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IMPACT OF INNOVATIVE FINANCIAL SERVICES ON BANKS' MARKET SHARE: THE ROLE OF ARTIFICIAL INTELLIGENCE

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Abstract
The increasing reliance on technology in the financial sector has paved the way for innovative financial processes that enhance operational efficiency and market competitiveness. This study examines the role of artificial intelligence (AI) in moderating the relationship between innovative financial processes and the market share of banks in Pakistan. The research employs structural equation modeling (SEM) to analyze data collected from 307 respondents across various branches of UBL, the most innovative retail bank in Pakistan. The study identifies key components of the innovative financial process, including internet banking, mobile banking, telephone banking, ATMs, and point-of-sale (POS) terminals, and assesses their impact on the bank's market share. The findings reveal a significant positive association between the adoption of innovative financial processes and an increase in market share. Banks that effectively implement digital banking solutions experience enhanced customer retention, cost efficiency, and expanded service reach, resulting in greater market competitiveness. However, the study finds that AI does not significantly moderate this relationship. While AI-driven technologies such as chatbots, automated decision-making, and machine learning algorithms contribute to service efficiency, their role in directly influencing market share remains limited in the context of Pakistan's banking sector. The findings suggest that the lack of significant moderation by AI could be attributed to limited AI adoption, customer resistance, and insufficient technical infrastructure within the banking industry. The study has important implications for banking policymakers and decision-makers in Pakistan.

INTRODUCTION

The modern banking sector's growth trajectory depends on its capacity to fulfill customer needs through the deployment of advanced financial technologies such as Artificial Intelligence (AI). Banking operations undergo transformation through artificial intelligence which enhances financial data

management while digital platforms enable customer accessibility and service optimization. AI-powered chatbots maintain continuous customer support services while machine learning algorithms perform predictive detection of fraudulent activities (Karim et al., 2021; Rabbani, 2022). Technological progress has made online payment systems more straightforward to boost customer convenience while decreasing human mistakes and cutting operational costs. Artificial intelligence deployment within Pakistan's banking industry stands at an early stage compared to advancements seen in more developed nations (Hassan et al., 2020; Khan et al., 2021). Pakistan's banking sector has yet to experience the expected advantages of AI technology which remain unfulfilled despite its considerable potential. A multitude of banking institutions persist in experimenting with AI technologies while confronting ongoing difficulties such as data privacy concerns, infrastructure deficiencies, and regulatory barriers. Artificial intelligence technology exerts remarkable impact on banking sector market share performance. Banks that develop AI technologies strengthen their competitive position which helps them gain market share because consumers prefer services that offer enhanced convenience together with better fraud protection and user experience (Hussain M. K. et al., 2022). Strategic implementation of AI advancements presents an essential challenge for the banking industry to simultaneously improve service delivery and operational performance while adhering to financial regulatory standards (Doumpos et al., 2022).

Market share serves as a critical performance metric indicating a company's industry standing through the division of its revenue by total industry sales for the same timeframe (Caminal and Vives, 1996). A greater market share usually represents superior market performance which often results in higher profitability (Akhisar et al., 2015). Through the implementation of numerous strategies including advanced technology adoption and strong customer relationship building alongside top talent attraction and competitive positioning, companies can expand their market share (Goyal et al., 2016). The process relies heavily on innovation as a fundamental component. Through the introduction of unique products or services that competitors lack, businesses have the potential to draw customers who may abandon their previously preferred brands (Nisar, 2017). Market share expansion finds a powerful engine in financial innovation. Through the introduction of cutting-edge financial products and services businesses achieve market distinction while delivering additional customer value. The phenomenon whereby customers turn into repeat purchasers simultaneously expands the company's market dominance while reducing competitor market portions (Gruin and Knaack, 2020; Kaur, 2020; Nazaritehrani and Mashali, 2020). An organization's capacity to develop new solutions while addressing shifting customer demands enables it to expand its market share which supports prolonged growth and ongoing financial success.

The financial sector experienced a transformative shift through Internet banking which delivers customers rapid fund transfers and perpetual account access, establishing it as a fundamental component in the move towards a cashless economy (Fung et al., 2015). Accessing cloud computing services through numerous devices presents significant risks including the potential for personal information exposure (Shannak, 2013). The deployment of internet banking along with mobile, telephone, and ATM services produces substantial effects on a bank's market share (Saravani et al., 2015). Banks persist in their innovative efforts to expand their service portfolios which result in more convenient and affordable solutions that help them attract and keep customers (Nisar, 2017). Banks achieve competitive superiority and expand market presence through the implementation of sophisticated financial services (Ahamed and Mallick, 2019). Banks that do not evolve to meet contemporary requirements face the threat of customer attrition and market position decline within the fiercely competitive financial sector (Nazaritehrani and Mashali, 2020). Pakistan's banks face challenges in adapting to customer expectations while trying to sustain their global standing because technological adoption remains a developing process (SAMA, 2020). The deployment of cutting-edge financial solutions enables banks to simultaneously grow their market presence and achieve cost savings which enhance their operational effectiveness while delivering superior customer services (Khalifaturofi'ah, 2021; Yang, 2021; Zouari-Hadiji, 2021). To achieve success in today's financial sector

banks, need ongoing innovation to meet evolving customer demands and industry developments.

