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Adoption of Mobile Wallets in Pakistan: Trends, Determinants, and Financial Inclusion Implications (FY2019–FY2025)

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Abstract

Mobile wallet adoption is a pivotal tool for achieving financial inclusion in developing countries, but its trend, drivers and consequences in Pakistan have been overlooked. We investigate the trends of mobile wallet adoption in Pakistan between FY2019 and FY2025 adopting a wide range of statistical tools on secondary data obtained from State Bank of Pakistan (SBP) Payment Systems Reviews and World Bank Global Findex Database. Using descriptive statistics, Shapiro-Wilk normality tests, Ordinary Least Squares (OLS) regression, Pearson and Spearman correlation, Augmented Dickey-Fuller (ADF) unit root tests, ARIMA forecasting, Mann-Kendall trend analysis, multiple linear regression, One-Way ANOVA with Tukey HSD post-hoc comparisons, chi-square tests, Principal Component Analysis (PCA), logistic regression, independent samples t-test, and Kruskal-Wallis H Results demonstrate that BB App users grew from 8 million in FY2019 to 72 million in FY2025 (R^2 = 0.978, $p < 0.001$), while digital wallet penetration increased from 10.5% to 50.2% (R^2 = 0.988, $p < 0.001$). ARIMA projections indicate a penetration rate of about 72% by FY2028. The Mann-Kendall test indicated significant monotonic upward trends for all adoption indicators ($Z = 3.004$, $p = 0.003$). Provider-level ANOVA showed significant platform transactional variance with JazzCash and Easypaisa leading the charge. PCA revealed the composite leading driver as broadband penetration, financial literacy and trust (PC1 = 81.10% variance). The post-Raast (instant payment infrastructure) policy effect was significant ($t = -3.769$, $p = 0.013$), providing evidence of policy-facilitated acceleration. However, there are significant provincial variations, with Balochistan showing less than half the penetration rate of Punjab. Its findings provide a holistically empirical evaluation of the mobile wallet adoption landscape in Pakistan and policy implications for the acceleration of inclusive digital financial services.

Keywords: Mobile Wallets, Financial Inclusion, Pakistan, Digital Payments, Bb App, Jazzcash, Easypaisa, Raast, Fintech, Sbp

Introduction

Emerging markets have witnessed a revolution in payments, savings and credit with the advent of digital financial services. Mobile wallets - which allow for the storage of value, transfer of money, payment of bills, fund transfer and other financial services on mobile telephone - have become a means to bring the unbanked into the formal financial system (Demirgüç-Kunt et al., 2022). In Pakistan, with a population of more than 230 million, until recently 40% of the total adult population were not using any formal financial service and the growth of mobile wallets is a disruptive economic phenomenon since 2015 (State Bank of Pakistan [SBP], 2024a).

Since the launch of the first mobile wallet service (Easypaisa by Telenor Microfinance Bank in 2009 and JazzCash - originally Mobicash - in 2012, mobile wallet growth has skyrocketed in Pakistan. This marked the beginning of branchless banking (BB) system in Pakistan, which took advantage of the country's wide network of mobile telecommunication to reach the under-serviced and under-class in remote parts of the country (Amin et al., 2020). The regulatory environment provided by the State Bank of Pakistan (SBP) and in particular the Branchless Banking Regulations, 2008 and its amendments have paved the way for competition by Electronic Money Institutions. In January 2021, the introduction of Pakistan's first instantaneous payment system (Raast) ushered in a new dawn for the country's digital payment system. The "real time, low cost" interoperability system enabled peer-to-peer (P2P), person-to-merchant (P2M) and government-to-person (G2P) payments in a way never before made possible (Husain & Nawaz, 2023). This study published in this article is the first to provide evidence about a statistically significant increase in the use of BB App in the post-Raast period (FY 2022 to FY 2025) vis-à-vis the pre-R

Despite this development, the mobile wallet system is fragmented in Pakistan. The gender gaps in financial payments remains - with women account holders at 26% of the total account holders, as of FY2.

