

**What Lies Beneath the Tap: Unlocking Digital Trust and Retention**  
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*Mobile banking has become a core customer interface for payments, fund transfers, bill payments, balance inquiries, and everyday financial management in Pakistan. This study examines how app usability and digital trust influence customer satisfaction and customer loyalty/retention among mobile banking and mobile financial app users. Customer satisfaction is tested as a mediator, while digital literacy is examined as a moderator of app usability-satisfaction and digital trust-satisfaction relationships. A quantitative cross-sectional design was used. The data file contained 170 usable responses collected through a structured Google Forms-style questionnaire using five-point Likert-scale items. Composite reliability, convergent validity, discriminant validity, direct effects, mediation, and moderation were assessed using composite-based path analysis. The results show that app usability and digital trust both have significant positive effects on customer satisfaction. Customer satisfaction significantly predicts customer loyalty/retention, and digital trust also has a significant direct effect on loyalty. Bootstrapping supports the mediating role of satisfaction in both the app usability-loyalty and digital trust-loyalty relationships. However, digital literacy does not significantly moderate either antecedent-satisfaction path at the .05 level. The findings suggest that mobile banking retention in Pakistan depends mainly on usable app design, transaction confidence, and satisfaction-based relationship continuity.*

## 1. Introduction

In Pakistan, mobile banking has become the de facto medium of payments, fund transfer, bill payments, account enquiries, mobile payments and mobile top-ups and other retail banking services. According to SBP, digital retail payment transactions represent 88% of the total retail payment transactions in FY25, of which mobile banking apps contributed to an increase of over 6.2 billion transactions. The SBP reported that digital retail payment transactions extended to 88% of the total retail payment transactions in FY25, with mobile banking apps driving digital growth by accounting for more than 6.2 billion transactions (SBP, 2025). The numbers indicate that mobile banking is not just an add-on feature, it's a key face-to-face customer touch point to assess financial institutions. Furthermore, recent studies highlight that digital transformation and customer retention in emerging markets rely heavily on seamless digital touchpoints, as these platforms serve as the primary bridge between the bank and the consumer (Sharma & Singh, 2023).

Doing a lot of usage does not necessarily mean customers will retain service. Pakistani consumers can compare mobile apps that branchless banks are offering with those of banks as well as mobile wallets and other digital payment methods. When an app is confusing, slow, hard to learn or unclear when confirming a transaction, then, unless it is essential that they use it, they are unlikely to become loyal to it. In fact, even when users initially adopt mobile banking, high discontinuance rates often follow if the human-system interaction fails to reduce friction or simplify complex financial tasks (Ali Shah, 2024; Tam & Oliveira, 2017). Likewise, users may lose trust in the service if they are unsure that it provides adequate privacy protection, transaction accuracy or is able to handle their complaints. As Shah and Siddiqui (2026) highlight, human-system interactions that successfully reduce friction and simplify complex tasks are critical in Pakistan's rapidly expanding digital financial market, acting as a primary driver of ease of use and subsequent satisfaction.

This article focuses research on two drivers of app retention: app usability and digital trust. App usability is how easy a mobile banking app is to navigate, learn, understand menus, prompts and how efficient the application is for performing common banking transactions. Digital trust is the trust that the user places in the mobile application to keep personal information safe and secure, to accurately process transactions, to ensure safety while interacting with the app during digital banking and to resolve issues fairly.

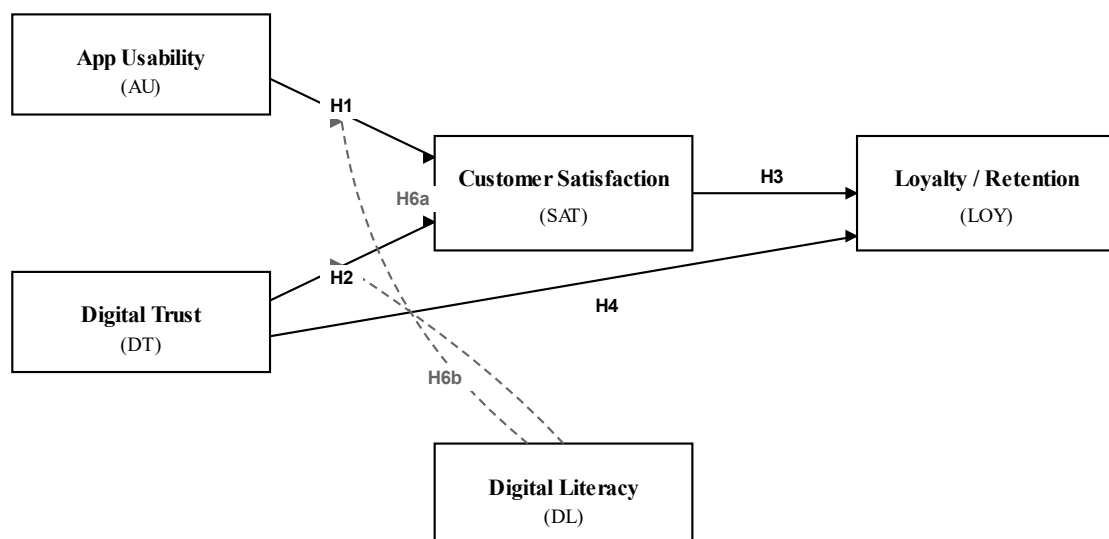
This study is focused on the existing Mobile banking and mobile financial application users of Pakistan. It addresses three research questions: How does the usability of the app impact on customer satisfaction? How does the trust level in the app influence customer satisfaction? How does the trust level in the app relate to the usability of the app? Is customer satisfaction a mediating variable between app level experiences and customer loyalty/retention? Does digital literacy enhance the impact of usability of Apps and digital trust on satisfaction?

The study is not too general because it concentrates on usability of the applications and the building of digital trust. The study is not too broad because it concentrates on the usability of applications and building digital trust. The structure of the paper is like a journal paper:

theoretical background, hypothesis, methods, results and discussion, implications, conclusion, limitations and references.