To stay competitive in today's fast-changing world, banks need to adopt innovative financial processes, which often means using advanced technologies like artificial intelligence (AI) (Işık et al., 2021; Karim et al., 2021; Rabbani et al., 2022a, b). This study adds to existing research by being the first to explore how AI can influence or moderate the innovation process within the banking sector. Its findings can be applied broadly across the banking industry. The main goal of this study is to understand how digital financial services directly affect the market share of Pakistan's most innovative bank. A second focus is to explore how AI contributes to that bank's creative financial strategies and overall market share.

Specifically, the study has two main objectives:

1. To examine how innovative financial services like internet, mobile, telephone, ATM, and POS banking impact the market share of Pakistan's most innovative bank.
2. To explore whether AI plays a moderating role in the relationship between innovative financial services and market share.

2.0 Literature review:

The banking industry faces major challenges from financial risk elements like operational and liquidity risks because these threats cause capital depletion and destabilize financial institutions (Işık et al., 2020; Lutfi et al., 2022). The management of these risks by policymakers and shareholders stands as an essential element to protect a bank's sustained profit potential. The financial sector's technological advancements possess capabilities to lessen these risks through cost reduction and enhanced operational efficiency (Xiang et al., 2022). Banking institutions have experienced enhanced financial performance through telephone and internet banking services which deliver more accessible and efficient options to customers resulting in improved satisfaction and retention (Işık et al., 2021). The digital economy sees technological advancements reshaping banking while simultaneously driving economic expansion and financial progress (Işık et al., 2022). The move to digital platforms demands deeper investigation into how financial service innovations affect bank market share in emerging markets such as Pakistan. This study's foremost objective entails examining how innovative financial processes correlate with market share within Pakistan's banking sector. The examination extends into the potential moderating effects of artificial intelligence adoption on this relationship, seeking additional insights into how AI might boost innovation's capacity to expand market share. Through a critical examination of previous studies and literature this research aims to uncover the underlying dynamics within the shifting financial environment.

2.1 Internet banking impact on market share

Through internet banking platforms, electronic payment systems enable customers to perform numerous financial transactions online via bank websites, delivering both convenience and flexibility (Rajasulochana & Khizerulla, 2022). Internet banking provides continuous access that enables users to handle account management and execute transactions from any location at any time while minimizing the necessity of visiting physical branches (Chauhan et al., 2022). The availability of digital services boosts customer satisfaction while enabling banks to reduce operational expenses by decreasing dependence on branch-based services (Akhter et al., 2022). The perception of internet banking as a secure, convenient, and user-friendly service drives its adoption among customers (Cui & Xu, 2022). Internet banking in Indonesia helped boost market share within the emerging Syariah economy (Siska, 2022). In Pakistan, internet banking helped banks expand their market share during the last ten years (Raza et al., 2017), while in Nigeria its impact on market share surpassed that of traditional banking methods (Sathiyavany & Shivany, 2018). The implementation of internet banking shows significant diversity across platforms, and research indicates that certain usage patterns and market conditions lead to mixed or negative effects on market share (Akhisar et al., 2015). Even with these discrepancies present, the general pattern indicates that internet banking helps banks increase their market share. The current research sets forth theoretical propositions to enable deeper examination and validation of these dynamic interactions.

2.2 Telephone banking impact on market share

Telephone banking enables customers to perform financial transactions remotely without visiting bank branches or using traditional cash methods (Payne et al., 2021a). Research demonstrate that telephone banking correlates positively with market share expansion for banks because it offers clients an efficient method to handle their financial activities (Jagathi, 2021). The modern rapid-paced society sees consumers valuing services that reduce their time expenditure and transportation expenses (Mahardini et al., 2022). According to Al Shawi et al. In 2022, private banks' market share remained tightly connected to the utilization of mobile banking, telephone banking, and ATMs because these channels enabled immediate transactions without the traditional check clearance delays. During the COVID-19 pandemic telephone banking became essential as customers pursued remote financial management through safer and more convenient methods (Hussain et al., 2022; Irwan et al., 2022). Research conducted in Kenya demonstrated that market shares of banks increased through the deployment of innovative financial services like phone banking (Mwangi, 2014a). The widespread adoption of smartphones has made telephone banking services more accessible which allows customers to perform balance checks, bill payments, and money transfers via SMS thereby reinforcing the connection between telephone banking and market share (Raghavan, 2006). Past research indicates positive trends which this study uses to formulate hypotheses examining telephone banking's role in Pakistan's banking sector and its market share impact potential.