This is the first study to provide a multiplier statistical analyses of mobile wallet in Pakistan for seven years (FY2019 to FY2025), including time series analysis and hypothesis testing (parametric and non-parametric) and structural decomposition analysis through Principal component analysis (PCA). This study makes four unique contributions: (1) the study documented and formalised the trend of the mobile wallet adoption through rigorous econometric techniques; (2) it identifies and tests the drivers of mobile wallet adoption through multi-regression and correlation analyses; (3) measures the inequalities in the adoption of mobile wallet platforms and across the provinces through ANOVA and chi-square tests, and (4) forecasts the mobile wallet penetration rate for the period from FY20.

Research Objectives

The aim of this paper is to: (1) to discuss the statistics and trend in the financial inclusion indicators for Pakistan from FY2019 and FY2025; (2) test for normality, stationarity and serial correlation; (3) to identify the factors causing the growth and increase in the digital wallet users in Pakistan through multiple regression analysis; (4) to check the difference in the transaction size; and (5) to test.

Research Questions

Our study is driven by the following research questions: (RQ1) What are descriptive and trend statistics of mobile wallet penetration indicators in Pakistan from FY2019 to FY2025? (RQ2) Which factors play a significant role in determining the penetration of digital wallets? (RQ3) Is there any statistically significant variation in the amount of transactions between mobile wallets? (RQ4) Is there any statistically significant difference in the province-wise penetration of mobile wallets? (RQ5) What will be the expected growth trends by 2028?

Literature Review

Theoretical Foundations of Mobile Wallet Adoption

Adoption of mobile wallets is largely explained by three theories: Davis's (1989) Technology Acceptance Model (TAM), Venkatesh et al.'s (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) theory and Roger's (2003) Diffusion of Innovations (DOI) theory. TAM identifies perceived usefulness and perceived ease of use as factors that shape behavioural intention to use while UTAUT is an extension of TAM theory and explains intention to use and usage behaviour via performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2012).

These theories have been modified to include trust, security and access to agent networks as challenges or enablers of mobile financial services in emerging markets (Alalwan et al., 2017; Oliveira et al., 2014). In a recent study, Shen et al. (2018) showed how perceived financial risk and personal privacy concerns are important in moderating the impact of perceived usefulness on intention to use mobile payment services in low institutional trust and weak consumer protection settings.

Mobile Wallet Adoption in Developing Economies

There is a wealth of evidence on the uptake of mobile money in the developing world. The uptake of M-Pesa in Kenya documented in Jack and Suri (2014) and Mbiti and Weil (2016) provided the empirical foundation for evidence that mobile money services can have dramatic impacts on consumption smoothing, poverty and vulnerability. Suri and Jack (2016) have also shown that the uptake of M-Pesa in Kenya resulted in a 2% rise in the number of people above the poverty line, with much larger effects for female-headed households.

Other examples include bKash in Bangladesh that has led to market-based financial inclusion at scale, and the impact of the Unified Payments Interface (UPI) payment system in India that has triggered a surge in digital payments following demonetization in 2016 (Gupta & Choudhary, 2021). Murendo et al. (2018) demonstrated positive impacts of mobile money on remittances and transactions costs for rural households in Zimbabwe. Asongu and Nwachukwu (2018) also showed that financial inclusion was positively associated with the mobile money innovation in African countries, even controlling for infrastructure and regulation.

Mobile Wallet Adoption in Pakistan: Existing Evidence

The empirical work on Pakistan's mobile wallet uptake has been short-lived and basic since 2015. Rashid and Zafar (2021) studied the absence of mobile banking in rural Pakistan and concluded financial education, agent availability and confidence in mobile financial institutions play an important role. The survey of 450 people from across four provinces found subjective norm and perceived usefulness are the most significant factors of mobile banking intention

Amin et al. (2020) demonstrated the effect of telecommunication penetration on the growth of Branchless Banking (BB) in Pakistan - increasing mobile telecommunication penetration by a percentage point increases BB account ownership by a 0.34 percentage point (controlling for literacy and income). Khan and Ahmed (2022) found gender differences in the adoption of mobile wallet, due to mobility issues combined with low digital literacy and lack of ID documents for women. In the Financial Inclusion Strategy (2023-2028) the SBP has prioritised women's financial inclusion, and targets to reach 50% female account ownership by 2028.

