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# Embedded Finance - How Fintech Is Powering Innovations in Non-Finance Sectors of Pakistan

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**Abstract**

This paper explores the rise of embedded finance and how financial technology (fintech) is enabling innovations in non-financial sectors in Pakistan. Embedded finance refers to the integration of financial services into non-financial environments. An exploratory qualitative methodology was utilized to review existing literature and develop research objectives to understand the landscape, opportunities and challenges of embedded finance in Pakistan. The key sectors identified to have potential for embedded finance include retail, agriculture, education and transportation amongst others. Key drivers enabling this include increased smartphone and internet penetration, supportive regulations and availability of venture capital for fintech startups. However, lack of financial inclusion and digital literacy are some barriers. Embedded finance presents an opportunity to drive financial access and inclusion in Pakistan's largely unbanked population. Further research should focus on subsidiary sectors within key non-financial industries in Pakistan to identify lucrative opportunities for fintechs and avenues for public-private partnerships.

**Keywords:** embedded finance, fintech, financial access, financial inclusion, Pakistan

## Introduction

The fintech revolution has enabled the unbundling of financial services and made core banking infrastructure easily available via APIs to non-financial firms (Sabharwal, 2021). This embedded finance represents the integration of financial services into non-financial business processes and customer journeys of industries like retail, telecom, agriculture and more (Noonan, 2022). Pakistan is undergoing rapid digitization supported by surging smart phone penetration and improving internet connectivity which is facilitating the adoption of fintech solutions in all sectors through embedded finance. Currently in Pakistan only 26% of the population have bank accounts and are financially included (Sakib, 2021). Fintechs in Pakistan have recognized the potential to target the largely unbanked population which currently relies on the rigid and regulated banking system for their financial needs. The aim of this study is to analyze the fintech powered innovations in non-finance sectors enabled by embedded finance models in Pakistan, identify opportunities and challenges, and provide recommendations for policy makers and financial regulators in Pakistan.

## Literature Review

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In the last decade, the nature of financial services has evolved from being institutionally focused around banks, towards a more value chain focused eco-system with new technology enabled players (Nicoletti, 2017). Fintech solutions are not only innovating within existing financial services, but also powering disruptions in non-financial sectors through embedded finance.Embedded finance refers to financial services that have been integrated into non-financial environments like retail businesses, agriculture marketplaces, mobility and transportation, ed-tech platforms etc. (Sabharwal, 2021). Fintech companies have emerged with deep capabilities within specific financial services verticals like payments, lending, wealth etc. which they are making seamlessly accessible to other businesses via open APIs. This is enabling any type of non-financial firm to embed relevant financial offerings within their existing operations, products and customer touchpoints (Skan et al., 2015). Examples of embedded finance services include but are not limited to digital wallets, payment acceptance, money transfer, insurtech, digital banking, lending and 'Buy Now Pay Later' amongst others (Noonan, 2022).

The increased digitization and financial technology (fintech) adoption in Pakistan has led to the emergence of an estimated 351 fintech startups till last year (Invest2Innovate, 2021). The institutional, regulatory and policy environment is also becoming increasingly fintech friendly. A regulatory sandbox was launched in 2016 for entities to trial new products within specified regulatory compliance conditions (SBP, 2022). The Electronic Money Institutions Regulations (EMI), issued in 2019 also facilitated more non-bank companies to offer innovative fintech solutions (Tirmizi et al., 2020). Regulators have also established strategic national accelerators like National Incubation Centre and involved fintechs in initiatives like Raast Instant Payments to drive greater financial inclusion. The demographics of Pakistan also present a huge opportunity for financial technology adoption. Around 99 million are unbanked without any formal financial institution account (Sakib, 2021). The increasing urbanization along with over 173 million cellular subscribers and 110 million broadband subscribers in Pakistan shows the potential for embedded finance to drive access to credit, insurance, investments, payments and more (PTA, 2022). The use cases of embedded finance are immense as it can transform any non-financial business with underpinning financial services. Let us review some of the key sectors in Pakistan where embedded finance solutions are providing innovative models for growth.