2.3 Mobile banking impact on market share

The use of smartphones and tablets for financial transactions defines mobile banking which emerged as a major innovation driver within the banking sector (Uddin, 2022). Mobile banking's facilitation of remote transactions empowers customers to handle their finances from any location at any time which drives financial institutions to adopt it more widely (Isik et al., 2021; Uddin, 2022). The proportion of industry sales that a company captures as market share emerges from numerous factors including customer convenience and transaction speed (Nguyen et al., 2022). Through mobile banking platforms financial institutions expand market presence by enabling customers to perform immediate transactions which support direct sales opportunities (Ma and Zhu, 2022). Research indicates that mobile banking boosts Islamic banks' market share by offering enhanced customer convenience (Payne et al., 2021a). Banks implementing mobile banking services witness profit growth while simultaneously expanding their customer base which leads to increased market share (Mullan et al., 2017). Technological progress represented by mobile banking systems demonstrates a marked influence on market share through enhanced service accessibility and customer satisfaction (Muthinja and Chipeta, 2018). A Turkish study discovered that mobile banking usage increases with deposits and loans but does not necessarily boost revenues or market share because of additional variables (Onay and Öztaş, 2018). Studies examining European banking sectors reveal mobile banking's powerful influence on market share (Druhov et al., 2019a). Based on the generally favorable results found in current research, this research expects mobile banking to positively impact Pakistan's banking sector market share.

2.4 Prior studies on Bank Market Share and AI

Table 1: Prior studies on Market Share and AI

Study	Focus	Methodology and Findings
Karim et al. (2021)	Impact of AI on banking operations	Methodology: Case study analysis of banks using AI tools Findings: AI technology enhances financial data management, improves customer service, and optimizes fraud detection, leading to operational efficiencies and market competitiveness.
Rabbani (2022)	Role of AI powered chatbots in customer service	Methodology: Survey of bank customers using AI chatbots Findings: AI chatbots provide 24/7 customer support,

		improving customer satisfaction, operational efficiency, and market share by enhancing accessibility and service quality.
Hassan et al. (2020)	Adoption of AI in Pakistan's banking sector	Methodology: Comparative analysis of AI adoption in developed and developing countries Findings: The implementation of AI in Pakistan's banking sector is still in early stages compared to developed nations, with significant challenges related to infrastructure and regulatory issues.
Hussain M. K. et al. (2022)	AI's impact on competitive positioning and market share in banking	Methodology: Statistical analysis of market data from banks implementing AI Findings: AI adoption leads to a competitive advantage for banks by enhancing service quality, fraud protection and customer retention, which results in an increased market share.
Işık et al. (2021)	AI and its influence on financial service innovation in the banking sector	Methodology: Literature review and qualitative interviews with bank managers Findings: AI accelerates the innovation process in banking, leading to new financial products and services, which contribute to market share expansion and competitive differentiation.

2.5 Impact of ATM on market share

The Automated Teller Machine (ATM) represents an electronic financial service platform enabling customers to execute diverse transactions including cash withdrawals, balance checks, and fund transfers without the necessity of a bank branch visit (Oluwafemi et al., 2022). Basic ATMs deliver essential services but advanced machines provide cheque deposits and transfers which operate 24/7 without bank staff assistance (Gautam et al., 2022). Studies repeatedly demonstrate that banks experience market share growth through ATM deployment. The deployment of mobile banking services alongside ATMs has enabled the banking sector in Afghanistan to expand its market share (Faryal and Tikhomirov, 2022). Numerous studies validate the concept that ATMs contribute to bank market share expansion across diverse regions. Thailand's market share expansion emerged from the synergy of ATMs with mobile banking platforms alongside a robust retail banking network (Wonglimpiyarat, 2014). A Kenyan study demonstrates ATMs' profound effects on financial intermediation by establishing a positive correlation between ATM usage and market share (Kithinji, 2017). The expansion of ATM networks and branch offices directly correlates with increased market share in Kenya according to Ahmed and Wamugo's 2019 study. Several studies by Le and Ngo (2020) demonstrate that 24/7 ATM availability boosts market share. Several studies propose a contrary connection by referencing elements like inadequate comprehension of digital payments (Kamboh and Leghari, 2016) or negligible effects on corporate banking institutions (Victor et al., 2017). The collected studies show varied outcomes yet the overall direction in academic work indicates that ATM deployment helps banks increase their market share. The present research formulates speculative propositions to explore how ATM usage affects Pakistan's banking industry.