Determinants of Digital Wallet Adoption

Recent cross-sectional and longitudinal research points to broadband access, and financial literacy, remittance payments and trust in financial institutions, as the key factors in the adoption of digital wallets. Demirgüç-Kunt et al. (2022) in the World Bank Global Findex 2021 report, noted that while most of the 1.4 billion unbanked adults in the world have access to cell phones, being in the digital marketplace does not translate into financial inclusion. It found that the primary demand-side constraints are behavioural and structural factors such as an overall distrust of financial institutions, not having enough money to open accounts and access.

In Pakistan, Chaudhry et al. (2021) employed an approach based on a structural equation model to show that perceived security, ease of use and agent proximity explained 64% of the variation in intention to use mobile wallets among their sample. And Hussain and Nawaz (2023) noted a jump in the use of digital wallets with the launch of Raast, and attributed it to the ease of payments and open access to multiple banks.

Methodology

Data Sources and Variables

In our paper, we used secondary data obtained from two sources: State Bank of Pakistan Payment Systems Review 2019-2025 (SBP, 2019, 2020, 2021, 2022, 2023, 2024a, 2024b) and the World Bank Global Findex Database 2021 We have a panel of We also used cross-sectional information of six administrative provinces (Punjab, Sindh, KPK, Balochistan, GB and AJK) from SBP Regional Offices and Pakistan Bureau of Statistics.

Statistical Methods

Each objective was tackled using a range of statistical tests. Measures of central tendency, dispersion and distributional shape were calculated for continuous variables. The Shapiro-Wilk test (Shapiro & Wilk, 1965) was used to test for normality, which is more powerful than the Kolmogorov-Smirnov test for small samples (n = 7); (Razali & Wah, 2011). Ordinary least squares (OLS) linear regression was estimated for key adoption measures on fiscal year. Pearson and Spearman correlation coefficients were calculated to test for bivariate associations with the latter being robust to distributional assumptions. We tested for time series stationarity using the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979). Box-Jenkins (Box et al., 2015) Auto-Regressive Integrated Moving Average (ARIMA) models were estimated to provide three-year forecasts. The Mann-Kendall non-parametric trend test (Mann, 1945; Kendall, 1975) was used to validate monotonic, non-normal trends. Multiple linear regression evaluated the collective impact of structural determinants on wallet adoption. One-Way ANOVA with Tukey HSD post-hoc tests assessed differences among platforms. Chi-square tests of independence assessed provincial categories. PCA reduced the complexity of determinant structure. Logistic regression was used to categorise provinces as high or low adoption. Independent

samples t-test was applied to examine differences in pre- and post-Raast means. Kruskal-Wallis H tests were used as a secondary test for inter-provincial comparisons. We used Python (version 3.11) and the SciPy, statsmodels and scikit-learn libraries.

Analytical Framework

The research design uses data from surveys of supply (SBP) and demand (World Bank Findex) to triangulate the adoption. Time series methods (ADF, ARIMA, Mann-Kendall) assess the dynamics and predict the trend. Cross-sectional statistical methods (ANOVA, chi-square, Kruskal-Wallis) reveal the differences between platforms, and between provinces. Multivariate methods (OLS, MLR, PCA, logistic regression) reveal and assess the determinants. This mixed method analysis provides internal validity of trend and external validity of social practices (Creswell & Creswell, 2018).

Results

Descriptive Statistics

Descriptive statistics of all the financial inclusion indicators are shown in Table 1. Total bank accounts expanded from 100 million (FY2019) to 220 million (FY2025), yielding a sample mean of 161.86 million (SD = 45.06). The skewness (-0.078) and kurtosis (-1.502) values, close to zero and negative, respectively, suggest that the distribution is relatively symmetric and platykurtic (flat) as is appropriate for linear growth. Internet banking users had greater positive skewness (0.80), consistent with acceleration in growth late in the period, with a mean of 19.06 million (SD = 15.25) and range from 3.5 to 44 million. Users of BB App, which is the key variable in this study for mobile wallet uptake, increased from 8 to 72 million over the period with a mean value of 35.81 million (SD = 24.45). Digital wallet penetration increased from 10.5% to 50.2%, with a mean of 28.33% (SD = 14.80). The number of female account holders grew from 20% to 33% and microfinance borrowers from 5.5 to 12 million during this period.

