Exploring Key Factors Shaping the Effectiveness of Mobile Banking in Pokhara's Financial Landscape

Bibek Karmacharya[*]
Lecturer, School of Business, Pokhara University
Corresponding Author's Email:bibekkarme@gmail.com

ABSTRACT

In the contemporary financial landscape with the anticipated transformation of engagements through mobile banking, this study aims to understand the factors influencing the efficacy of mobile banking services in the Pokhara valley. Using a survey approach with 410 participants, the Confirmatory Factor Analysis indicates a well-fitting measurement model (RMSEA=0.034, GFI=0.941, AGFI=0.923, $\chi2/df$ = 1.486, CFI=0.901, TLI=0.887). Key associations reveal that User Adoption negatively impacts effectiveness, while Security Concerns, Ease of Use, and Customer Support positively influence it. Technical Issues, however, have a negative effect. The Squared Multiple Correlation for Mobile Banking Effectiveness is 0.608, emphasizing a substantial proportion of explained variance. Implications stress the need for Pokhara valley financial institutions to recognize and address user adoption and security concerns, with strategic efforts focusing on user education and technological support to enhance mobile banking effectiveness.

Keywords: Ease of use, effectiveness, mobile banking, security concern, TAM model

INTRODUCTION

In today's financial landscape, mobile banking is expected to play an important role in revolutionizing how people interact with financial services (Popelo et al., 2021). This banking strategy allows customers to display a variety of financial transactions on their mobile devices, namely smartphones and tablets. The services available range from basic chores like checking

account balances to intricate procedures like cash transfers, bill payments, and check deposits (Murugun, 2023). This paradigm change has resulted in an unprecedented degree of ease, reach, and efficiency for users.

Mobile banking is often accessed via specific mobile applications or mobile web browsers, which require users to enroll and set up security measures such as passwords, PINs, and sophisticated biometric verification (Ali et al., 2020). The ease it provides has resulted in broad acceptance, but security issues have arisen, including possible data breaches and fraudulent activity. Financial institutions address these issues by using strong security measures like encryption and two-factor authentication to protect client information (Bruzgiene & Jurgilas, 2021).

The Nepalese financial environment, particularly in the Pokhara valley, is a fascinating example of in the adoption of mobile banking (Shrestha et al., 2021). With high mobile phone coverage and low transaction costs, mobile banking emerges as a major development driver in the region (Siano et al., 2020). The widespread usage of mobile phones for financial transactions indicates an emerging trend, with the expectation that all mobile users will switch to online banking in the near future.

This study seeks to give a thorough knowledge of the factor that influence the effectiveness of mobile banking services for financial institutions in the Pokhara valley. The inquiry covers a wide range of topics, including technological complexities, security problems, building consumer trust, and the quality of customer service. A thorough examination of these components is required to identify possible difficulties and possibilities inherent in the changing landscape of mobile banking. By obtaining insights into these parameters, this study hopes to give useful knowledge that will influence strategies for continuous improvement and optimization of mobile banking services in the defined geographic context.

LITERATURE REVIEW

User Adoption and Mobile banking effectiveness

User adoption, within the context of mobile banking, summarizes the degree to which individuals not only willingly embrace but actively integrate and utilize mobile banking services as an integral component of their financial practices (Shareef et al., 2018). It signifies the degree to which users include these services into their day-to-day financial transactions, reflecting a level of acceptance that goes beyond mere acknowledgment Zhang et al., 2018).

Recognized as a critical determinant of mobile banking success, user adoption plays a pivotal role in shaping the effectiveness of these digital financial services. Venkatesh et al. (2003) highlight those high levels of user acceptance exhibit a positive correlation with the overall effectiveness of technology adoption, emphasizing the idea that a widespread acceptance of mobile banking among users contributes to its success (Bhatt & Bhatt, 2016). As user adoption increases, it signifies a greater frequency of utilization and engagement with mobile banking services, resulting in an inherently enhanced effectiveness in facilitating financial transactions and meeting user needs (Chakiso, 2019). The complex relationship between user adoption and mobile banking effectiveness underscores the significance of understanding and promoting user acceptance for the frequent success and optimization of mobile banking services. Thus, this has led to the development of first hypothesis of the study which is as follows: -

H1: There is significant positive impact of user adoption and mobile banking effectiveness of a financial institution.

Security Concerns and Mobile banking effectiveness

Security concerns in the context of mobile banking summarize the perceived risks associated with the utilization of these services, ranging from potential data breaches to identity theft and other fraudulent activities (Normalini & Ramayah, 2017). Users' trust and willingness to adopt mobile banking are intricately tied to their perceptions of security (Zhang et al., 2018). Addressing these concerns emerges as a crucial factor influencing the overall effectiveness of mobile banking services. Users, rightfully careful about the vulnerabilities inherent in digital financial transactions, evaluate the safety measures implemented by financial institutions (Lin, 2013). Aladwani (2001) highlights the profound impact of perceived security on users' readiness to adopt technology, highlighting its critical role in shaping user behavior. Financial institutions' proactive efforts in mitigating security risks not only contribute to improved user confidence but also positively influence the overall effectiveness of mobile banking (Kelly & Palaniappan, 2019). As users perceive a sensitive level of security in their transactions, they are more likely to trust and actively engage with mobile banking services, finally contributing to the success and effectiveness of these digital financial platforms (Bakar et al., 2017). Recognizing and addressing security concerns is thus important for financial institutions seeking to optimize the effectiveness of their mobile banking services in promoting user trust and satisfaction. Thus, this has led to the development of second hypothesis of the study which is as follows: -

H2: There is significant positive impact of security concerns and mobile banking

effectiveness of a financial institution.