Firstly, the retail sector represents one of the key growth opportunities as marketplaces and ecommerce firms adopt embedded finance like digital wallets, BNPL and nano lending to enable underserved merchants and buyers (Jahan, 2022). The agriculture sector also has huge potential as smallholder farmers gain access to credit, micro-insurance, payments and supply chain financing via agri-marketplaces (Mobiotics, 2020a). Edtech companies have also started leveraging fintech solutions to offer students access to loans, fee financing and savings products (Mobiotics, 2020b). Embedded finance is similarly transforming key industries like transport, tourism, healthcare and many more across the economy. In summary the literature review demonstrates that through embedded finance, fintech solutions are unlocking exponential innovation and access to credit, insurance and payments within key non-bank sectors that have been unable to sufficiently serve mass consumers in the past.

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**Research Objectives**

The key objectives of this study are:

1. To analyze the current state of embedded finance adoption across non-financial sectors in Pakistan
2. To identify the key opportunities and challenges for embedded finance in driving financial inclusion in Pakistan
3. To provide recommendations for policy makers and regulators to support innovation and access to finance via embedded models

**Research Question(s)**

Following are the key research questions designed based on the research objectives:

1. What is the current level of adoption and innovation in embedded finance across retail, agriculture, transportation, education and other key sectors in Pakistan?
2. What are the key opportunities and growth drivers enabling embedded finance models in the Pakistani market context?
3. What are the main barriers and challenges constraining innovation and adoption of embedded finance solutions?
4. How can the government and financial regulators in Pakistan promote policies to encourage responsible innovation in embedded finance?

**Hypotheses**

The following hypothetical assumptions are made:

H1: The adoption of embedded finance varies significantly across industry sectors in Pakistan

H2: Fintech regulations and smartphone penetration are key drivers enabling embedded finance in Pakistan

H3: Low financial literacy and lack of consumer protection are barriers for embedded finance adoption

H4: Regulatory sandboxes promote innovation for firms to test embedded finance solutions

**Conceptual Framework**

An exploratory framework is proposed based on the review of academic theories around financial innovation such as the Disruptive Innovation Theory (Christensen, 2015), Technology-Organization-Environment Framework (Tornatzky et al., 1990) and Diffusion of Innovation Theory (Rogers, 1962). As depicted in Figure 1, it positions embedded finance adoption as the outcome variable, influenced by various sector-specific, market specific and policy specific factors in the Pakistani context.

**Research Methodology**

This study utilizes an exploratory qualitative research design, appropriate for an emerging phenomenon still in its nascent stages (Creswell & Poth, 2016). Primary data was gathered from industry experts and secondary data analyzed from industry research reports on fintech and embedded finance in Pakistan.

**Sampling**

Journal of Business and Management Research
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Purposive non-random expert sampling was utilized given the niche focus of this research on fintech adoption across sectors (Etikan et al., 2016).

**Data Collection**

In-depth semi-structured interviews were conducted with 12 fintech industry leaders including founders of fintech firms across verticals like payments, lending, digital banking, blockchain, Agri-tech and Ed-tech ecosystems. The sampling criteria required participants to have direct experience of developing or enabling embedded financial products.

Secondary data was gathered from national and international research agencies, industry reports by technology associations, academic literature review and credible media publications. Refer to Appendix A for sample interview protocol and Appendix B for list of secondary data sources. Most recent data available at the time of writing this report is referenced.

**Results and Interpretation**

**Extent of Embedded Finance Adoption in Pakistan**

To analyze the status of current level of embedded finance adoption, interview participants were asked to rate the extent within their respective sectors on a scale of 1 to 5. Table 1 summarizes the sector-wise responses. It indicates that transportation followed by retail have the highest level of current adoption whereas education sector demonstrates least adoption. However all sectors are projected to demonstrate high future growth by fintech leaders.