2.6 POS terminals' impact on the market share

A Point of Sale (POS) terminal functions as a retail device that facilitates customer payments for products and services using debit or credit cards (Shafei and Sijanivandi, 2022). Local cardholders rely on these portable devices to perform retail market transactions which boost convenience for both shoppers and vendors (Kajdi and Kiss, 2022). Studies indicate that POS terminal adoption boosts bank market share across various regions including Kenya where their implementation has led to banking sector expansion (Mukira et al., 2022). Prior research indicates a positive correlation between POS system

implementation and financial sector market dominance which shows that increased POS adoption leads to greater bank market share and profit margins (Kamboh and Leghari, 2016). Le and Ngo (2020) demonstrate that a direct relationship exists between the proliferation of POS terminals and bank profitability alongside market share expansion, which highlights their significance in enhancing a bank's market footprint. The study investigates whether the expansion of POS terminals in Pakistan's banking sector will boost bank market share, building on positive regional evidence that links POS terminal usage to market share growth.

2.7 Artificial intelligence and innovative financial services

The notion of artificial intelligence (AI) has gained heightened importance during recent years particularly within the financial sector. Banking services now prominently feature AI technology through the integration of chatbots, virtual assistants, and other AI-powered tools across bank websites, mobile apps, and social media platforms (Kruse et al., 2019). Financial processes including mobile banking, internet banking, ATMs, and POS systems have become more efficient through AI implementation which reduces operational time and costs while expanding banks' market share (Ayllon, 2020). AI technology transforms customer interactions with banking systems into complex experiences through gesture, writing, and speech recognition in mobile banking applications (Payne et al., 2021). AI possesses the capability to revolutionize conventional banking methods through advancements in digital banking services while enabling social media engagements and streamlining decision-making processes to improve customer experiences. This transformation boosts operational efficiency while simultaneously expanding a bank's market share through the provision of innovative services that align with changing customer expectations (Ashta and Herrmann, 2021). Though certain researches indicate that AI serves as a positive moderator in speeding up innovative financial processes to boost market share, the body of research on this subject remains sparse. This research seeks to formulate analogous hypotheses for Pakistan's banking industry by suggesting that incorporating AI into financial services will probably enhance banks' regional market share considerably.

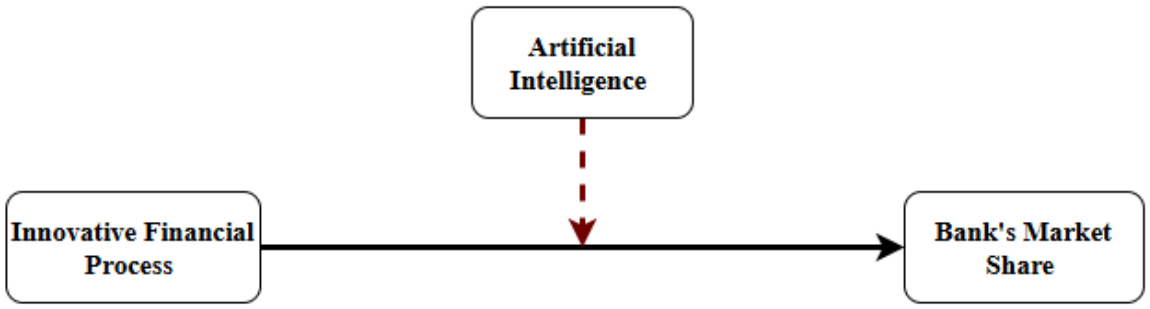

Figure 1: Research Model

3.0 Population, sampling and data collection

According to the State Bank of Pakistan's report from September 11, 2020, United Bank Limited (UBL) is recognized as a leading innovative retail bank in Pakistan due to its comprehensive technological advancements in banking services. A detailed investigation covered 145 UBL branches spread across 45 cities in Pakistan. Analysts treated each branch as an independent entity when choosing the branch manager and operations manager as data collection respondents. Through a cluster-based sampling method the study attained diverse representative samples by choosing branches based on their geographical locations. Researchers identified clusters before using cluster simple random sampling to select the final sample according to Acharya et al.'s guidelines. (2013). By employing this methodology, UBL reaches balanced national branch distribution while simultaneously identifying its innovation success factors. Researchers achieve detailed insights

into retail banking innovations through the combined application of strategic sampling methods and geographical diversity. Data collection in the study utilized a self-administered survey questionnaire which was arranged into four separate sections. Section 1 examined socio-economic and demographic variables including gender, age, qualifications, experience, employment term, and average monthly salary. Section 2 presented inquiries regarding advanced financial mechanisms including internet banking, mobile banking, telephone banking, ATMs, and point-of-sale terminals. The third section focused on inquiries regarding the bank's market share whereas the fourth section explored artificial intelligence applications within UBL banking operations. All the measures were scaled at a five-point Likert type of scale measure. The data were collected using a cluster-based sampling technique due to the fact of the geographical distribution of banks in different cities. A total number of more than 450 questionnaires were shared while 307 respondents actively filled out the responses. Therefore, the response rate was 68.22%. For analyzing the research, structural equation modeling using SmartPLS was adopted for evaluating the hypothesis of the study.