Ease of Use and Mobile banking effectiveness

Ease of use in the context of mobile banking summarizes the user-friendliness, simplicity, and intuitiveness of the interface and functionalities of these digital financial services, directly influencing users' ability to direct and utilize the platform. Davis (1989) laid the basis for understanding technology adoption through the Technology Acceptance Model (TAM), where perceived ease of use arose as a key determinant. In the specific context of mobile banking, ease of use is supreme, as users engage with these services to streamline financial transactions. Prastiawan et al., (2021). and Raza et al., (2017). reveal a notable and positive relationship between ease of use and the effectiveness of mobile banking. A user-friendly interface and an intuitively designed platform contribute significantly to heightened user satisfaction and increased overall service effectiveness (Ramli & Rahmawati, 2020). As users find the mobile banking platform easy to navigate and use, they are more likely to engage with the services more frequently, leading to a higher degree of effectiveness in enabling financial transactions and meeting user needs (Ardiansyah & Usman, 2021). This underscores the crucial role of ease of use in determining the success and effectiveness of mobile banking services, highlighting the importance of a user-centric design for frequent optimization and user satisfaction (Widanengsih, 2021). Thus, this has led to the development of third hypothesis of the study which is as follows: -

H3: There is significant positive impact of ease of use and mobile banking effectiveness of a financial institution.

Technical Issues Mobile banking effectiveness

Technical issues within the context of mobile banking include challenges related to the functionality, reliability, and performance of these digital financial services (Tam & Oliveira, 2017). Such challenges may include system problems, instances of downtime, and slow response times, all of which can significantly impact the user experience. The effectiveness of mobile banking is intricately tied to its technical robustness; a seamless and reliable digital platform is paramount for ensuring user satisfaction and trust (Bhatt, & Bhatt, 2016). Wu & Ho (2022). underscore the prominent impact of technical issues on the effectiveness of mobile banking services. Technical glitches and downtime have the potential to erode user confidence, as users rely on the reliability and performance of these services for their financial transactions (Tam & Oliveira, 2017). Cases of slow response times or system malfunctions can hamper the

seamless execution of transactions, leading to user frustration and, consequently, influencing the overall effectiveness of mobile banking (Gikandi & Bloor, 2010). Recognizing and addressing technical issues is imperative for financial institutions to uphold the reliability and performance of their mobile banking platforms, thereby ensuring the sustained effectiveness of these services in meeting user expectations and fostering user trust (Manser Payne et al., 2021). Thus, this has led to the development of fourth hypothesis of the study which is as follows: -

H4: There is significant positive impact of technical issues and mobile banking effectiveness of a financial institution.

Customer Support and Mobile banking effectiveness

Customer support in the context of mobile banking relates to the provision of assistance, guidance, and responsiveness to users, with the aim of enhancing their overall experience and addressing any issues or queries that may arise during their interactions with the platform (Mostafa, 2020). This aspect of support is integral to sustaining user engagement and satisfaction, as users often pursue reassurance and assistance in navigating the complexities of digital financial services (Singh & Srivastava, 2020). Empirical evidence suggests a significant positive relationship between the quality of customer support and the overall effectiveness of mobile banking (Khan et al., 2021). The establishment of responsive and effective customer support contributes significantly to an improved user experience, promote increased trust in the platform. Users who feel supported and attended to are more likely to engage with mobile banking services confidently, thus enhancing the overall effectiveness of the platform (Geebren, et al., 2021). This underscores the importance of customer support as a critical element in the success of mobile banking, as it plays a crucial role in shaping user perceptions, satisfaction, and trust, eventually contributing to the continuous effectiveness and optimization of mobile banking services (Manser Payne et al., 2021). Thus, this has led to the development of fifth

hypothesis of the study which is as follows: -

H5: There is significant positive impact of customer support and mobile banking effectiveness of a financial institution.

Theoretical Framework

Based on past empirical studies and above hypothesis, the theoretical framework of the study is as follows