Table 1: ***Descriptive Statistics: Financial Inclusion Indicators (FY2019–FY2025)***

Variable	N	Mean	SD	Min	Q1	Median	Q3	Max	Skewness	Kurtosis
Total Bank Accounts (Mn)	7	161.86	45.06	100	129	163	196	220	−0.078	−1.502
Internet Banking Users (Mn)	7	19.06	15.25	3.5	7.75	14.0	28.2	44	0.800	−0.749
BB App Users (Mn)	7	35.81	24.45	8	16	32	53.35	72	0.353	−1.491
Unbanked Population (Mn)	7	138.14	27.64	100	118.5	138	158.5	175	−0.039	−1.388
Digital Wallet Penetration (%)	7	28.33	14.80	10.5	17.0	26.4	38.6	50.2	0.321	−1.341
Female Account Holders (%)	7	26.29	4.72	20	23	26	29.5	33	0.163	−1.191
Microfinance Borrowers (Mn)	7	8.41	2.41	5.5	6.6	8.1	10.05	12	0.366	−1.266

Note. N = 7 fiscal year observations. Data sourced from SBP Payment Systems Reviews FY2019–FY2025 and World Bank Global Findex 2021. Mn = millions; Pct = percentage.

Normality Testing

Shapiro-Wilk tests for normality of all variables are reported in Table 2 All W-stats are greater than 0.908 and all p values greater than 0.38, so we can conclude that the null hypothesis of normality cannot be rejected at the $\alpha = 0.05$ significance level for any of the variables. This confirms the use of parametric techniques (OLS regression, Pearson correlation, ANOVA and t-tests) in the following analyses (Razali & Wah, 2011). Such large W-statistics (0.908-0.973) are in line with the linear trends observed in the descriptive analysis.

Table 2: *Shapiro-Wilk Normality Test Results (n = 7)*

Variable	W-Statistic	p-value	Conclusion
Total Bank Accounts (Mn)	0.959	0.8105	Normal
Internet Banking Users (Mn)	0.908	0.3848	Normal
BB App Users (Mn)	0.937	0.6138	Normal
Unbanked Population (Mn)	0.968	0.8834	Normal
Digital Wallet Penetration (%)	0.955	0.7726	Normal
Female Account Holders (%)	0.973	0.9169	Normal
Microfinance Borrowers (Mn)	0.956	0.7791	Normal

Note. H_0: Data is normally distributed. H_0 is rejected if $p < 0.05$. All variables satisfy the normality assumption.

OLS Trend Regression Analysis

Results of Shapiro-Wilk tests for normality of all variables are listed in Table 2 All W-stats are above 0.908 and the p values above 0.38, so we can reject the null hypothesis of normality of all variables at the $\alpha = 0.05$ level of significance. This confirms the use of parametric techniques (OLS regression, Pearson correlation, ANOVA and t-tests) in the following analyses (Razali & Wah, 2011). These Wstats (0.908-0.973) in line with the linear nature of the descriptive analysis.

Table 3: *OLS Linear Trend Regression Results*

Dependent Variable	Intercept	Slope (Year)	R^2	Adj. R^2	F-Statistic	p-value	Result
BB App Users (Mn)	−22,596.14	11.1929	0.978	0.974	221.43	< 0.001	Significant
Digital Wallet Penetration (%)	−13,735.71	6.8071	0.988	0.985	398.65	< 0.001	Significant
Internet Banking Users (Mn)	−13,759.43	6.8143	0.932	0.918	68.09	0.0004	Significant

Note. Fiscal year as the single independent variable. R^2 values reflect proportion of variance explained by linear time trend.

Correlation Analysis

Bivariate Pearson and Spearman correlation coefficients are in Table 4. The Pearson correlations between the number of users of the BB App and digital wallet penetration ($r = 0.999$, $p < 0.001$), and the number of bank accounts and digital wallet penetration ($r = 0.991$, $p < 0.001$) were almost perfect. The direction of relationship as indicated by the Mann-Kendall test was reflected in the Spearman rank correlation coefficients (all either 1.000 or -1.000), which are also perfect monotonic correlations. Unbanked population was highly negatively correlated with digital wallet penetration ($r = -0.996$, $p < 0.001$), as is expected because the growth of mobile wallet is associated with decline in unbanked population. The female bank account holder penetration was also strongly correlated with digital wallet penetration ($r = 0.997$, $p < 0.001$), meaning that digital inclusion was positively associated with female inclusion.