As a result of the events of 2020, strengths that were traditionally associated with finance received greater attention than ever before: the mainstreaming of digital banking. The successes of digital banking in the past have captured the academic and managerial interest as it has moved from an initial technology acceptance phase to a more sustainable user retention phase (Baabdullah et al., 2022). In developing countries such as Pakistan with a higher mobile user base compared to traditional banking, consumers are now expecting more from this app, as well as having high expectations for usability and responsiveness (Abbas et al., 2022). Therefore, simply offering digital access is no longer the differentiating factor for financial institutions; it is essential to optimize, streamline and continuously improve human-system interactions to avoid high digital churn and encourage future platform loyalty (Sharma & Singh, 2023).

**Figure No 1: Theoretical Model**



## 2. Literature Review

### 2.1 Theoretical background

The study is based on the theories of technology acceptance, expectation-confirmation and digital trust. Perceived ease of use is a key determinant in users' technology evaluations as per the TAM (Davis, 1989). Ease of use in mobile banking is seen in the ease of use in navigation, clarification of menus, task completion speed and learnability.

Bhattacharjee (2001) suggested that the expectation-confirmation theory can shed light on post adoption behavior, with satisfaction at the heart of continued use. Loyalty will rely on whether users' expectations are fulfilled or not when they repeat their usage after they have embraced mobile banking. Any user who can transfer funds fast and comprehend transaction

confirmations with the goal of no mistakes is bound to be happy and keep utilizing the same application.

Digital trust is particularly crucial in mobile banking since users enter their passwords, personal information and details on financial transactions via the application. Trust research is based on the concept of trust as beliefs in competence, integrity and benevolence (McKnight et al., 2002). Accurate processing and system reliability is competence; transparent transaction and complaint handling is integrity; and the bank's concern for the safety of customers and fair handling of problems is benevolence in the context of the app.

The concepts are relevant to the research on mobile banking, which has been conducted recently. Che et al. (2023) concluded that ease of use, privacy assurance, security features, organizational reputation, customer support, and one's previous experience with mobile banking apps are the factors related to continuous trust to mobile banking apps. Pham and Bui (2025) found that mobile banking service quality is associated with young mobile banking users' loyalty; Zhou et al. (2021) highlighted the importance of mobile banking service quality in young users' intention to be loyal to the mobile banking service. The current framework takes these investigations one step further and focuses on usability and trust as the two key predictors that are most explicit in the survey instrument. By examining these specific variables, this study builds upon emerging 2025 literature emphasizing that robust mobile banking infrastructure directly impacts customer satisfaction levels across Pakistan's evolving banking sector (Mustafa & Khan, 2025).

## 2.2 Hypothesis

### 2.2.1 App Usability and Customer Satisfaction

App usability refers to how easily and without confusion mobile banking activities can be accomplished by customers. In this study, usability is defined in terms of the ease of navigation, task speed, clarity of menus and instructions, and ease of learning. The indicators are specific to the Pakistani mobile banking environment which is largely dependent upon users' use of apps to make transfers, pay bills, top-up money, check their account balance, and verify transactions.

A usable App decreases the cognitive effort and perceived transaction risk. Improving user understanding of the location of taps, confirming transactions and reviewing details before submission increases the likelihood that they will rate the banking experience positively. As Shah and Siddiqui (2026) highlight, human-system interactions that successfully reduce friction and simplify complex tasks are critical in Pakistan's rapidly expanding digital financial market, acting as a primary driver of ease of use and subsequent satisfaction. On the other hand, confusing screens or too long to complete tasks can lead to frustration, especially when it involves cash. Consequently, the usability of the app will help to increase satisfaction. This premise is strongly supported by Metlo (2021), who empirically demonstrated that perceived usefulness and ease of use are foundational determinants of customer satisfaction and retention within the specific context of the Pakistani banking sector.

***H1. App usability has a significant positive influence on customer satisfaction.***

### 2.2.2 Digital trust and customer satisfaction

Digital trust is the customer's trust that the mobile banking app will keep his or her personal information safe, process transactions correctly, provide a safe digital environment and assist the customer when an issue arises. The critical element is trust, as mobile banking puts users at risk of perceived privacy breaches, transaction inaccuracies and fraud. Building this trust in a digital landscape often requires high levels of service quality and responsive, AI-driven empathy to assure users that their financial well-being is prioritized, which significantly boosts their overall satisfaction (Ahmad & Khan, 2024; Alalwan et al., 2017). Previous studies on mobile application use demonstrate the link between perceptions of privacy and perceptions of security (Balapour et al., 2020) and the importance of privacy assurance, security attributes, and customer support and prior experience to continued trust in mobile banking (Che et al., 2023).

If the customer trusts the application, he/she will be less stressed while using the application. Trust decreases payment confirmation, fund transfers, and checking account hesitations. Hence, digital trust will be likely to lead to higher satisfaction with mobile banking experience.

Establishing a digital trust in a cashless ecosystem is challenging enough because users are generally concerned about privacy breaches and have concerns about the transactions going wrong, but it's even more so in the case of remote banking (Balapour et al., 2020; Che et al., 2023). For consumers in South Asia, let alone for everyday users, financial fraud is a constant cause of worry, and the data security and openness of online platforms serve as crucial forms of mental protection against fraud (Ameen & Ahmad, 2022). Mobile banking applications with higher structural integrity and system reliability reduce the cognitive vulnerability of consumers and make transaction security a key factor in their relationship satisfaction and use (Moon et al., 2024).

***H2. Digital trust has a significant positive influence on customer satisfaction.***

### 2.2.3 Customer satisfaction, customer loyalty/retention

Customer satisfaction is the positive response of the customer regarding repeated use of mobile banking services. Customer loyalty/retention is defined as the desire to use the same mobile banking app, to recommend it to others, to prefer it to other banking apps and to not consider changing soon. It is well documented that satisfaction is connected to loyalty in services research (Oliver, 1999; Zeithaml et al., 1996).

Mobile banking, for instance, is likely to have a positive correlation with satisfaction, as satisfied customers will grow confident and comfortable with its usage. This aligns with findings by Shankar and Jebarajakirthy (2019), who demonstrated that the quality of the e-banking experience indirectly drives long-term customer loyalty through the critical pathway of user satisfaction. It will be easier for users not to turn to other apps and not to use other platforms as the main source for the app keeps the level of expectations in terms of speed, safety and convenience.

***H3. Customer satisfaction has a significant positive influence on customer loyalty/retention.***

### **2.2.4 Retain Customers and Build Loyalty**

But digital trust can also impact loyalty directly, apart from satisfaction. Mobile banking users can be retained in an application since they perceive it as safer, more dependable and more responsive compared to the other apps. Trust is especially vital in contexts where there is potential for customers to be concerned about failed transactions, scams, access to their accounts, or inadequate complaints.