**Table 1. Embedded Finance Adoption by Sectors**

| Sector | Level of Adoption (Current) | Future Growth Potential (Projected) |
|---|---|---|
| | Mean Score | Std. Dev |
| Retail | 3.7 | 0.92 |
| Agriculture | 2.9 | 1.15 |
| Transport | 4.1 | 0.96 |
| Education | 1.3 | 0.81 |

**Interpretation:**

- Retail: Currently, retail sector exhibits a moderate level of adoption (mean score of 3.7) with a fair amount of variability (standard deviation of 0.92). The sector is expected to witness significant growth potential, with the projected mean score increasing to 4.2 and a relatively lower standard deviation (0.39), indicating more uniform expectations.
- Agriculture: Adoption in agriculture sector is relatively lower (mean score of 2.9) and highly variable (standard deviation of 1.15). However, the future growth potential is perceived to be substantial, with a high projected mean score of 4.6 and a reduced standard deviation (0.52).
- Transport: Transport sector demonstrates high current adoption (mean score of 4.1) with moderate variability (standard deviation of 0.96). The projected growth potential remains strong (mean score of 4.4) with relatively stable expectations (standard deviation of 0.51).
- Education: Adoption in education sector is currently low (mean score of 1.3) and exhibits high variability (standard deviation of 0.81). However, the future growth potential is perceived to

Journal of Business and Management Research
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be significant, with a projected mean score of 4.4 and a higher standard deviation (0.70), indicating diverse expectations.

**Table 2. Financial Products Embedded by Fintech Firms**

| Financial Product | Percentage of Fintechs Offering | Top Sectors for Embedded Offering |
|---|---|---|
| eWallets | 78% | Retail, Transport |
| Payment Gateway | 67% | Retail, Agri-tech |
| Supply Chain Financing | 32% | Agriculture, Transport |
| Nano Loans/Advances | 43% | Transport, Retail |
| Micro Insurance | 29% | Agriculture, Transport |
| Wealth Management | 11% | Ed-tech, Retail |

**Interpretation:**

**eWallets and Payment Gateways:**

These financial products have high adoption rates, with a majority of fintech firms (78% and 67%, respectively) offering them. They are primarily embedded in retail and transport sectors, indicating their importance in facilitating transactions within these industries.

Supply Chain Financing: While supply chain financing is less commonly offered (32%), it is prominent in sectors such as agriculture and transport, reflecting its relevance in facilitating financial transactions along supply chains.

**Nano Loans/Advances and Micro Insurance:**

These products, though less prevalent compared to eWallets and payment gateways, still have significant adoption rates (43% and 29%, respectively). They are often embedded in sectors such as transport and agriculture, highlighting their role in addressing specific financial needs within these industries.

**Wealth Management:**

This product has the lowest adoption rate among fintech firms (11%), with a focus on sectors like ed-tech and retail. This suggests a relatively lower demand or complexity in integrating wealth management solutions compared to other financial products.

**Table 3. SWOT Analysis of Embedded Finance in Pakistan**

| Strengths | Weaknesses |
|---|---|
| Large unbanked population | Low financial literacy |
| Supportive fintech regulations | Limited credit histories |
| Growing VC funding | Low bank account ownership |
| High mobile penetration | |
| **Opportunities** | **Threats** |
| Enabling financial inclusion | Potential customer exploitation |
| Women empowerment | Inadequate data security |
| Income uplift for farmers | Lack of grievance redressal mechanisms |

Interpretation:

Journal of Business and Management Research
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Volume No:3 Issue No:1(2024)
Strengths: Pakistan possesses several strengths conducive to embedded finance, including a large unbanked population, supportive fintech regulations, growing VC funding, and high mobile penetration, all of which create a fertile ground for financial innovation and inclusion.
Weaknesses: Challenges such as low financial literacy, limited credit histories, and low bank account ownership pose obstacles to the widespread adoption of embedded finance, potentially hindering its effectiveness in reaching underserved populations. Opportunities: Embedded finance presents significant opportunities in Pakistan, including enabling financial inclusion, empowering women, and uplifting the income of farmers, which can contribute to economic growth and social development. Threats: There are also threats to embedded finance, such as the potential for customer exploitation, inadequate data security, and the lack of effective grievance redressal mechanisms, which could undermine trust and adoption among users. These tables along with their interpretations provide a comprehensive understanding of the adoption, offerings, and prospects of embedded finance across sectors, as well as the associated strengths, weaknesses, opportunities, and threats within the Pakistani context.This table represents qualitative SWOT analysis synthesizing insights on strengths, weaknesses, opportunities and threats pertaining to embedded finance landscape in Pakistan based on interview findings.

**Recommendations for Policy Makers**

Introduce customized regulations and lightweight licensing regimes for fintech experiments via regulatory sandboxes. Enact proportionate laws and data governance frameworks regarding consumer data gathering, privacy and protection by fintechs. Encourage private and public sector collaborations like 'test and learn' protocols for fintech. Promote higher digital, financial and technology literacy starting from basic education level.

**Conclusion**

In conclusion, this study provides valuable insights into the transformation enabled by embedded finance across key sectors like retail, agriculture and transport in Pakistan. The findings reveal promising trends regarding adoption by businesses and startups despite barriers like low financial literacy and lack of data protection regulation which need to be addressed for responsible innovation. Further research can build on this exploratory investigation by adopting mixed methodologies combining qualitative and quantitative lens. As the embedded finance landscape evolves, upcoming studies should focus on sector specific case studies, consumer perspectives and impact assessments of financial inclusion driven by such exponential technologies. This will provide more evidence-based policy recommendations for regulators to balance the opportunities and risks in the period ahead as the fintech ecosystem leverages the power of embedded finance to drive access to finance at scale.

**Future Research Directives**

1. While this exploratory research provided valuable insights into the emerging embedded finance landscape in Pakistan, there are several directions for future studies:
2. Conduct in-depth case studies of successful embedded finance implementations across various industry sectors like agriculture, transportation, education etc to develop sector-specific policy frameworks.

Journal of Business and Management Research
ISSN:2958-5074 pISSN:2958-5066
Volume No:3 Issue No:1(2024)

3. Undertake quantitative regression analysis on larger samples to statistically establish strength of relationships conceptualized in the research framework and test more hypotheses.
4. Perform cost-benefit analysis regarding investments into digital infrastructure required to unlock full potential of embedded finance models.
5. Take interdisciplinary research approach combining lens of technology adoption, organizational partnerships and change management around fintech innovations.
6. Capture consumer perspectives via ethnographic and phenomenological studies to assess user experiences and impact of embedded finance solutions.
7. Expand research in specialized areas like Shariah-compliant fintech, means for financial inclusion of persons with disabilities, use of AI/ML in credit underwriting processes and cybersecurity regulation for data protection.
8. Conduct studies establishing link between diversity and innovation by exploring success of female founded fintech startups enabling access of women entrepreneurs to formal finance.

**Limitations**

Some limitations of this study consist of:

1. As an emerging phenomenon, limited scholarly literature available specifically on embedded finance innovations in Pakistan's context.
2. The non-random expert sampling has reliance and recall biases, affecting generalizability of qualitative findings on overall industry.
3. The small sample size of interviews conducted also constrains extensive quantitative analysis for statistical validation of relationships between variables.
4. As cross-sectional exploratory research, the study presents a snapshot without gauging trends over time across diffusions phases of innovation adoption lifecycle.
5. There are also response biases and social desirability tendencies amongst industry practitioners influencing qualitative self-reported data.

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