Table 4: *Pearson and Spearman Correlation Analysis*

Variable 1	Variable 2	Pearson r	p (Pearson)	Sig.?	Spearman ρ	p (Spearman)	Sig.?
BB App Users (Mn)	Digital Wallet Penetration (%)	0.999	< 0.001	Yes	1.000	< 0.001	Yes
Internet Banking Users (Mn)	BB App Users (Mn)	0.985	< 0.001	Yes	1.000	< 0.001	Yes
Total Bank Accounts (Mn)	Digital Wallet Penetration (%)	0.991	< 0.001	Yes	1.000	< 0.001	Yes

Unbanked Population (Mn)	Digital Wallet Penetration (%)	−0.996	< 0.001	Yes	−1.000	< 0.001	Yes
Female Account Holders (%)	Digital Wallet Penetration (%)	0.997	< 0.001	Yes	1.000	< 0.001	Yes

Note. All p-values based on two-tailed tests. Sig.? = statistically significant at α = 0.001. ρ = Spearman rank correlation coefficient.

Stationarity Testing

ADF unit root results are shown in Table 5. All level series were found to be non-stationary ($p > 0.05$), with ADF statistics not rejecting the presence of a unit root. The first-differenced data were also non-stationary at standard significance levels, although the first difference of digital wallet usage was close to significance ($p = 0.059$). This finding is consistent with the low power of ADF tests using seven observations (Banerjee et al., 1993). Unit roots in levels are consistent with the trending results reported under OLS and are a justification for the use of first-differenced specifications in ARIMA models.

Table 5: ***Augmented Dickey-Fuller Unit Root Test Results***

Series	ADF Statistic	p-value	Lags	CV 1%	CV 5%	Conclusion
BB App Users (Mn)	1.6115	0.998	0	−5.354	−3.646	Non-Stationary
Δ BB App Users (Mn)	−2.035	0.271	0	−6.045	−3.929	Non-Stationary
Digital Wallet Penetration (%)	−0.323	0.922	1	−6.045	−3.929	Non-Stationary
Δ Digital Wallet Penetration (%)	−2.796	0.059	0	−6.045	−3.929	Non-Stationary
Unbanked Population (Mn)	−2.434	0.132	1	−6.045	−3.929	Non-Stationary
Δ Unbanked Population (Mn)	−0.980	0.760	1	−7.355	−4.474	Non-Stationary

Note. H_0: Series has a unit root (non-stationary). Δ denotes first difference. CV = Critical Value. Small sample (n = 7) limits test power.

ARIMA Forecasting

We fit the ARIMA (1,1,0) models with the (1,1,0) model being the best-fit according to the unit root tests, for the BB App users and digital wallet penetration. Table 6 below provides the forecasts and 95% upper and lower bounds for FY2026 to FY2028. BB App users are projected to reach 84.28 million (95% CI: [50.33, 118.24]) in FY2026, 95.63 million (CI: [61.68, 129.59]) in FY2027, and 106.11 million (CI: [72.16, 140.07]) in FY2028. Digital wallet penetration is forecast at 57.74% (CI: [37.19, 78.29]) in FY2026, 65.13% (CI: [44.58, 85.68]) in FY2027, and 72.36% (CI: [51.81, 92.91]) in FY2028. The projections indicate Pakistan will have a near-saturated digital wallet penetration of the adult banked population in the forecasting period under the assumption of continued infrastructure and policy support (Hussain & Nawaz, 2023; SBP, 2024b).

Table 6: ***ARIMA(1,1,0) Forecast Results (FY2026–FY2028)***

Variable	Forecast Period	Point Forecast	Lower CI (95%)	Upper CI (95%)
BB App Users (Mn)	FY2026	84.28	50.33	118.24
BB App Users (Mn)	FY2027	95.63	61.68	129.59
BB App Users (Mn)	FY2028	106.11	72.16	140.07
Digital Wallet Penetration (%)	FY2026	57.74	37.19	78.29
Digital Wallet Penetration (%)	FY2027	65.13	44.58	85.68
Digital Wallet Penetration (%)	FY2028	72.36	51.81	92.91

Note. Point forecasts with 95% confidence intervals. ARIMA specification selected via AIC minimization. Mn = millions; % = percentage of adult population.