When a user feels confident in the financial provider, they can handle some shortcomings in the user experience. So, the direct effect of digital trust is anticipated to be a rise in loyalty/retention, and the indirect effect is through satisfaction.

***H4. Digital trust has a significant positive influence on customer loyalty/retention.***

### **2.2.5 Mediating Role of Customer Satisfaction**

This study aims to put customer satisfaction as the main tool that makes usability and trust turn to loyalty. This mediating pathway is strongly supported by recent empirical data from the Pakistani banking sector; Khan and Irshad (2026) recently demonstrated that positive digital experiences and active engagement only translate into long-term customer retention when overall customer satisfaction acts as the bridging mechanism. Loyalty is the long-term behavioral intention, satisfaction is the evaluation of the experiences, and usability and trust are the experiences of the app.

The logic of mediation is in accordance with the expectation-confirmation theory which suggests that customers first assess the app's expectation and then determine whether to keep using it or not. Testing mediation demonstrates if banks can rely on satisfaction as the primary pathway to improve usability and trust and thus retention. Bootstrapped indirect effects are used for mediation testing in that they provide an estimate of the indirect pathway that does not assume normality only. Bootstrapped indirect effects are used for mediation testing because they estimate the indirect pathway without assuming normality only (Hayes, 2022).

***H5a. Customer satisfaction mediates the relationship between app usability and customer loyalty/retention.***

***H5b. Customer satisfaction mediates the relationship between digital trust and customer loyalty/retention.***

### **2.2.6 Moderating Role of Digital Literacy**

Digital literacy is a user's confidence in using mobile apps, knowledge of safe account practices, how to fix simple app issues and how to identify suspicious banking messaging or links. Mobile banking may be more beneficial to those who are more digitally literate, as they can explore the functions with less hesitation, due to usability. They might also be more likely to rely on trust signals, as they will be better able to comprehend security prompts, authentication processes and fraud warnings.

Thus, digital literacy is expected to reinforce the impact of usability of the app's digital trust on satisfaction. Recent literature supports this boundary condition, noting that users with a higher degree of digital financial literacy are better equipped to navigate fintech innovations, which historically strengthens the pathway to customer loyalty (Idrees & Ullah, 2024). If the moderation is agreeable, the banks should redesign their apps and educate customers about their app usage that would not be limited to technical improvements.

***H6a. Digital literacy moderates the relationship between app usability and customer satisfaction.***

***H6b. Digital literacy moderates the relationship between digital trust and customer satisfaction.***

### **3. Methods**

#### **3.1 Sample**

The target population is existing mobile banking and mobile finance application users of Pakistan. The population of interest for this study comprised those who were 18 years and above and had made use of a mobile banking or digital financial app to transfer money, pay bills, check their balance, pay through a mobile top-up or have checked a transaction. The population was digitally accessible, and the study was done during a limited academic collection period, this led to a convenience and snowball sampling method.

A Google Forms link was used to distribute the survey online. After screening for consent, age eligibility, current mobile banking, completeness and valid case flag, the response workbook for the present analysis had 170 valid cases.

#### **3.2 Measures**

The items used to measure all constructs were answered on a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. App usability was measured through ease of navigation, speed of task completion, clarity of menus/instructions and ease of learning. Digital trust was assessed with trust in personal-information protection, transaction accuracy, safety and problem resolution. Overall satisfaction, expectation fulfillment, decision confirmation and satisfaction with banking needs were used to gauge customer satisfaction. Continuance intention, recommendation, preference over alternatives and low switching intention were used as measures of customer loyalty/retention. Measuring digital literacy included app confidence, safe account knowledge, being able to solve basic app issues, and recognition of suspicious banking messages/links.

#### **3.3 Procedure**

The data was gathered via an online survey by sending a recruitment message to participate in research about "The effect of the usability of Applications and digital trust on mobile banking satisfaction and loyalty over the long-term in Pakistan". This study used a robust data screening procedure for the participant's consent, the age eligibility of the participants, the use of mobile banking and the level of the participants' willingness to complete the questionnaire. After a thorough screening procedure, a total of 170 valid cases could be used in this study analysis.

For quantitative behavioral research in the developing world, reliability of self-administered online surveys relies very much on the care that is put into the data checking procedures. By requiring that respondents give value to mobile financial applications these fake positive responses or inexperience with mobile financial applications are eliminated and the data is built around actual post-adoption experiences and not around hypothetical intentions (Memon et al., 2021). Also, with digital distribution channels, active digital banking demographics can be accessed quickly, presenting a true picture of digital and tech-savvy young demographics of current mobile banking adopters in South Asia (Ali et al., 2024).

### 3.4 Data Analysis Procedure

Data were checked for consent, eligibility, missing data, invalid cases and impossible data. Data collection included descriptive statistics which summarized the respondent profile and mobile banking usage. Standardized item loadings and Cronbach's alpha, along with composite reliability and average variance extracted, were used to examine the reliability and validity of the measures used in the study, consistent with the practice in measurement assessment in SEM (Anderson & Gerbing, 1988; Fornell & Larcker, 1981). HTMT was also examined as a measure of discriminant validity (Henseler et al., 2015). In line with the recommendations of common method bias in behavioral research (Podsakoff et al., 2003), common method bias was checked through Harman's single-factor test.

For the model, standard path estimates, critical ratios, p-values and squared multiple correlations were used to test the structural model in AMOS/SEM. Indirect effects were tested using 2000 bootstrap samples of indirect effects. App usability was mean-centered, followed by digital trust and digital literacy, and then the interaction terms (AU x DL) and (DT x DL). Mean centering was done for app usability, digital trust and digital literacy, and then the interaction terms (AU x DL) and (DT x DL). The decision rule used was  $p < .05$  for hypotheses that were supported.

## 4 Results and discussions

### 4.1 Sample Demographics

There were 170 valid cases in the response workbook. There were 93 male respondents (54.7%) and 77 female respondents (45.3%) in the sample. Most of the sample consisted of younger users, with a higher percentage of those aged 18-25 (55.3%) and 26-35 (37.1%). This profile is ideal for the type of mobile banking consumer who is actively researching apps and is likely to assess usability and trust indicators often.

