sizeable population (63.6) falls within the 2,00,001 to 4,00,000 range indicating moderately considered middle-class group in regards to Effort Expectancy and Performance Expectancy. These demographic differences provide an in depth idea of what affects the perceptions of users. The results highlight the need to take into account various socio-economic backgrounds when discussing the processes related to Effort Expectancy and Performance Expectancy in the context of mobile banking adoption (Karki et al., 2024).

Managerial Implications

- Financial institutions with offices in the rural Gujarat, are recommended to comprehensively customize their mobile banking products/solutions to suit the particular socio-economic and cultural conditions surrounding the user. This customization can heavily enhance user-friendliness and acceptance.
- Managers need to note that socio-economic factors are significant in influencing the user attitudes towards mobile banking. The adoption can actually increase significantly by investing into those initiatives that will positively affect the socio-economic conditions.
- The attendance of specific user education programs may be a solution to any barriers that may be connected with the perceived effort expectancy. The institutions can adopt mobile banking rapidly by enhancing the understanding and familiarity of other users with mobile banking.
- Understanding the role played by external factors, financial institutions are to cooperate with the governmental agencies to help to develop infrastructure in rural territories. Increased accessibility and connectivity have the potential to influence perceptions positively both among users (Menikdiwela et al., 2022).
- Sources: Since big MIKE places significant emphasis on the issue of trust when adopting technology, managers must certainly consider important measures to build up trust. By having formidable security measures and carefully handling issues of privacy, the confidence of the users to mobile banking can be boosted.

- Create policies/ strategies that will support a wide range of socio-economic statuses. Wider uptake can be helped by inclusionary approaches which look at the financial needs and preferences of different income groups.
- Financial institutions must continuously track the trends in demographic to keep in touch with the changing features of the users. This encompasses age, education and income distribution, which can subsequently make adjustments in time in the marketing and service tactics.
- Having partnerships with local communities and leaders may help to better understand the subtleties of the region. This kind of partnership can guide the process of developing mobile banking services that will appeal to the unique needs of rural Gujarat.
- Installing systems of gathering unremitted feedback of users. This process of cyclicality can thus reveal the ever-changing preferences and difficulties so that the financial institutions can real-time adjust their services (Merhi et al., 2020).
- Financial institutions should consider the new technologies such as artificial intelligence, given the dynamic nature of the technology. The outcome of how AI affects user acceptance in the adaptive rural settings of Gujarat would offer information on how second generation technology could be developed.

Discussion and Conclusions

Results of the study reveal that the Relationship between Socio-Economic Factors, Effort Expectancy, and Performance Expectancy are complex in terms of the viewpoint of the mobile banking adoption in rural Gujarat. The quantitative analysis revealed significant indirect effects that indicates that perception of the ease of using mobile banking services and perception of the benefits of improvements in socio-economic conditions have significant indirect effects. The more people in rural Gujarat feel like they desire their current or future financial requirements to be satisfied with the additional socio-economic conditions they experience. These introspections highlight the significance of considering the socio-economic aspects as the foundation of fostering desirable attitudes towards adopting mobile banking in the parts of the world that present with unusual opportunities and threats (Thusi and Maduku, 2020).

Overall, the present research will add important information to understanding the dynamics of mobile banking adoption in rural areas, in particular, in Gujarat. Through the emphasized mediating role of Socio- Economic Factors, the study will focus on the essential determinants that affect user perceptions. Not only does the findings enrich existing literature on mobile banking adoption, it also has practical implications on financial institutions that aspire to promote inclusive financial solutions in areas that have diverse socio-economic backgrounds (Susilo & Dizon, 2023).

Limitations and Future Scope of Study

Although the forbearing perceptions brought forth in the study are great, there are a few limitations that need to be addressed. The research was mainly based on primary data thus bringing in the issue of response bias. As regards to the future study, a more extensive research might involve qualitative research techniques to help in capturing the experiences and perceptions of the users. Additionally, assessing the impact that privacy and security issues have, as well as the results of the user education programs, may contribute more to the knowledge base established in this field (Bausch et al., 2021).

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