3.1 Measurements

The dependent variable of the study was market share, which was measured using 10 item-statements adapted from Nazaritehrani and Mashali (2020). Responses were recorded using a seven-point Likert scale ranging from 1 = Strongly Disagree to 7 = Strongly Agree. The independent variable, innovative financial processes, was measured through five components: internet banking (4 items), mobile banking (4 items), telephone banking (3 items), ATM facility (4 items), and point-of-sale terminals (4 items). These items were adopted from Raza et al. (2017) and Nazaritehrani and Mashali (2020), and were also assessed using the same five-point Likert scale. The moderating variable, artificial intelligence, was evaluated using two dimensions: automated decision-making (4 items), and chatbot and social media interactions (4 items), adopted from Kruse et al. (2019) and Ayllon (2020). All constructs were measured on a five-point Likert scale to ensure consistency and comparability across variables.

4.0 Data analysis:

4.1 Descriptive statistics

Table 2: Descriptive Statistics

Variable	Mean	Std. Deviation	Skewness	Kurtosis
Internet Banking (IB)	5.05	1.33	-0.55	0.15
Atm facility (AF)	4.60	1.50	-0.41	-0.30
Mobile Banking (MB)	4.90	1.15	-0.26	-0.29
Pos Terminal (POS)	5.50	1.31	-0.96	0.77
Telephone Banking (TB)	4.44	1.46	-0.20	-0.65
Bank Market Shre (BMS)	5.15	1.25	-0.51	0.61
Artificial Intelligence (AI)	4.60	1.51	-0.12	-0.25

Descriptive statistics of the banking technologies need to be considered against established threshold values for skewness and kurtosis when interpreting. As per George and Mallery (2019) a skewness values between -1 and +1 is generally acceptable for a normal distribution, hence variable of this dataset (e.g., Internet Banking, ATM Facility and POS Terminal) are within this range implying symmetrical distribution. Values between –2 and +2 are usually considered appropriate for kurtosis (West, Finch, & Curran, 2012). However, the values in this range are found for kurtosis of most variables in this dataset, except for POS terminals (Kurtosis = 0.77), suggesting moderately peaked distribution. These threshold values are established as a criterion to study the normality of data, and to interpret the result using appropriate statistical methods.

4.2 Reliability and Validity Statistics

Table 3: Validity Statistics

Construct	Item	Loading	Cronbach's Alpha	CR	AVE
Internet Banking (IB)	IB1	0.82	0.89	0.92	0.66
	IB2	0.81			
	IB3	0.81			
	IB4	0.83			
Atm facility (AF)	AF1	0.75	0.89	0.92	0.75
	AF2	0.83			
	AF3	0.84			
	AF4	0.85			
Mobile Banking (MB)	MB1	0.87	0.93	0.94	0.77
	MB2	0.89			
	MB3	0.87			
	MB4	0.88			
Pos Terminal (POS)	POS1	0.88	0.92	0.93	0.54
	POS2	0.91			
	POS3	0.86			
	POS4	0.70			
Telephone Banking (TB)	TB1	0.79	0.96	0.97	0.79
	TB2	0.78			
	TB3	0.68			
Bank Market Shre (BMS)	BMS1	0.77	0.84	0.81	0.64
	BMS2	0.71			
	BMS3	0.80			
	BMS4	0.72			
	BMS5	0.73			
	BMS6	0.72			
	BMS7	0.68			
	BMS8	0.89			
	BMS9	0.89			
	BMS10	0.87			
Artificial Intelligence (AI)	AI1	0.87	0.96	0.97	0.79
	AI2	0.89			
	AI3	0.91			
	AI4	0.85			
	AI5	0.92			
	AI6	0.88			
	AI7	0.88			
	AI8	0.91			
	AI9	0.87			
	AI10	0.70			
	AI11	0.79			

Results found for the measurement model indicate that all constructs will have high internal consistency since Cronbach's Alpha values on the constructs are above the usual acceptance level 0.7 (Nunnally & Bernstein, 1994). For example, Cronbach's Alpha of Internet Banking (IB) as 0.89 and Mobile Banking (MB) as 0.93 show high reliability of these constructs. All the constructs Composite Reliability (CR) values are above the acceptable limit of 0.70 (Hair et al., 2010) as attested by Mobile Banking (CR = 0.94) and Artificial Intelligence (AI) (CR = 0.97). Furthermore, the Average Variance Extracted (AVE) values for all items are above the 0.50 threshold (Fornell & Larcker, 1981) which means ATM Facility (AF) and Mobile Banking (MB) have 0.75 and 0.77 values respectively which make them have adequate convergent validity. Therefore, these results indicate that the constructs are reliable and valid enough for further analysis.