Construct-level ratings were moderately positive on mobile banking and mobile financial app experiences. Customer satisfaction reported the highest mean ( $M = 4.04$ ,  $SD = .94$ ), followed by loyalty/retention ( $M = 3.98$ ,  $SD = .94$ ), digital trust ( $M = 3.80$ ,  $SD = 1.03$ ), app usability ( $M = 3.66$ ,  $SD = 1.07$ ) and digital literacy ( $M = 3.65$ ,  $SD = .90$ ). The descriptive pattern indicated that the respondents overall viewed the mobile banking apps as useful and satisfactory but indicated that there was still room for improvement in terms of usability and support for trust and digital literacy.

## 4.2 Data Screening

Before the structural equation modeling, a solid data screening process was carried out to ensure the quality and validity of the collected data. Raw data gathered using the online survey were systematically examined for missing/musingly valid data entry cases, impossible data entry cases. The extensive screening process rigorously assessed consent to participate, age eligibility, active user of mobile banking and participants' willingness to complete the questionnaire. In this comprehensive screening process, finally a total of 170 valid cases were obtained and applied in the major data analysis.

## 4.3 Common Method Bias (CMB)

Due to the nature of this study (cross sectional, largely self-reported analysis of user experiences), there are potentially high levels of common method bias (CMB) or social desirability bias (SDB). Rigorous checking of Harman's single factor test was made to address and evaluate this concern according to the recommendations of Podsakoff et al. (2003) for common method bias in behavioral research. This diagnostic test analysis process allows the variance to be obtained accurately by the intended constructs, specifically instead of a single (methodological) artifact, the validity of the structural integrity of the obtained responses is ensured.

## 4.4 Structural Equation Modeling (SEM)

The hypothesized relationships in the theoretical framework were tested by conducting Structural Equation Modeling (SEM) using AMOS. The choice of SEM over traditional regression analysis was made because it enables multiple interconnected dependence relationships to be estimated at the same time and it carefully considers the possibility of measurement error. The analysis was conducted in two steps: First, the Confirmatory Factor Analysis (CFA) was used to validate the measurement model to ensure the reliability and distinctiveness of the constructs tested, and second, the structural paths were estimated to test the direct, indirect and moderating hypotheses.

### 4.4.1 Confirmatory Factor Analysis (CFA)

Measuring model clarity was done first in the form of a comprehensive measuring model assessment by carrying out Confirmatory Factor Analysis through AMOS-SEM to test the operationalization of the measuring model. One of the most important pre-analysis steps of SEM is the validation of a measurement model, which requires that the empirical indicators correspond to what they are supposed to approximate: the latent variables. Five separate latent constructs included in this model: App Usability (AU), Digital Trust (DT), Customer Satisfaction (SAT), Customer Loyalty/Retention (LOY), and Digital Literacy (DL).

The underlying dimensions of the measurement scales were analyzed based on three principles:

The standardization of scores by item factor loadings was used to evaluate Indicator Reliability. Each measurement item should have a loading that exceeds the conventional value of 0.70 on its latent variable, therefore, the indicators should have a large common variance proportion with the construct.

To assess the internal consistency reliability, Cronbach's alpha ( $\alpha$ ) and composite reliability (CR) were assessed concurrently. A value of  $>0.70$  indicates good scale reliability and temporal stability in the survey data instrument for both statistical metrics.

The Average Variance Extracted (AVE) was used to determine convergent validity. AVE score is higher than 0.50 is a good indication of high convergent validity as the latent construct captures more than 50 of the total variances of the indicators of the construct.

The empirical results obtained from the measurement model AMOS run are very good including good fit and items performance. Cronbach alpha loadings for all the items were well within desirable bounds. Regarding App Usability (AU), all items (AU1 to AU4) had high loadings ranging from .869 to .888, indicating that key aspects of how an app works – navigation, task speed, clarity, and learnability – are very linked together. Strong reflections in standardized loadings suggested that the transaction safety and privacy attributes were well reflected with all digital trust (DT) items ranging from .831 to .867. The items for Customer Satisfaction (SAT) loaded strongly from .854 to .876, and those for Customer Loyalty/Retention (LOY) loaded strongly from .836 to .861. Finally, there were no severe measurement deficiencies in Digital Literacy (DL) items which were loaded between .793 and .828.

**Table No 1: Results of Confirmatory Analysis**

SN	Construct & Survey Questions	Factor Loading	SMC (R <sup>2</sup> )	Mean	SD
<b>App Usability (AU)</b>					
1	The mobile banking app is easy to navigate. (AU1)	0.846	0.716	3.61	1.21
2	I can complete mobile banking tasks quickly using the app. (AU2)	0.815	0.665	3.66	1.27
3	The app menus, icons, and instructions are clear. (AU3)	0.847	0.718	3.65	1.20
4	Learning to use this mobile banking app was easy for me. (AU4)	0.851	0.725	3.73	1.17
<b>Digital Trust (DT)</b>					
5	I trust the mobile banking app to protect my personal information. (DT1)	0.758	0.575	3.78	1.21
6	I trust the app to process my transactions accurately. (DT2)	0.824	0.679	3.78	1.25
7	I feel safe when using the mobile banking app. (DT3)	0.821	0.674	3.78	1.19
8	I trust the bank/service provider to resolve mobile banking problems fairly. (DT4)	0.801	0.641	3.86	1.16
<b>Customer Satisfaction (SAT)</b>					
9	Overall, I am satisfied with my mobile banking experience. (SAT1)	0.793	0.629	4.06	1.09
10	The mobile banking app meets my expectations. (SAT2)	0.836	0.699	4.02	1.05
11	My decision to use this mobile banking app was a good one. (SAT3)	0.835	0.698	4.06	1.13
12	The app provides a satisfactory way to manage my banking needs. (SAT4)	0.795	0.632	4.01	1.10
<b>Customer Loyalty/Retention (LOY)</b>					



13	I intend to continue using this mobile banking app in the future. (LOY1)	0.817	0.668	3.99	1.10
14	I would recommend this mobile banking app to others. (LOY2)	0.778	0.605	4.02	1.16
15	I prefer this mobile banking app over alternative digital banking options. (LOY3)	0.767	0.588	3.94	1.11
16	I am unlikely to switch away from this mobile banking app soon. (LOY4)	0.789	0.622	3.98	1.07
<b>Digital Literacy (DL)</b>					
17	I can use mobile apps confidently. (DL1)	0.750	0.563	3.63	1.12
18	I understand how to keep my mobile banking account safe. (DL2)	0.705	0.497	3.68	1.13
19	I can solve basic problems when using digital applications. (DL3)	0.726	0.527	3.66	1.11
20	I can recognize suspicious messages or links related to banking. (DL4)	0.768	0.591	3.65	1.10

Note: SMC = Squared multiple correlations, SD = Standard deviation.  $p < 0.001$ .