Figure 1

Theoretical Framework

Adapted from: Chung & Kwon, 2009; Koenig-Lewis et al., 2010; Lin, 2011
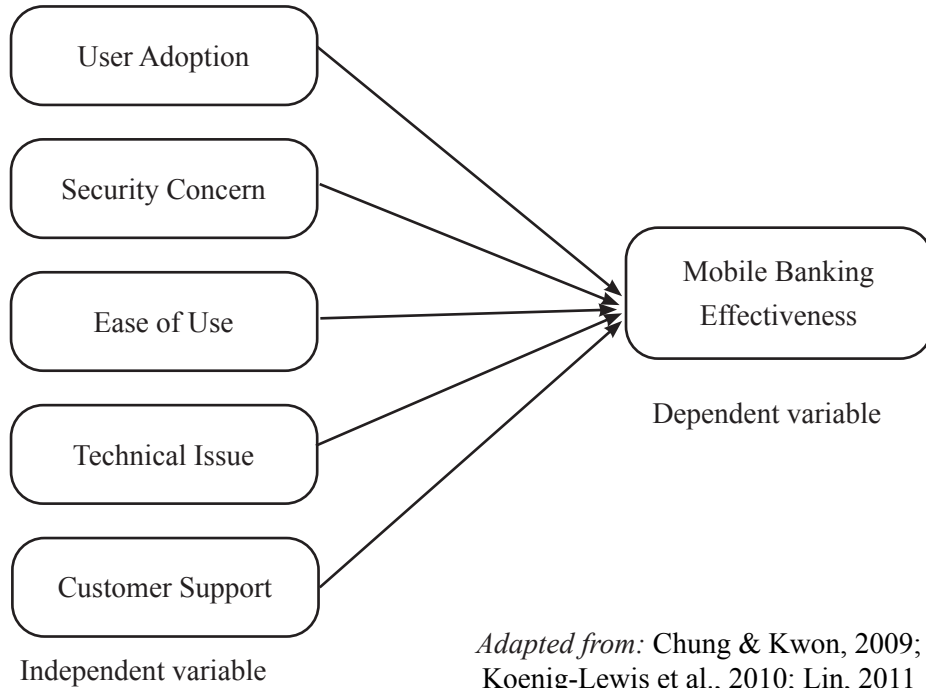
RESEARCH METHODOLOGY

The study's research design combines descriptive and explanatory methods, aiming to thoroughly examine the factors affecting the efficiency of mobile banking in financial institutions located in Nepal. Employing a survey-based approach, a meticulously crafted questionnaire is distributed among active mobile banking users in Pokhara, representing diverse financial institutions. This method enables the collection of valuable insights into the determinants of mobile banking effectiveness. By utilizing purposive sampling, the study targets a specific group of mobile banking users in alignment with its objectives, ensuring the acquisition of pertinent data. The sample size, initially set at 384 participants following

Taherdoost (2017) methodology, is slightly expanded to 410 participants to enhance statistical accuracy.

The structured questionnaire, designed to measure mobile banking effectiveness, assesses various factors such as user adoption, security concerns, ease of use, technical issues, and customer support using a 5-point Likert scale. The operationalization of these variables is elaborated in the study's appendix. To validate the questionnaire, theoretical models from previous research are employed, assessing both convergent and discriminant validity. Internal reliability is evaluated using Cronbach's Alpha, while confirmatory factor analysis (CFA) verifies convergent validity.

Data collection methods involve structured questionnaires to gauge mobile banking effectiveness. CFA and structural equation modeling (SEM) are utilized to test the accuracy of measured variables and explore the relationships between independent and dependent variables, respectively. References are drawn from credible sources, including scientific journals, books, and professional websites, to ensure the robustness of the study's findings.

RESULTS AND DISCUSSION

Respondent Profile

The study presents the demographic profile of individuals utilizing mobile banking services across different financial institutions in the Pokhara Valley. These profiles include gender, age, marital status, educational qualifications, work experience, monthly income, and duration of usage. Data on these demographic variables were collected through the questionnaire and analyzed using SPSS, with results presented as percentages. The summarized demographic characteristics of respondents are presented in Table 1.

Table 1

Demographic Profile of Respondents

Demographic Characteristic	Sub Categories	Frequency	Percent
Gender	Male	336	82
	Female	74	18.0

Age	Below 20 years	71	17.3
	Between 20-30 years	143	34.9
	Between 30-40 years	103	25.1
	Between 40-50 years	71	17.3
	Above 50 years	22	5.4
Marital Status	Married	101	24.6
	Unmarried	309	75.4
Education	SLC/SEE	28	6.8
	Plus 2	76	18.5
	Bachelor	186	45.4
	Masters	116	28.3
	Others	4	1
Experience	Below 3 years	173	42.2
	Between 3 to 5 years	87	21.2
	Between 5-10 years	70	17.1
	Above 10 years	80	19.5
Monthly income	Below Rs 10,000	32	7.8
	Between Rs 10,000 and 20,000	118	28.8
	Between Rs 20,000 and 30,000	106	25.9
	Between Rs 30,000 and 40,000	51	12.4
	Between Rs 40,000 and 50,000	51	12.4
	Above Rs 50,000	52	12.7
Usage duration	Below 2 years	93	22.7
	Between 2-5 years	165	40.2
	Between 5-8 years	114	27.8
	Above 8 years	38	9.3
Total		410	100

Note: Field Survey, 2023 and authors' calculation.

Table 1 provides an extensive demographic overview of individuals utilizing mobile banking services across various financial institutions in the Pokhara Valley, Nepal. The gender distribution reveals that 82% of participants are male, with females comprising 18% of the sample. Concerning age, the majority fall within the 20-30 years range, constituting 34.9% of respondents, with other age brackets represented proportionately. Regarding marital status, the majority are unmarried (75.4%), while 24.6% are married.

The educational background of respondents varies, with 45.4% holding a Bachelor's degree and 28.3% possessing a Master's degree. In terms of experience, a significant proportion of respondents (42.2%) reported having below 3 years of experience. Monthly income distribution demonstrates a diverse range, with 28.8% earning between Rs 10,000 and 20,000. Additionally, the majority of participants (40.2%) reported using mobile banking services for 2-5 years. This comprehensive breakdown of demographics provides valuable insights into the diverse characteristics of individuals participating in the study, contributing to a deeper understanding of the factors influencing mobile banking effectiveness in Nepalese financial institutions.