4.3 Fornell Larcker Criteria

Table 4: Fornell Larcker Criteria

	IB	AF	MB	POS	TB	BMS	AI
Internet Banking (IB)	(0.610)						
Atm facility (AF)	0.482	(0.624)					
Mobile Banking (MB)	0.553	0.579	(0.591)				
Pos Terminal (POS)	0.479	0.498	0.530	(0.607)			
Telephone Banking (TB)	0.390	0.345	0.422	0.401	(0.589)		
Bank Market Shre (BMS)	0.405	0.428	0.466	0.388	0.445	(0.602)	
Artificial Intelligence (AI)	0.332	0.362	0.399	0.376	0.415	0.437	(0.570)

The analysis of the correlation matrix for the variables representing the constructs indicates the interrelationship among variables using Fornell – Larcker criterion (Fornell & Larcker, 1981). As per this criterion, the Average Variance Extracted (AVE) for each construct should be larger than its correlations with all other constructs to test the discriminant validity. Here, square root of the AVE for each construct serves as the diagonal value (0.610, 0.624, 0.591, 0.607, 0.589, 0.602, and 0.570 for the Internet Banking, ATM Facility, Mobile banking, POS Terminal, Telephone Banking, Bank Market Share, Artificial Intelligence respectively). All of these are higher than the correlations between the constructs, which indicates that these constructs are more highly related to its own indicators than they are to other constructs, which confirms the discriminant validity. For instance, the square root of AVE for Internet Banking (IB) (0.610) and the correlation between IB and ATM Facility (AF) (0.482) is less than the square root of the AVE for IB, verifying that the constructs are different. These findings are consistent with threshold standards of convergent as well as discriminant validity, as per Fornell and Larcker (1981), and Hair et al. (2010), AVE is greater than 0.5 and inter construct correlation sufficiently low to be set apart.

4.4 HTM RATIO

Table 5: HTM RATIO

Variables	IB	AF	MB	POS	TB	BMS	AI
Internet Banking (IB)	0.887						
Atm facility (AF)	0.512	0.864					
Mobile Banking (MB)	0.472	0.518	0.879				
Pos Terminal (POS)	0.578	0.522	0.483	0.736			
Telephone Banking (TB)	0.465	0.46	0.488	0.483	0.887		
Bank Market Shre (BMS)	0.394	0.448	0.409	0.427	0.466	0.899	

Artificial Intelligence (AI)	0.386	0.452	0.476	0.422	0.441	0.411	0.877

An advanced method of assessing discriminant validity (Henseler, Ringle, and Sarstedt 2015) is the Heterotrait-Monotrait Ratio (HTMT) criterion. This criterion states that the HTMT values should be below the threshold 0.90 to confirm discriminant validity. If any HTMT value is larger than this threshold, it suggests that there is no discriminant validity between the related constructs. Where in this case, the HTMT values of the different pairs of constructs are substantially small. In this example the HTMT value between the Internet Banking (IB) and ATM Facility (AF) is 0.512 which is quite lower than 0.90 indicating good discriminant validity. The fit between Mobile Banking (MB) and POS Terminal (POS) is also confirmed by HTMT value of 0.483 which is similar to the first case. Other pairs like Telephone Banking (TB) and Bank Market Share (BMS) have HTMT values between 0.394 and 0.488, which are all still quite good, which mean the constructs do not overlap each other. Consequently, discriminant validity was seen to exist for all constructs and thus the measurement model satisfies the criteria for convergent and discriminant validity based on this criterion.

4.5 Hypotheses Testing:

Table 6: Hypotheses Results

Path	Path Coefficient	Std. Dev (SD)	T-value (Bootstrap)	p-value	BI (2.5%; 97.5%)	Result
IB → BMS	0.463	0.038	12.308	0.000	0.389; 0.537	Accepted
TB → BMS	0.132	0.045	2.932	0.003	0.045; 0.220	Accepted
MB → BMS	0.142	0.027	5.295	0.000	0.094; 0.199	Accepted
ATM → PBMS	0.204	0.032	6.455	0.000	0.147; 0.270	Accepted
POS→BMS	0.321	0.045	2.254	0.004	0.048; 0.321	Accepted
IFP × AI → BMS	0.050	0.022	2.278	0.023	0.007; 0.092	Accepted

Note: Internet Banking (IB), Atm facility (AF), Mobile Banking (MB), Pos Terminal (POS), Telephone Banking (TB),

Bank Market Shre (BMS), Artificial Intelligence (AI)

The path analysis results provide insights into the relationships between the various banking technologies (Internet Banking, Telephone Banking, Mobile Banking, ATM Facility, and POS Terminal) and Bank Market Share (BMS), as well as the moderating effect of Artificial Intelligence (AI). All of the hypothesized paths are significant, with path coefficients that indicate varying degrees of influence on BMS. For example, the relationship between Internet Banking (IB) and BMS is strong, with a path coefficient of 0.463 and a t-value of 12.308, suggesting a robust positive impact ($p < 0.001$). Similarly, other paths, including Telephone Banking (TB → BMS, path coefficient = 0.132, t-value = 2.932, $p = 0.003$) and Mobile Banking (MB → BMS, path coefficient = 0.142, t-value = 5.295, $p < 0.001$), also show significant positive relationships with BMS. The relationship between ATM Facility (ATM → BMS) and BMS is particularly strong, with a path coefficient of 0.204 and a t-value of 6.455, indicating a significant positive impact on market share ($p < 0.001$). The relationship between POS Terminal (POS → BMS) is also significant, with a path coefficient of 0.321 and a t-value of 2.254 ($p = 0.004$). Finally, the moderating effect of Artificial Intelligence (IFP × AI → BMS) is significant, with a path coefficient of 0.050 and a t-value of 2.278 ($p = 0.023$), indicating that AI plays a small but significant role in enhancing the impact of banking technologies on market share.