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Mann-Kendall Non-Parametric Trend Analysis

Results of the Mann-Kendall trend test are reported in Table 7. S-statistics for all adoption indicators were positive maximum value (+21 for n = 7) with Z-scores and p-values of 3.004 and 0.003 respectively, suggesting significant monotonic upward trends at the level of alpha = 0.01. The S-statistic for unbanked population was -21 (minimum for n = 7) with significant monotonic decreasing trend (Z = -3.004, p = 0.003). The S-statistics are in line with the fact that repeated year-on-year decrease was not observed for any adoption indicator during the period - a real progress that highlights the sustainability of Pakistan's digital financial inclusion strategy.

Table 7: ***Mann-Kendall Non-Parametric Trend Test Results***

Variable	S Statistic	Z Score	p-value	Significant?	Trend Direction
Total Bank Accounts (Mn)	+21	3.004	0.003	Yes	Increasing
Internet Banking Users (Mn)	+21	3.004	0.003	Yes	Increasing
BB App Users (Mn)	+21	3.004	0.003	Yes	Increasing
Unbanked Population (Mn)	−21	−3.004	0.003	Yes	Decreasing
Digital Wallet Penetration (%)	+21	3.004	0.003	Yes	Increasing
Female Account Holders (%)	+21	3.004	0.003	Yes	Increasing
Microfinance Borrowers (Mn)	+21	3.004	0.003	Yes	Increasing

Note. S = Kendall's concordance statistic; Z = standardized test statistic. S = +21 represents the maximum possible value for n = 7. Significant at α = 0.01 (two-tailed).

Multiple Linear Regression: Determinants of Wallet Penetration

Table 8 presents multiple linear regression estimates with the dependent variable digital wallet penetration and five structural factors as predictors: broadband subscriptions (million), remittances (billion USD), institutional trust score, and financial literacy index. The overall model was highly significant ($F = 2{,}490.17$, $p < 0.001$) with near-perfect explanatory power ($R^2 = 0.9998$, Adj. $R^2 = 0.9994$). But none of the predictors was statistically significant at the 5% level: this is because of severe multicollinearity among predictors, which are all highly correlated with each other and the time trend. Variance inflation factors (VIFs) were above the standard threshold for all predictors, making individual estimates of the coefficient parameters unreliable. This issue is overcome by performing a regression on the PCA components, reported in the next section.

Table 8: ***Multiple Linear Regression Results (Dependent Variable: Digital Wallet Penetration %)***

Predictor Variable	Coefficient	Std. Error	t-Statistic	p-value	Significant?
Intercept	−23.297	25.567	−0.911	0.458	No
Broadband Subscriptions (Mn)	0.303	0.586	0.517	0.657	No
Remittances (Bn USD)	0.043	0.063	0.688	0.562	No
Institutional Trust Score	0.939	3.146	0.298	0.794	No
Financial Literacy Index	0.446	1.616	0.276	0.808	No

Note. $R^2 = 0.9998$, Adj. $R^2 = 0.9994$, $F(4, 2) = 2{,}490.17$, $p = 0.0004$. Individual predictors not significant due to multicollinearity. SE = Standard Error.

Platform-Level ANOVA and Post-Hoc Analysis

Table 9 shows One-Way ANOVA and Tukey HSD post-hoc tests for the mean volume of transactions for four mobile wallets. The main effect of ANOVA was significant ($F = 5.111$, $p = 0.007$), which means there were differences in means for at least one pair of mobile wallets. JazzCash exhibited the highest mean volume (M = 247.86 Mn, SD = 176.71), followed closely by Easypaisa (M = 227.14 Mn, SD = 165.57), and substantially ahead of SadaPay (M = 41.86 Mn, SD = 44.18) and NayaPay (M = 35.71 Mn, SD = 39.67). According to the Tukey HSD, the mean number of JazzCash was significantly higher than the mean number of NayaPay (mean difference = 212.14, $p = 0.033$) and

SadaPay (mean difference = 206.00, p = 0.040), but not than the mean of Easypaisa (p = 0.992). This findings support the duopolistic competition in the market, with market leaders being the mobile wallets of telecommunication companies (JazzCash and Easypaisa) which are enjoying network effects and JazzCash's and Easypaisa's agent networks (Rashid & Zafar, 2021).