RELIABILITY AND VALIDITY

Construct Reliability

Table 2 presents an assessment of construct reliability for key variables utilized in the study, employing both Cronbach's Alpha and Composite Reliability measures. The values obtained for Cronbach's Alpha, ranging from 0.754 to 0.895, signify robust internal consistency across variables such as User Adoption, Security Concerns, Ease of Use, Technical Issues, Customer Support, and Mobile Banking Effectiveness. Furthermore, the Composite Reliability values, ranging from 0.794 to 0.922, reinforce the reliability of these constructs. These findings indicate that the scales utilized to measure these variables demonstrate strong internal reliability, thereby bolstering the credibility and validity of the research outcomes concerning factors influencing mobile banking effectiveness in Nepalese financial institutions.

Table 2

Construct Reliability of Scale

Variables	Cronbach's Alpha	Composite Reliability
User Adoption	0.754	0.794
Security Concerns	0.895	0.922

Ease of Use	0.835	0.876
Technical Issue	0.856	0.899
Customer Support	0.874	0.911
Mobile Banking Effectiveness	0.862	0.893

Note: Field Survey, 2023 and authors' calculation.

Construct Validity

Tables 3 and 4 collectively present the assessment of construct validity, aiming to evaluate the accuracy with which concepts are measured in the study. Table 3 specifically focuses on convergent and discriminant validity, showcasing the Average Variance Extracted (AVE) scores and Mean Shared Variance (MSV) for each variable. The AVE values, ranging from 0.694 to 0.755, surpass the recommended threshold of 0.50, indicating strong convergent validity. Furthermore, the MSV values, ranging from 0.657 to 0.712, suggest that there is more variance shared within each construct than across different constructs, thus affirming discriminant validity.Top of Form

Table 3

Convergent and Discriminant Validity

Variables	AVE	MSV
User Adoption	0.694	0.657
Security Concerns	0.712	0.668
Ease of Use	0.729	0.672
Technical Issue	0.755	0.692
Customer Support	0.734	0.712
Mobile Banking Effectiveness	0.694	0.678

Note: Field Survey, 2023 and authors' calculation.

Table 4 delves deeper into examining discriminant validity via the Square Root of AVE and Construct Correlation Analysis. The diagonal entries depict the square root of AVE, while the off-diagonal entries represent the correlations between constructs. Meeting the recommended criterion, wherein the square root of AVE for each construct exceeds the inter-construct correlations, strengthens discriminant validity (Şimşek & Noyan, 2013). This analysis guarantees that the measurement model accurately captures the uniqueness of each construct while preserving significant relationships among them.

Table 4

Square Root of AVE and Construct Correlation Analysis

Variables	User Adoption	Security Concerns	Ease of Use	Technical Issue	Customer Support	Mobile Banking Effectiveness
User Adoption	0.833					
Security Concerns	0.568	0.844				
Ease of Use	0.542	0.695	0.854			
Technical Issue	0.634	0.672	0.631	0.869		
Customer Support	0.673	0.641	0.689	0.712	0.857	
Mobile Banking Effectiveness	0.578	0.634	0.712	0.732	0.719	0.833

Note: Field Survey, 2023 and authors' calculation.

Confirmatory Factor Analysis

In this study, Confirmatory Factor Analysis (CFA) was utilized to assess the validity of the measurement model, employing AMOS software (version 22), a widely recognized tool for Structural Equation Modeling (SEM). The maximum likelihood (ML) estimator, renowned for its unbiased and efficient properties under specific assumptions (Byrne, 2016), was employed to estimate the model parameters. The CFA results demonstrated an excellent fit of the measurement model, as indicated by absolute fit indices such as Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), χ^2, and Root Mean Square Error of Approximation (RMSEA). The proposed model exhibited favorable fit statistics, with GFI and AGFI values of 0.941 and 0.923, respectively. However, it's important to note that GFI and AGFI, being influenced by sample size, have inherent limitations as fit indices.

To ensure a comprehensive evaluation of the model's fit, additional fit indices were considered. The average chi-square ratio (χ^2/df) was found to be 1.486, below the acceptable threshold of 3.0, although its reliability is influenced by sample size and observed variables. Further assessment involved examining the RMSEA, which at 0.034 (below 0.08), suggested a good fit (Hair, 2011). Incremental fit indices, such as the Tucker Lewis Index (TLI) and Comparative Fit Index (CFI), yielded values of 0.887 and 0.901, respectively. In conclusion, based on the collective fit indices (RMSEA=0.034, GFI=0.941, AGFI=0.923, χ^2/df = 1.486,

CFI=0.901, and TLI=0.887), the CFA results indicate a well-fitting measurement model (Hair, 2011). The diagrammatic representation of the CFA is illustrated below:

Figure 2

Measurement Model of Factors Shaping the Effectiveness of Mobile Banking in Pokhara's Financial Landscape
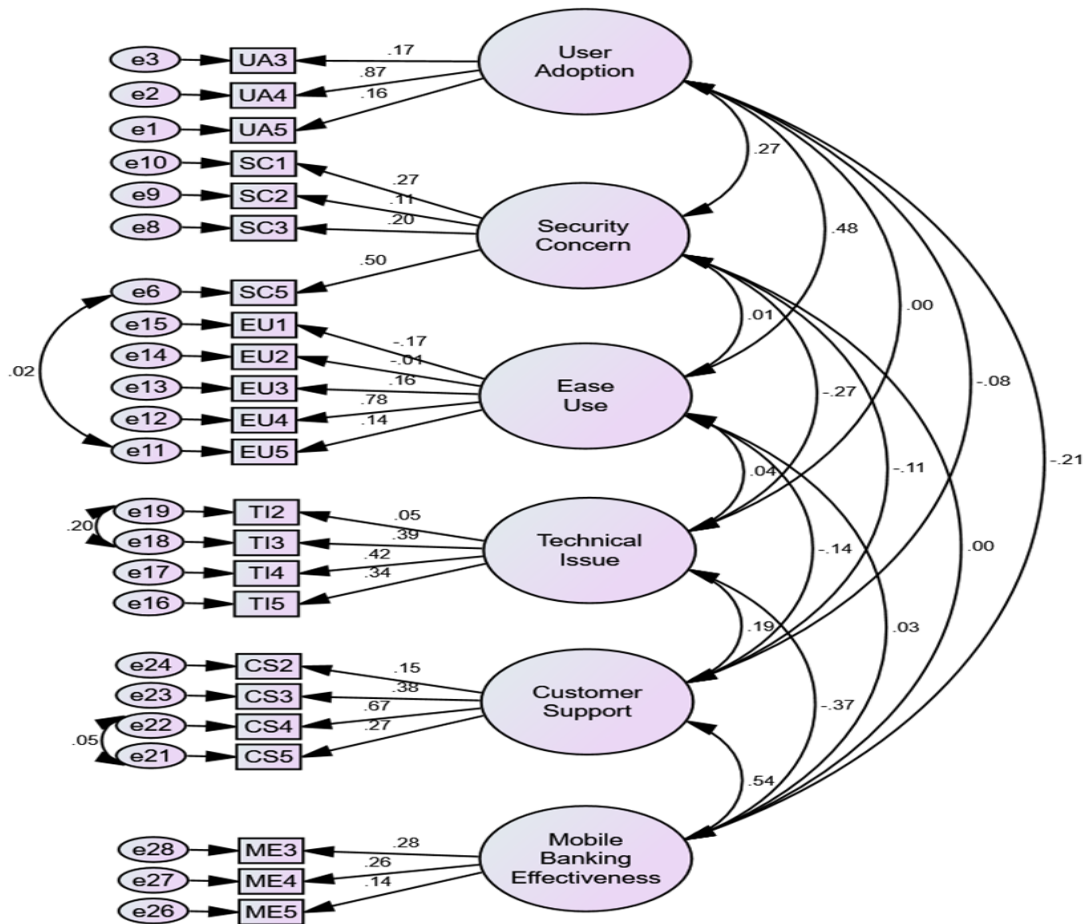
Structural Model or Path Analysis

Figure 3 illustrates the transition in the research focus from examining the connections between hidden concepts and observable phenomena to analyzing the nature and intensity of relationships among these concepts. This transition occurs as the study progresses from understanding measurement methodologies to investigating the interrelationships among

these concepts. The structural model, constructed based on established economic theories, proposes that factors such as usage frequency, security concerns, ease of use, technical issues, and customer support play significant roles in determining the effectiveness of mobile banking for users across various financial institutions in Pokhara. The findings of this investigation are synthesized in Table 6, employing a methodology known as Structural Equation Modeling (SEM) path analysis to elucidate the anticipated relationships derived from theoretical frameworks. This approach aids in comprehending the interconnectedness of these factors in real-world contexts.

Table 6

SEM Path Analysis

Structural Path		Estimate	SRWa
Mobile Banking Effectiveness ← User Adoption		-0.251*** (0.003)	-0.291
Mobile Banking Effectiveness ← Security Concern		0.003* (0.072)	0.011
Mobile Banking Effectiveness ← Ease of Use		0.258*** (0.001)	0.273
Mobile Banking Effectiveness ← Technical Issue		-0.195* (0.083)	-0.504
Mobile Banking Effectiveness ← Customer Support		0.342*** (0.002)	0.649

Squared Multiple Correlation, Mobile Banking Effectiveness ($\gamma2=0.608$), Model Fit Measures, Chi-square = 315.116 (df=212, prob. = 0.000), CMIN/DF=1.486, CFI=0.901, RMSEA=0.034, TLI=0.887, GFI=0.941, AGFI=0.923, aSRW = Standardized regression weights*** p<0.001, **p<0.01, *p<0.1

*Note: Field Survey, 2023 and authors' calculation*

Table 6 summarizes the findings from the Structural Equation Modeling (SEM) path analysis, which explores the interconnections between various factors and the effectiveness of mobile banking. The estimates of the structural paths not only reveal the magnitude of these connections but also their directional influence. The results underscore significant associations between Mobile Banking Effectiveness and several influencing factors. Notably, User Adoption demonstrates a negative impact (estimate: -0.251, p<0.001), while Security Concern exhibits a positive impact (estimate: 0.003, p<0.1). Ease of Use positively influences Mobile Banking Effectiveness, with an estimate of 0.258 (p<0.001), whereas Technical Issues

have a negative impact (estimate: -0.195, p<0.1). Customer Support demonstrates a positive impact with an estimate of 0.342 (p<0.001).