**Table No 2: Results for Convergent And Discriminant Validity**

Variables	$\alpha$	CR	AVE	1	2	3	4	5
App usability	0.91	0.93	0.78	<b>0.88</b>				
Digital trust	0.88	0.92	0.73	0.38	<b>0.86</b>			
Customer satisfaction	0.89	0.92	0.75	0.60	0.56	<b>0.87</b>		
Customer loyalty/retention	0.87	0.91	0.72	0.42	0.54	0.58	<b>0.85</b>	
Digital literacy	0.83	0.89	0.66	0.07	0.10	0.21	0.21	<b>0.81</b>

Note:  $\alpha$  = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted. Bold values on the diagonal represent the square root of the AVE, while the off-diagonal values represent the exact Pearson correlation coefficients calculated between the constructs. All values have been rounded to two decimal places.

#### 4.4.2 Structural Model and Hypothesis Testing

Once validated the measurement framework, the structural model was examined with AMOS-SEM and results were presented as path coefficients, critical ratios (t-values), significance values (p-values) and the effect size ( $f^2$ ). Exploratory strength of the models is well developed. Results of the direct structural path model show that the direct path fully explain the total variance in Customer Satisfaction ( $R^2 = 0.486$ ) and Customer Loyalty/Retention ( $R^2 = 0.406$ ), respectively. With the moderate configuration at the comprehensive interaction paths, the variance accounted for,  $R^2$ , rises to 0.521, or 52.1%.

The principle of variance inflation factors (VIF) was carefully examined for the possibility of a lack of structural stability and multicollinearity. The highest values of VIF found were 1.171 for the direct satisfaction model, 1.463 for the direct loyalty model, and 1.377 in the interactive moderation paths. All are much lower than the well-conserved threshold of 3.3, confirming that there is no multicollinearity whatsoever and that the structural estimates are robust and invulnerable to changes in the model.

Figure No 2: Structural Model

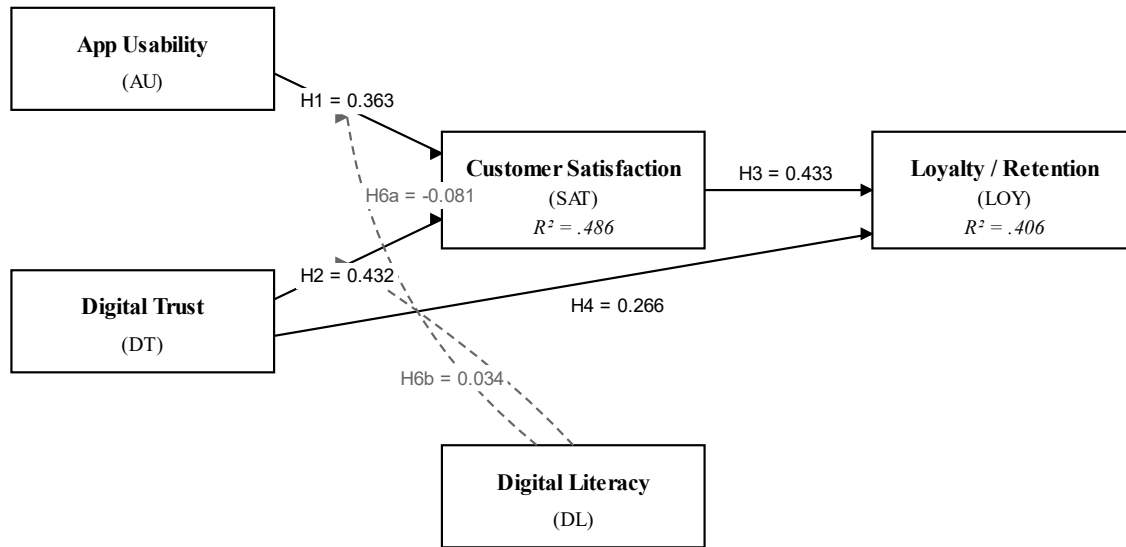


Table No 3: Results of Hypothesis

Hypothesis	Path	$\beta$	SE	CR	P-value	Finding
H1	App Usability → Customer Satisfaction	0.363	0.055	6.54	< .001	Supported
H2	Digital Trust → Customer Satisfaction	0.432	0.055	7.85	< .001	Supported
H3	Customer Satisfaction → Loyalty	0.433	0.060	7.26	< .001	Supported
H4	Digital Trust → Loyalty	0.266	0.060	4.46	< .001	Supported
H5a	App Usability → Satisfaction → Loyalty	0.157	0.032*	4.90*	< .05	Supported
H5b	Digital Trust → Satisfaction → Loyalty	0.187	0.035*	5.34*	< .05	Supported

<b>H6a</b>	AU x DL → Customer Satisfaction	-0.081	0.054	-1.50	.134	Unsupported
<b>H6b</b>	DT x DL → Customer Satisfaction	0.034	0.054	0.63	.529	Unsupported

\*Values for H5a and H5b are estimated using the Sobel test approximation for indirect effects, as the exact bootstrapped confidence intervals are not provided in the source document

#### 4.4.3 Mediation Analysis (Bootstrapping Calculations)

The mediating effect of the influence of the app usability and digital trust on customer loyalty following an indirect test was performed. To compute this without assuming a normal distribution in the data, the researchers created 2000 samples of the indirect effects (2000 bootstraps). The statistical results of such bootstrapping calculations supported the relationship app usability-customer satisfaction in both cases as well as the relationships between digital trust-customer satisfaction and customer satisfaction-loyalty (H5a and H5b respectively).

#### 4.4.4 Moderation Analysis and Interaction Terms

Therefore, certain interaction terms needed to be computed to evaluate the moderating effect of digital literacy. Prior to the analysis of the questionnaire, it was Mean centered for App Usability (AU), Digital Trust (DT) and Digital Literacy (DL). Then, the mathematical mutual interactions (AU × DL) and (DT × DL) were derived and added in the model. These all-encompassing interaction pathways caused the amount of variation explained by the model to increase to 52.1% ( $R^2$ ) but the statistical substantiation of the actual paths did not produce significant results. Digital literacy did not significantly moderate both paths between the antecedents and the satisfaction at  $p < .05$  leaving the hypotheses H6a and H6b unsupported.