Table 9: ***One-Way ANOVA Results: Platform Transaction Volumes with Tukey HSD Post-Hoc Comparisons***

Platform	N	Mean (Mn)	SD	95% CI Upper	ANOVA F	p-value
JazzCash	7	247.86	176.71	378.77	5.111	0.007
Easypaisa	7	227.14	165.57	349.80	—	—
SadaPay	7	41.86	44.18	74.59	—	—
NayaPay	7	35.71	39.67	65.10	—	—

Note. Panel A: ANOVA summary. Panel B: Tukey HSD pairwise comparisons. Reject H_0 (equal means) if $p < 0.05$. Mean difference represents JazzCash advantage over compared platform.

Provincial Analysis: Chi-Square and Kruskal-Wallis Tests

Table 10 shows mobile wallet indicators by province. Provinces of Punjab and Sindh showed the highest BB penetration (42.5% and 38.2%), the highest agent density per 100,000 population (185 and 145), highest percentage of female wallet users (32% and 28.5%), as well as highest literacy rates: 62% and 55% The lowest penetration rates were observed in Balochistan and Gilgit-Baltistan (18.5% and 22.0% respectively) with low agent density (42 and 68 per 100,000). The chi-square test of independence between province and penetration category was $\chi^2 = 12.00$, $p = 0.285$, failing to reject the null hypothesis of no association (this is likely due to low cell counts, n = 6 provinces). The Kruskal-Wallis H test also provided a non-significant finding ($H = 5.000$, $p = 0.416$), although the evidence in a substantive sense for differences across provinces is strong and supported by contextual evidence (Chaudhry et al., 2021; Khan & Ahmed, 2022).

Table 10: ***Provincial Mobile Wallet Indicators and Chi-Square Results ($\chi^2 = 12.00$, $p = 0.285$)***

Province	BB Penetration (%)	Female Wallet Users (%)	Agent Density /100K	Literacy Rate (%)	Category
Punjab	42.5	32.0	185	62	High
Sindh	38.2	28.5	145	55	High
KPK	29.8	18.2	98	53	Medium
Balochistan	18.5	12.0	42	41	Low
Gilgit-Baltistan	22.0	20.0	68	58	Low
AJK	30.5	25.0	110	68	Medium

Note. Province-level data from SBP Regional Offices and Pakistan Bureau of Statistics. Agent Density reported per 100,000 population. Literacy Rate = adult literacy percentage.

Principal Component Analysis

We used PCA to determine the latent structure of the seven adoption drivers. Variance accounted by principal components is listed in Table 11. PC1 explained 81.10% of variance (eigenvalue = 6.623), PC2 accounted for 17.89% (eigenvalue = 1.461), and the two components explained 98.99% of variance. The remaining five components, PC3 to PC7, explained a combined 1.01%. Using the Kaiser rule (eigenvalue > 1), PC1 and PC2 were interpreted. Component loadings (Table 12) confirmed that PC1 loaded heavily and positively on broadband subscriptions (0.417), financial literacy (0.416), trust score (0.417) and negatively on security concern (−0.417) and cash preference (−0.418), defining a composite 'digital readiness and institutional trust' factor. The latter loaded on GDP growth (0.885) and remittances (0.423), forming a 'macroeconomic dynamism' factor. This finding implies that digital infrastructure, literacy and trust, together captured in PC1, represent the most important structural factor for mobile wallets in Pakistan.

Table 11: *PCA: Explained Variance by Component and Component Loadings*

Component	Eigenvalue	Variance Explained (%)	Cumulative (%)
PC1	6.623	81.10%	81.10%
PC2	1.461	17.89%	98.99%
PC3	0.074	0.90%	99.89%
PC4	0.008	0.10%	99.99%
PC5	0.001	0.01%	100.00%

Note. Kaiser criterion (eigenvalue > 1) retains PC1 and PC2. Combined explained variance = 98.99%.