Furthermore, the Squared Multiple Correlation for Mobile Banking Effectiveness is 0.608, indicating the proportion of explained variance. Model fit indices, including Chi-square, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Tucker Lewis Index (TLI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI), collectively confirm the well-fitted nature of the proposed model. Standardized regression weights (SRW) offer insights into the standardized strength of each relationship. In conclusion, the SEM path analysis reveals significant associations, and the model demonstrates a robust fit with the observed data. The diagrammatic representation of the Path analysis is illustrated below

Figure 3

SEM Path Analysis Showing Factors Shaping the Effectiveness of Mobile Banking in Pokhara's Financial Landscape Top of Form
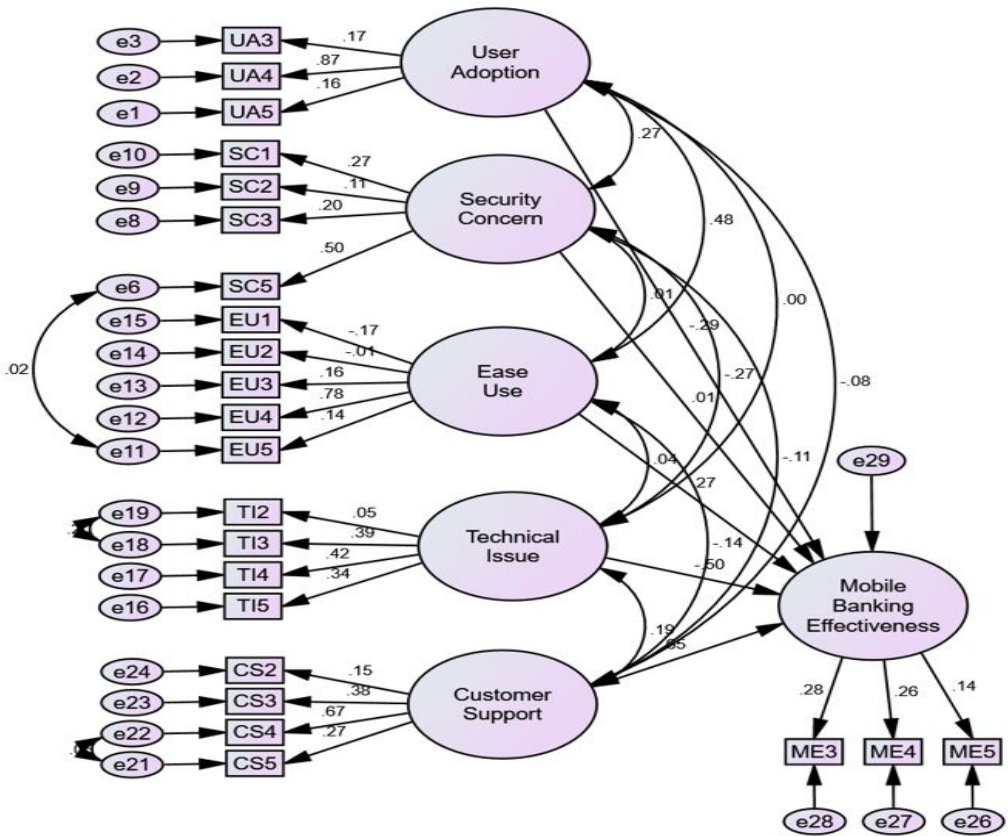
DISCUSSION

The outcomes of the structural equation modeling (SEM) path analysis shed light on the complex relationships influencing mobile banking effectiveness. Notably, user adoption established a significant negative impact, suggesting that a higher degree of user adoption might lead to a decrease in mobile banking effectiveness. This result aligns with the findings of Koenig☐Lewis et al., (2010), who also reported a negative relationship between user adoption and mobile banking performance in their empirical study. However, this study adds depth to this understanding by considering additional factors and providing nuanced insights into the specific context of mobile banking in pokhara. Contrastingly, security concerns exhibited a positive impact on mobile banking effectiveness, which align with the results observed in the study conducted by Normalini & Ramayah, (2017). where higher security concerns were associated with increased mobile banking effectiveness.

The positive influence of ease of use on mobile banking effectiveness aligns with the findings of previous research by Shareef et al., (2018). and highlights the universal importance of user-friendly interfaces in optimizing mobile banking outcomes. The negative impact of technical issues, as revealed in our study, echoes concerns raised by Lin, (2013). emphasizing the critical role of technological robustness in shaping users' perceptions of mobile banking effectiveness. The positive relationship between customer support and mobile banking effectiveness is consistent with the conclusions drawn by Chakiso, (2019). Enhanced customer support services contribute positively to users' perceptions of mobile banking efficacy, suggesting that customer service plays a crucial role in shaping overall effectiveness.