5.0 Discussion:

This study finds that innovative financial services predict market share in the Pakistani banking sector through the moderator of artificial intelligence (AI). From the results of this study, all five banking

technologies including Internet Banking (IB), Mobile Banking (MB), Telephone Banking (TB), Automated Teller Machines (ATM) and Point of Sale (POS) terminals are found to have significant and positive effect on bank market share (BMS) thereby substantiating the hypotheses formulated in the study. Such findings are consistent with contemporary literature and help fill in the picture of technology-led growth in emerging banking markets.

The results validate the idea that the Internet Banking, which include both operational efficiency and customer accessibility, strengthens market share. This coincides with the findings of Rajasulochana and Khizerulla (2022), who concluded that the online platforms facilitate round the clock transactions that make life easier for customers. Chauhan et al. (2022) and Akhter et al. (2022) mention internet banking as equally beneficial in terms of reducing and replacing branch operation and reducing costs which helps financial growth alike. In the context of Pakistan, this observed effect is strike because Raza et al. (2017) precisely observed the positive evolution of internet banking in expanding market penetration. Like a relatively traditional channel, the effect of telephone banking was also significant albeit modestly. This research by Jagathi (2021) and Mahardini et al. (2022) found that telephone banking is still considered a useful service, especially in the presence of lack of digital infrastructure. These findings are also supported by the increased significance mentioned by Hussain et al. (2022) and Irwan et al. (2022) during the period of COVID 19 pandemic, showing how telephonic channels became an easier and more robust replacement to in person interaction.

Mobile banking exhibited a significant and positive influence consistent with global findings. Prior literature confirms that mobile financial platforms enhance service accessibility and contribute to customer retention (Uddin, 2022; Isik et al., 2021). Studies in both emerging and advanced economies (e.g., Payne et al., 2021a; Druhov et al., 2019a) have highlighted mobile banking's centrality to market competitiveness. However, some regional discrepancies remain, such as those noted by Onay and Öztas (2018), where deposits and loans increased, but not necessarily market share. Yet in the present study, mobile banking's contribution affirms its value within Pakistan's growing digital banking environment. The relationship between ATM facilities and market share also emerged as substantial. This reinforces the assertion that ATMs remain integral to banking services, particularly in environments where branchless banking is expanding. Previous research in Afghanistan and Kenya (Faryal & Tikhomirov, 2022; Kithinji, 2017) demonstrated that ATM deployment directly enhances financial inclusion and institutional outreach. Gautam et al. (2022) observed that ATMs delivering multi-functional services yield higher customer satisfaction, which can lead to greater market retention. The consistency across regions and models provides robust support for ATM's continued importance in both digital and hybrid banking ecosystems. POS terminals demonstrated a significant relationship with market share, revealing their growing importance in digitizing retail transactions. In alignment with Kajdi and Kiss (2022), POS systems enable convenience, speed, and transparency in payments, fostering a favorable banking experience for both consumers and merchants. These findings are in line with those of Mukira et al. (2022) and Kamboh and Leghari (2016), who associated POS growth with profit and market expansion. This means that in Pakistan where adoption of the digital is rising by leaps and bounds in commerce, POS terminals may be important frontier to customer engagement and market share expansion.

Though statistically modest, this moderating effect of AI on the relationship between innovative financial processes and market share has functional impact which adds some depth to the interpretation. This is in line with assertions made by Isik et al. (2021) and Karim et al. (2021)) that in financial services, AI can aid innovation outcomes through its use. Automated services, such as predictive analytics, customer profiling, and chatbots utilize AI drivers to improve service personalization and working speed, which results in further strengthened relationship and loyalty with the customers. According to Rabbani (2022), 24/7 client interaction with AI chatbots is not only motivating for clients, but also provides an edge for businesses in the highly competitive MRO market. The above also agrees with the fact that the findings of Hussain M. K. et al. (2022) are to containers that AI improves fraud detection and customer security, thereby creating a critical determinant for banking

market share in digital settings. Despite Pakistan's modest AI infrastructure (Hassan et al, 2020), the high moderation effect demonstrates the potential for transformative AI when used in innovation in banking services. Ayllon (2020) and Ashta and Herrmann (2021) note that the observed synergy fits with the catalytic effect of AI in boosting financial tools' interface and functionality to attract and keep customers. That is to say that while the effects of AI achieved in isolation may never be too powerful, it makes the operating systems of digital banking more effective.