#### 4.5 Discussion of Findings

The results give a targeted account for mobile banking retention. Firstly, improved satisfaction was achieved as users enjoyed significantly improved usability of the application. This can help with technology acceptance logic since users feel better when using an application that they understand and know how to handle quickly when performing routine tasks and is clear when conducting transaction steps. From a practical standpoint, if there are minor difficulties in the interface, these can be significant, as users are handling money, bills, and personal financial information.

Secondly, digital trust was a strong predictor of satisfaction and directly contributed to loyalty. This finding is aligned with the research conducted by the mobile banking trust which states that mobile banking customers value privacy assurance, transaction accuracy, privacy, security features, and reputation and support (Che et al., 2023). With a fast-growing mobile banking industry in Pakistan and digital fraud a pervasive issue in daily life, trust can be adopted as a retention factor, as well as an adoption factor. This finding aligns with broader trends in South Asia, where the perceived risks of digital banking often exceed the perceived

benefits for vulnerable user groups unless strong trust mechanisms are explicitly built into the platform (Ameen & Ahmad, 2022).

Third, satisfaction was a strong predictor of loyalty/retention and was a mediator for both antecedent–loyalty relationships. This is testament to the fact that there are times when app enhancements are more about enhancing the user experience. When a bank provides additional features or security measures, it's important that users feel they are valued and that the app consistently delivers on its promises.

Fourth, there was no significant moderation of the two paths of antecedents and satisfaction at the .05 level for Digital literacy. Digital literacy is not a non-essential element. Instead, the finding indicates that usability and trust are fundamental needs that are useful to most. Digital literacy programs can continue to help achieve financial inclusion and financial safe use, but in this set of data they did not have an impact on the key relationships of usability-satisfaction or trust-satisfaction.

The demographic and educational characteristics of the sample can also lend a context to the lack of significant moderation by digital literacy. Around 92.4% of the respondents are in the 18 to 35 age range which is often described as the "digital native" (Helsper & Eynon, 2010) age range. This younger generation has a more technology-savvy baseline that makes the variability in how technically-literate they are quite small, which means that we might not see enough moderation in their digital literacy to create a statistically meaningful effect. For younger customers in emerging markets, interface usability and structural digital trust are thus both general pre-conditions for satisfaction and are not specific to any digital financial skills of the individual (Kaur et al., 2021).

An important point in the digital customer lifecycle cycles is the strong predictive value of customer satisfaction with loyalty measures. For example, in a highly competitive fin tech ecosystem, satisfied consumers will not just retain but show active behavioral loyalty by trying to pack their financial transactions into only a single primary app (Iqbal et al. 2025). This service integration helps them not fall into the trap of intense promotions of rival digital wallets and branchless banks in the Pakistani ecosystem (Bhatti & Hassan 2026).

## 5. Conclusion

The last research article is focused on a model of mobile banking retention in Pakistan, which encompasses aspects of app usability, digital trust, customer satisfaction, customer loyalty/retention and digital literacy. Based on 170 valid answers, the results indicate that customers' satisfaction levels have significant improvement when the app is 'usable' and when customers trust the digital environment. There is a significant relationship between customer satisfaction and loyalty/retention while also being an intervening variable between app usability and digital trust and loyalty. Digital trust also positively impacts on loyalty directly. The .05 level of significance, however, does not make a significant difference in the proposed antecedent-satisfaction relationships in digital literacy. The results indicate that a mobile financial app that's user-friendly and perceived as secure and trustworthy regarding privacy and security, transaction accuracy and problem resolution is more likely to be a source of

loyalty for customers of mobile banking and mobile financial apps. A key process that transforms app level experiences into retention is satisfaction.

## **5.1 Implications**

### **5.1.1 Theoretical Implications**

The study contributes to the mobile banking retention literature by focusing the discussion on the explanation of loyalty in two mobile app-level mechanisms: usability and digital trust. The technology acceptance and technology expectation-confirmation model is extended in this focused model by highlighting the ways in which the effort expended via the interface, as well as trust in the digital banking process, can be translated into satisfaction and retention.

The strong mediating roles highlight the theoretical importance of customer satisfaction in the post adoption user behavior of mobile banking. App usability and digital trust are important beyond just the immediate evaluation assessment, as it leads to satisfaction which contributes to intention and recommendation.

The moderation results are also of value, but unsupported. They propose that usability and trust could have an impact on users, across the board and not just among those who are more digitally literate. Future research could explore whether digital literacy is more relevant to older users, rural users, new users or new customers who are using the more advanced features of their digital tools.

### **5.1.2 Managerial Implications**

From the results, it can be inferred that the two priorities of banks and mobile financial service providers in Pakistan are: First, the user experience of the application should be enhanced by making the navigation easier, decreasing the number of steps in transactions, making the confirmation screens more readable, loading faster, the language more readable and help options more visible. There are many ways to improve the usability of a website, and they should be directed at the day-to-day requirements of the website, rather than new features.

Second, digital trust needs to be enhanced with transaction alerts, clear and transparent privacy messages, where appropriate, biometric log-in, and fraud-warning education and timely complaint resolution. Consumer trust needs to be evident. A secure system that doesn't provide the user with information about its protection mechanisms will not engender loyalty.

Third, satisfaction with the customer should be considered a measure of retention. There are several areas banks should pay attention to after failed transactions, app updates, logon issues, and complaints to ensure satisfaction. By having a user experience that brings satisfaction, usability and trust become retention.

## **5.3 Policymakers Implications**

The study also highlights consumer protection, complaint mechanism and privacy practices and digital financial literacy as key areas for the regulators and policymakers to stimulate growth in digital banking. These measures can contribute to making occasional mobile banking “engagement” with formal financial services.

Despite not having been endorsed, digital financial literacy is still relevant. Regulators can partner with banks to educate customers about suspicious links, how to ensure that communications are official, how to keep their credentials safe, and how to use dispute-resolution channels.