CONCLUSION

In conclusion, the study contributes in-depth insights into the factors influencing mobile banking effectiveness in Pokhara. While user adoption negatively impacts effectiveness, security concerns, ease of use, and customer support emerge as positive contributors. Technical issues, however, pose challenges to mobile banking efficacy. These findings align with and extend existing literature, providing valuable implications for financial institutions seeking to enhance mobile banking services. Moving forward, future research could investigate deeper into the specific user characteristics and institutional practices that influence the observed relationships. Additionally, exploring the impact of cultural factors on mobile banking perceptions in the context of Pokhara would enrich the understanding of these dynamics. The findings underscore the importance of prioritizing user-friendly interfaces, robust technological

infrastructures, and responsive customer support in the design and implementation of mobile banking services.

The implications of this study are diverse for financial institutions and policymakers. Recognizing the nuanced impact of user adoption and addressing security concerns can inform strategies to enhance mobile banking effectiveness. Institutions should prioritize user education and technological support to mitigate technical issues and strengthen customer support services. Overall, the study provides actionable insights for optimizing mobile banking services and fostering financial inclusion in the region.

ORCID

Bibek Karmacharya, https://orcid.org/0009-0008-7384-6759

REFERENCES

Aladwani, A. M. (2001). Online banking: a field study of drivers, development challenges, and expectations. *International journal of information management*, *21*(3), 213-225.

Ali, G., Ally Dida, M., & Elikana Sam, A. (2020). Two-factor authentication scheme for mobile money: A review of threat models and countermeasures. *Future Internet*, *12*(10), 160.

Ardiansyah, A., & Usman, O. (2021). The Effect of Perceptions of Usefulness, Perceptions of Ease, Perceptions of Usability on the Use of Mobile Banking. *Perceptions of Ease, Perceptions of Usability on the Use of Mobile Banking (January 19, 2021)*.

Bakar, R. A., Aziz, N. A., Muhammud, A., & Muda, M. (2017). Perceived ease of use, security and privacy of mobile banking. *International Journal of Business and Social Research*, *2*(1), 56-62.

Bhatt, A., & Bhatt, S. (2016). Factors affecting customer's adoption of mobile banking services. *Journal of Internet Banking and Commerce*, *21*(1), 1-22.

Bruzgiene, R., & Jurgilas, K. (2021). Securing remote access to information systems of critical infrastructure using two-factor authentication. *Electronics*, *10*(15), 1819.

Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge.

Chakiso, C. B. (2019). Factors affecting attitudes towards adoption of mobile banking: Users and non-user's perspectives. *EMAJ: Emerging Markets Journal*, *9*(1), 54-62.

Chung, N., & Kwon, S. J. (2009). The effects of customers' mobile experience and technical support on the intention to use mobile banking. *Cyberpsychology & Behavior*, *12*(5),

539-543.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Geebren, A., Jabbar, A., & Luo, M. (2021). Examining the role of consumer satisfaction within mobile eco-systems: Evidence from mobile banking services. *Computers in Human Behavior*, *114*, 106584.

Gikandi, J. W., & Bloor, C. (2010). Adoption and effectiveness of electronic banking in Kenya. *Electronic commerce research and applications*, *9*(4), 277-282.

Hair, J. F., Ortinau, D. J., & Harrison, D. E. (2010). *Essentials of marketing research*. McGrawHill/Irwin.

Hair, J. F. (2011). Multivariate data analysis: an overview. *International Encyclopedia of Statistical Science*, 904-907.

Kelly, A. E., & Palaniappan, S. (2019). Survey on customer satisfaction, adoption, perception, behaviour, and security on mobile banking. *Journal of Information Technology & Software Engineering*, *9*(2), 1-15.

Khan, A. G., Lima, R. P., & Mahmud, M. S. (2021). Understanding the service quality and customer satisfaction of mobile banking in Bangladesh: Using a structural equation model. *Global Business Review*, *22*(1), 85-100.

Koenig Lewis, N., Palmer, A., & Moll, A. (2010). Predicting young consumers' take up of mobile banking services. *International journal of bank marketing*, *28*(5), 410-432.

Lin, H. F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International journal of information management*, *31*(3), 252-260.

Lin, H. F. (2013). Determining the relative importance of mobile banking quality factors. *Computer Standards & Interfaces*, *35*(2), 195-204.

Manser Payne, E. H., Peltier, J., & Barger, V. A. (2021). Enhancing the value co-creation process: artificial intelligence and mobile banking service platforms. *Journal of Research in Interactive Marketing*, *15*(1), 68-85.

Mostafa, R. B. (2020). Mobile banking service quality: a new avenue for customer value co-creation. *International Journal of Bank Marketing*, *38*(5), 1107-1132.

Murugun, D. (2023). Technology Adoption in Indian Banking Sectors–2023. *East Asian Journal of Multidisciplinary Research*, *2*(2), 569-580.

Normalini, M. K., & Ramayah, T. (2017). Trust in internet banking in Malaysia and the mo-

derating influence of perceived effectiveness of biometrics technology on perceived privacy and security. *Journal of Management Sciences*, *4*(1), 3-26.

Popelo, O., Dubyna, M., & Kholiavko, N. (2021). World experience in the introduction of modern innovation and information technologies in the functioning of financial institutions. *Baltic Journal of Economic Studies*, *7*(2), 188-199.

Prastiawan, D. I., Aisjah, S., & Rofiaty, R. (2021). The effect of perceived usefulness, perceived ease of use, and social influence on the use of mobile banking through the mediation of attitude toward use. *APMBA (Asia Pacific Management and Business Application)*, *9*(3), 243-260.