Logistic Regression and t-Test Results

The logistic regression model with 100% classification accuracy, positive regression coefficients and odds ratios (greater than 1.70) for all four predictors (number of bank accounts, internet banking, female account holders, microfinance) included, confirmed that the higher the province's position in all the inclusion measures, the higher the probability of being a high-adoption province. Using the independent samples t-test we compared the average pre-Raast (FY2019 to FY2021, M = 13.33 Mn BB users, SD = 4.99) and post-Raast (FY2022 to FY2025, M = 52.68 Mn, SD = 1.

Discussion

The landscape of digital wallets is transformed in Pakistan. Use of digital wallets almost quintupled from FY 2019 to FY 2025. BB App users grew nine times over. This growth pattern is not uncommon. When a technology is ready, the innovators come first. Then the majority start to catch up as barriers are removed and confidence grows.

One factor stands out above the rest: digital readiness. That includes internet access, financial competence, and trust. And they determine who will use mobile wallets and who won't. Those with higher readiness are less concerned about security. They also use less cash. This isn't surprising. Knowledge and trust eases fear.

JazzCash and Easypaisa are market leaders. They got there first. They have the support of major telecom companies. And they have thousands of agents nationwide. NayaPay and SadaPay are new, app-based, options. But they're mostly used by city dwellers. Their user numbers are much smaller. Competition is difficult. Market forces favour the big boys.

Another factor is geography - and not in a good way. Balochistan has a broadband penetration rate of just 18.5%. Punjab's is more than double that. There are fewer agents, less literacy and much less female financial inclusion in Balochistan. Women there are also more likely to lack the identity documents needed to open an account. These aren't just statistics. They reflect entrenched inequalities.

There are limitations to the provincial data. There are only six "provinces". But the differences are real and pronounced. Something needs to be done in Balochistan, Gilgit-Baltistan and KPK.

Raast changed things. BB App users almost tripled after the launch of Pakistan's interoperable payment system. This is what happened in India, too. Interoperable payments lead to more users. The State Bank of Pakistan should continue to invest in Raast. It's working.

Females are catching up in digital payments. The number of females with accounts increased from 20% in FY2019 to 33% in FY2025. The correlation between women and wallet growth is remarkable and close to perfect. But a 41-percentage-point gap between men and women still exists. This is concerning, but also presents an opportunity. We know mobile money benefits women the most. Simple actions - such as easy ID verification, women-only agent points and financial literacy training - would help..

Conclusion

This study took a deep look at mobile wallet adoption in Pakistan. It covered six years — from FY2019 to FY2025. Thirteen different statistical methods were used. The data came from the State Bank of Pakistan and the World Bank. The results tell a clear story. Adoption has been strong, consistent, and accelerating. Better digital infrastructure, supportive regulation, and the arrival of Raast all played a role. Here's what the numbers showed. BB App users jumped from 8 million to 72 million. That growth follows a near-perfect linear trend. Digital wallet penetration rose from 10.5% to 50.2% — again, almost perfectly consistent. Statistical tests confirmed these weren't random fluctuations. The growth was real and steady across every indicator measured.

The Raast instant payment system made a visible difference. A clear acceleration in adoption followed its launch. Forecasts suggest penetration could hit around 72% by FY2028. That's a striking trajectory if current momentum holds.

JazzCash and Easypaisa remain firmly on top. Their transactional advantages over newer players are significant. Meanwhile, the biggest driver behind adoption differences comes down to two things — digital readiness and institutional trust. People who are connected, literate, and confident in the system are far more likely to use mobile wallets.

But serious challenges remain. Balochistan and Gilgit-Baltistan still lag far behind. The gender gap in account ownership is wide. These aren't minor issues. They represent millions of people still left out. The policy path forward is fairly clear. Raast needs to expand further — especially into person-to-merchant payments and cross-border remittances. More agents are needed in underserved areas. Financial literacy should become part of school and university curricula. And the process of opening an account needs to become easier for women. Simpler, gender-sensitive ID verification would help enormously.

Future research should go deeper. Large-scale household surveys would help confirm whether aggregate trends reflect real individual behavior. Structural equation modeling could reveal exactly how trust and digital readiness translate into adoption decisions. The big picture is promising. But the finer details still need work.

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