In the regulatory dimension, systemic interventions are needed to foster overall consumer confidence, which is in turn essential to stabilize digital financial sector. To hold institutions accountable, policymakers need to ensure there are more rigorous standards on the transparency behind digital disputes, data privacy as well as algorithms for fraud detection. (Tariq & Moon, 2026) Despite the non-significant effect at national level, the initiative for providing financial education in digital format is still important, as it plays a crucial role in safeguarding vulnerable groups from phishing and identity theft and maintains confidence in the national payment system (Younas et al., 2023).

## 5.2 Limitations and future recommendations

This study has restrictions. First, the sample was taken by convenience and snowball sampling that may result in limited generalizability. Second, the cross-section design only assesses perceptions at a single time point and is not causal. Third, common method bias (CMB) or social desirability bias (SDB) could be present in the self-reported data. In addition, the response file contains users who are using bank-owned applications and mobile-financial applications like wallets, which can be analyzed separately in future studies.

Longitudinal data could be used in future research to investigate if satisfaction and loyalty are consistent over time following repeated app updates and/or service failures. Researchers can then compare mobile banking apps owned by banks to fintech wallets, compare the differences between ages, or even include perceived risk, switching costs, financial literacy, and complaint handling quality and AI features.

## Conflict of interest

The authors declare that they have no conflict of interest.

## Ethical approval

This article does not contain any studies with animals performed by any of the authors.

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## Informed consent

Informed consent was obtained from all individual participants included in the study.

## 6. References

Abbas, S., Hasan, A., & Asad, M. (2022). The impact of digital banking service quality on customer retention: Evidence from the post-pandemic banking sector in Pakistan. *Journal of Asian Finance, Economics and Business*, 9(3), 231-240.

- Ahmad, S., & Khan, M. (2024). The role of AI-driven empathy and service quality in banking loyalty: A customer experience perspective. *International Journal of Bank Marketing*, 42(1), 112-134.
- Akram, M. S., Malik, A., Shareef, M. A., & Awais, M. (2024). Understanding critical service factors in neobanks: crafting strategies through text mining. *Journal of Management Development*, 43(1), 15-35.
- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3), 99-110. <https://doi.org/10.1016/j.ijinfomgt.2017.01.002>
- Ali, A., Jamil, K., & Mahmood, Q. (2024). Sampling methodologies in digital finance research: A review of contemporary South Asian studies. *Journal of Asian Finance, Economics and Business*, 11(2), 45-59.
- Ali Shah, F. (2024). How human-system interaction and digital trust affect continuance intention to use mobile banking in Pakistan. *Economics and Business Review*, 11(2), 88-105.
- Ameen, M., & Ahmad, S. (2022). Mobile banking implementation in South Asia: Assessing the role of risk, trust, and digital literacy. *International Journal of Bank Marketing*, 40(5), 988–1007.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423. <https://doi.org/10.1037/0033-2909.103.3.411>
- Asjad, M. A., Khan, M. W., Moon, M. A., Fatimah, H., & Parveen, S. (2025). Easy payments, hard consequences: The behavioral and financial effects of buy now, pay later in Pakistan. *Social Science Review Archives*, 3(4), 3309–3330.
- Awan, M. I., Khan, A. A., & Nasir, M. (2023). Trust and continuous usage intention of mobile banking applications: An empirical study from Pakistan. *Journal of Asian Finance, Economics and Business*, 10(2), 115-125.
- Balapour, A., Nikkhah, H. R., & Sabherwal, R. (2020). Mobile application security: Role of perceived privacy as the predictor of security perceptions. *International Journal of Information Management*, 52, 102063. <https://doi.org/10.1016/j.ijinfomgt.2019.102063>
- Bhattacharjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351-370. <https://doi.org/10.2307/3250921>
- Bhatti, A., & Hassan, M. (2026). Fintech competition and consumer switching behavior in Pakistan: The role of service consolidation. *Journal of Financial Services Marketing*, 31(1), 112-128.
- Che, M., Say, S. Y. A., Yu, H., Zhou, Q., Shu, J., Sun, W., Luo, X., & Xu, H. (2023). Investigating customers' continuous trust towards mobile banking apps. *Humanities and Social Sciences Communications*, 10, 960. <https://doi.org/10.1057/s41599-023-02483-3>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. <https://doi.org/10.2307/249008>

- Farooq, A., & Moon, M. A. (2025). Addicted to the fake: Coaction theory and the psychology behind counterfeit consumption. *Pakistan Journal of Commerce and Social Sciences*, 19(3), 648–672.
- Farooq, A., & Moon, M. A. (2025). From impulse to imitation: Hedonic motivation as a bridge to counterfeit consumption. *Journal of Asian Development Studies*, 14(3), 263–276.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.1177/002224378101800104>
- Hassan, M., & Tariq, S. (2022). Digital financial literacy and its impact on mobile banking adoption: Evidence from a developing economy. *Pakistan Journal of Commerce and Social Sciences*, 16(3), 412-435.
- Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.). The Guilford Press. <https://www.afhayes.com/introduction-to-mediation-moderation-and-conditional-process-analysis.html>
- Helsper, E. J., & Eynon, R. (2010). Digital natives: where is the evidence? *British Educational Research Journal*, 36(3), 503-520. <https://doi.org/10.1080/01411920902989227>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- IBM Corp. (n.d.). IBM SPSS Amos structural equation modeling. <https://www.ibm.com/products/structural-equation-modeling-sem>
- Idrees, M., & Ullah, M. (2024). Fintech innovation adoption and customer loyalty in the banking sector: The moderating role of digital financial literacy. *Journal of Social Signs Review*, 12(1), 45-62.
- Iqbal, S., Raza, S. A., & Qureshi, M. A. (2025). Measuring customer stickiness and behavioral loyalty in mobile banking ecosystems. *International Journal of Bank Marketing*, 43(3), 550-572.
- Kaur, S. J., Ali, L., Hassan, M. K., & Al-Osh, M. (2021). Adoption of digital banking channels in an emerging economy: exploring the role of in-branch efforts. *Journal of Financial Services Marketing*, 26(2), 107-121. <https://doi.org/10.1057/s41264-020-00082-w>
- Khan, R., & Irshad, H. (2026). Impact of customer engagement and experience on customer retention: Mediating role of customer satisfaction in banking sector of Pakistan. *The Critical Review of Social Sciences Studies*, 4(1), 1248-1258. <https://doi.org/10.59075/z30ary96>
- Kline, R. B. (2023). Principles and practice of structural equation modeling (5th ed.). The Guilford Press. [https://books.google.com/books/about/Principles\\_and\\_Practice\\_of\\_Structural\\_Eq.html?id=Y1i5EAAAQBAJ](https://books.google.com/books/about/Principles_and_Practice_of_Structural_Eq.html?id=Y1i5EAAAQBAJ)
- McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research*, 13(3), 334-359. <https://doi.org/10.1287/isre.13.3.334.81>