5.1 Practical implications

Furthermore, the findings of this study have practical relevance for banking practitioners, policymakers, and strategists of the financial technology in the context of Pakistan and similar emerging economies. These findings underscore the importance of innovative financial services, i.e., the internet banking, mobile banking, telephone banking, ATM facilities, and point of sale (POS) terminals, in expansion of market share. Artificial Intelligence (AI) signals a moderating effect – a need to utilize intelligent technologies into the traditional banking systems to achieve optimum results. This indicates that banks should give priority to the development and continuous improvement of the internet banking platforms. Internet banking systems at banks should be secured, user friendly and multi-functional such that they cannot afford customers to visit the bank brick and mortar in their quest for services. Doing this can make customers satisfied though and retain them resulting to higher market competitiveness.

The outcome stands as an indicator that mobile banking has a major impact in market share; in the current age, mobile apps are not a choice, but a must for the modern banking cosmos to survive. The diversity of these financial activities (real time fund transfers, utility payments, loan applications, financial advisory services) should be supported by the mobile app of the financial institution. Additionally, mobile banking platforms must be operable across different operating systems and should be available on low-cost devices so that they are inclusive in segments of underbanked. Telephone Banking's positive correlation to market share shows that even in the face of rapid digitization, legacy systems have some value in particular for consumers that are less digitally literate or that do not have internet access. Telephone banking services should be maintained and modernized by banks, possibly incorporating this into voice-based AI for the purpose of increased efficiency while keeping human touch points when required.

One other finding illustrates the need to expand ATM networks especially in semi urban and rural areas where banking access remains limited. Placing multi-functional ATMs strategically will reduce customer wait times, provide vital financial services at all times, and help build brand reliability. Likewise, the POS terminal positive results indicate that financial institutions can work with retail businesses to further rollout POS terminals. To stimulate adoption of POS systems, expenses, such as installation costs or revenue sharing model, can be subsidized to help increase transaction volumes and, therefore, market penetration. It too has confirmed that AI plays the role of strengthening the relationship between innovative banking services and market share. AI should be perceived of by banks as a strategic enabler, rather than a technological upgrade. To enhance operational efficiency and service personalized, you can use AI tools like chatbots, automated decision-making system, fraud detection algorithm and customer sentiment analysis. They can help speeding up interactions and reducing manual workloads, as well as in process of fraud monitoring, which are crucial when it comes to customer trust and satisfaction. These trends mean that policymakers and regulators too must also recognize these trends and provide an environment for digital and AI led transformation. The regulatory frameworks, which include the aspect of data privacy, cybersecurity, and equitable access to digital tools all out to develop can help in banking sector innovation.

5.2 Limitations

The study focuses exclusively on a single commercial bank—United Bank Limited (UBL)—identified as one of Pakistan's most innovative banks. Although this focus allows for a concentrated and detailed research, it limits the generalizability of the results across the broader banking sector. Other banks may differ in their technological adoption, customer demographics, and operational practices, which could influence how innovative financial services and AI affect their

market share. The study relies on cross-sectional data collected through self-administered questionnaires. This method captures respondents' perceptions at a single point in time and may not reflect long-term trends or changes in market dynamics. Additionally, self-reported data are subject to biases such as social desirability or misinterpretation of questions, which could affect the accuracy of the results.

The analysis is limited to five financial service components (internet banking, mobile banking, telephone banking, ATM services, and POS terminals) and two dimensions of AI (automated decision-making and chatbot/social media interactions). While these elements represent major digital innovations in the banking sector, they do not encompass all possible technological advancements. For instance, blockchain technology, biometric authentication, and open banking APIs are emerging tools that were not considered but could influence market share. The moderating role of AI was measured using a composite variable without a detailed examination of individual AI applications' differential impacts. As AI tools vary significantly in their complexity and effectiveness, treating AI as a single moderating construct may oversimplify its influence on financial innovation outcomes.

5.3 Future Directions

Future studies should expand the scope to include multiple banks across varying tiers—public, private, and Islamic financial institutions—to improve the generalizability of findings and capture a more comprehensive view of the sector. A comparative analysis would reveal whether technological innovations impact banks differently based on ownership structure, customer base, or geographic focus. Longitudinal studies are recommended to track changes in technological adoption and market share over time. This approach would allow researchers to identify causal relationships and better understand the long-term effects of innovation strategies on competitive performance.

Future research can also benefit from incorporating qualitative methods such as interviews or focus groups with bank executives and technology officers. These methods could provide deeper insights into the strategic decision-making processes behind innovation adoption and AI integration. Moreover, expanding the conceptual framework to include additional technological constructs such as blockchain, cybersecurity infrastructure, and fintech collaborations would enrich the understanding of how emerging tools reshape market dynamics.

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