Ramli, Y., & Rahmawati, M. (2020). The effect of perceived ease of use and perceived usefulness that influence customer's intention to use mobile banking application. *IOSR Journal of Business and Management*, *22*(6), 33-42.

Raza, S. A., Umer, A., & Shah, N. (2017). New determinants of ease of use and perceived usefulness for mobile banking adoption. *International Journal of Electronic Customer Relationship Management*, *11*(1), 44-65.

Shrestha, D., Wenan, T., Rajkarnikar, N., & Niroula, S. (2021). Analysis of ICT Infrastructure and Tourism Informational Needs: A Case Study of Nepal. *Available at SSRN 3984232*.

Şimşek, G. G., & Noyan, F. (٢٠١٣). McDonald›s ωt, Cronbach›s α, and generalized θ for composite reliability of common factors structures. *Communications in Statistics-Simulation and Computation*, *42*(9), 2008-2025.

Singh, S., & Srivastava, R. K. (2020). Understanding the intention to use mobile banking by existing online banking customers: an empirical study. *Journal of Financial Services Marketing*, *25*(3-4), 86-96.

Shareef, M. A., Baabdullah, A., Dutta, S., Kumar, V., & Dwivedi, Y. K. (2018). Consumer adoption of mobile banking services: An empirical examination of factors according to adoption stages. *Journal of Retailing and Consumer Services*, *43*, 54-67.

Siano, A., Raimi, L., Palazzo, M., & Panait, M. C. (2020). Mobile banking: An innovative solution for increasing financial inclusion in Sub-Saharan African Countries: Evidence from Nigeria. *Sustainability*, *12*(23), 10130.

Taherdoost, H. (2017). Determining sample size; how to calculate survey sample size. *International Journal of Economics and Management Systems*, *2*.

Tam, C., & Oliveira, T. (2017). Literature review of mobile banking and individual performance. *International Journal of Bank Marketing*, *35*(7), 1044-1067.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Widanengsih, E. (2021). Technology acceptance model to measure customer's interest to use mobile banking. *Journal of Industrial Engineering & Management Research*, *2*(1), 73-82.

Wu, C. G., & Ho, J. C. (2022). The influences of technological characteristics and user beliefs on customers' perceptions of live chat usage in mobile banking. *International Journal of Bank Marketing*, *40*(1), 68-86.

Zhang, T., Lu, C., & Kizildag, M. (2018). Banking "on-the-go": examining consumers' adoption of mobile banking services. *International Journal of Quality and Service Sciences*, *10*(3), 279-295.

APPENDIX

Operationalization of variables

S.N.	Symbol	Statements
		User adoption
1	UA1	I find mobile banking to be convenient and easy to use.
2	UA2	I trust my financial institution to keep my personal information and transactions secure.
3	UA3	I would recommend mobile banking to others.
4	UA4	Mobile banking is an essential service for me.
5	UA5	Overall, I am satisfied with my experience using mobile banking.
		Security concerns
6	SC1	I am concerned about the security of my personal information and transactions when using mobile banking.
7	SC2	I trust my financial institution to take appropriate measures to protect my personal information and transactions.
8	SC3	I believe that mobile banking is a safe and secure way to manage my finances.
9	SC4	I feel confident that my financial institution would quickly resolve any security issues that arise with my mobile banking account.
10	SC5	Overall, I am satisfied with the level of security provided by my financial institution's mobile banking service.

S.N.	Symbol	Statements
		Ease of use
11	EU1	The mobile banking app is intuitive and easy to navigate.
12	EU2	I can complete all necessary transactions quickly and efficiently using the mobile banking app.
13	EU3	The mobile banking app provides me with all the information I need to manage my finances.
14	EU4	I prefer using the mobile banking app over other methods of managing my finances.
15	EU5	Overall, I am satisfied with the ease of use of my financial institution's mobile banking service.
		Technical issues
16	TI1	I have experienced technical issues while using mobile banking (e.g., app crashes, slow response times).
17	TI2	The technical issues I have experienced have negatively impacted my satisfaction with the mobile banking service.
18	TI3	I believe my financial institution takes appropriate measures to address technical issues with the mobile banking service.
19	TI4	I would continue using mobile banking despite any technical issues I have experienced.
20	TI5	Overall, I am satisfied with the technical performance of my financial institution's mobile banking service.
		Customer support
21	CS1	I am satisfied with the level of customer support provided by my financial institution for mobile banking.
22	CS2	The customer support provided by my financial institution has been responsive and helpful when I have had issues with mobile banking.
23	CS3	I feel confident that my financial institution would resolve any issues I have with mobile banking in a timely manner.
24	CS4	I would recommend my financial institution's mobile banking service to others based on the level of customer support provided.
25	CS5	Overall, I am satisfied with the customer support provided by my financial institution for mobile banking.
		Mobile banking effectiveness

S.N.	Symbol	Statements
26	ME1	Mobile banking allows me to easily access and manage my account information.
27	ME2	Mobile banking allows me to complete transactions quickly and efficiently.
28	ME3	Mobile banking provides me with a secure way to manage my finances.
29	ME4	Mobile banking is a convenient way to manage my finances.
30	ME5	Overall, I am satisfied with the effectiveness of my financial institution's mobile banking service.