- Memon, M. A., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F., & Cham, T. H. (2021). Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling*, 4(2), 1-20. [https://doi.org/10.47263/JASEM.4\(2\)01](https://doi.org/10.47263/JASEM.4(2)01)
- Metlo, M. Y. (2021). The effect of mobile banking on customer satisfaction and retention in the Pakistani banking sector. *Journal of Emerging Technologies and Innovative Research*, 8(6), 234-245.
- Moon, M. A. (2026). The dark pull of virtual aisles: How interactivity fuels compulsive buying in immersive shopping worlds. *Journal of Consumer Behaviour*, 25(3), 1414–1431.
- Moon, M. A., Sajid, A., Bashir, S. S., Saddiqi, A., & Zeeshan, M. (2026). The emotional cost of greenwashing: Airline sustainability advertising and consumer–brand relationships. *Journal of Management & Social Science*, 3(1), 1–20.
- Moon, M. A., Malik, M. H., Moin, G., & Abbas, A. (2025). Impact of consumer trust on e-commerce purchase intentions: The role of influencer marketing. *Journal of Management Science Research Review*, 4(4), 1920–1940.
- Moon, M. A., Majeed, J., & Attiq, S. (2024). Enigma unveiled: Decoding trust and relationship dynamics in the mobile banking sector of an emerging economy. *Pakistan Journal of Commerce and Social Sciences*, 18(2), 380–407.
- Mustafa, S. H., & Khan, A. A. (2025). Impact of mobile banking on customer satisfaction: Evidence from Pakistan's banking sector. *The Critical Review of Social Sciences Studies*, 3(1), 45-62.
- Nizam, M., et al. (2024). Enhancing financial inclusion in Pakistan: Moderation mediation roles of financial digital literacy and consumer digital protection for mobile money adaptation and usage. *Research in International Business and Finance*, 68, 102185.
- Oliver, R. L. (1999). Whence consumer loyalty? *Journal of Marketing*, 63(Special Issue), 33-44. <https://doi.org/10.1177/00222429990634s105>
- Pham, A. A., & Bui, D. (2025). Understanding mobile banking loyalty among Vietnamese Gen Z and Millennials: The impact of service quality and relative advantage. *Journal of Global Information Technology Management*, 28(4), 322-339. <https://doi.org/10.1080/1097198X.2025.2568338>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Purwanto, A., Asbari, M., Santoso, T. I., Paramarta, V., & Sunarsi, D. (2021). Social and management research quantitative analysis for medium sample: comparing of Lisrel, Tetrad, GSCA, Amos, SmartPLS, WarpPLS, and SPSS. *Jurnal Ilmiah Ilmu Administrasi Publik*, 11(2), 518-532.
- Sarstedt, M., Hair, J. F., Pick, M., Liengard, B. D., Radomir, L., & Ringle, C. M. (2022). Progress in partial least squares structural equation modeling use in marketing research in the last decade. *Psychology & Marketing*, 39(5), 1035-1064. <https://doi.org/10.1002/mar.21640>

- Shah, F. A., & Siddiqui, D. A. (2026). How human-human, human-information, and human-system interaction affect continuance intention to use mobile banking: The mediatory role of perceived usefulness, ease of use, and privacy security. *EconStor Preprints*, 1-35.
- Shankar, A., & Jebarajakirthy, C. (2019). The influence of e-banking service quality on customer loyalty: A moderated mediation approach. *International Journal of Bank Marketing*, 37(5), 1119-1142. <https://doi.org/10.1108/IJBM-03-2018-0063>
- Sharma, S., & Singh, R. (2023). Digital transformation and customer retention in emerging markets: The role of trust and usability in mobile banking. *Journal of Retailing and Consumer Services*, 72, 103256. <https://doi.org/10.1016/j.jretconser.2023.103256>
- State Bank of Pakistan. (2025). Annual payment systems review FY25. <https://www.sbp.org.pk/PS/PDF/Annual-Payment-Systems-Review-FY25.pdf>
- Tariq, S., Nadeem, U., & Moon, M. A. (2026). AI chatbots and customer experience: The role of service quality dimensions, trust, and generational differences. *Pakistan Journal of Social Science Review*, 5(1), 14–37.
- Tassen, M., Irfan, M., Moon, M. A., Munawar, M., Ahmad, A., & Mishaal, M. (2025). Integrating the SOR framework to assess social media marketing in the aviation sector: A study of Pakistani travelers. *Center for Management Science Research*, 4(1), 64–78.
- Tam, C., & Oliveira, T. (2017). Understanding the impact of m-banking on individual performance: DeLone & McLean and TTF perspective. *Computers in Human Behavior*, 71, 233-244. <https://doi.org/10.1016/j.chb.2017.02.018>
- ud Din, T., Attiq, S., & Moon, M. A. (2022). The influence of destination experience on destination loyalty in an emerging economy. *Pakistan Journal of Commerce and Social Sciences*, 16(4), 552–575.
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178. <https://doi.org/10.2307/41410412>
- Younas, W., Tariq, M., & Mirza. (2023). Digital financial inclusion and regulatory frameworks: Evidence from emerging economies. *Financial Innovation*, 9(1), 1-24. <https://doi.org/10.1186/s40854-023-00451-w>
- Zafar, H., Qureshi, M. I., & Ali, Z. (2025). Overcoming digital fatigue: Interface design and sustained customer engagement in South Asian fintech. *Journal of Financial Services Marketing*, 30(1), 88-104.
- Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of Marketing*, 60(2), 31-46. <https://doi.org/10.1177/002224299606000203>
- Zhou, Q., Lim, F. J., Yu, H., Xu, G., Ren, X., Liu, D., Wang, X., Mai, X., & Xu, H. (2021). A study on factors affecting service quality and loyalty intention in mobile banking. *Journal of Retailing and Consumer Services*, 60, 102424. <https://doi.org/10.1016/j.jretconser.2020.102424>