



EMBEDDED FINANCE AND SME LENDING: INTERNATIONAL EXPERIENCE AND STRATEGIC IMPLICATIONS FOR COMMERCIAL BANKS IN UZBEKISTAN

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ABSTRACT

The rapid digitalization of financial services has accelerated the emergence of Embedded Finance as a transformative model for delivering financial products through non-financial digital platforms. By integrating lending, payments, and other financial services directly into business ecosystems, Embedded Finance has the potential to improve access to finance for small and medium-sized enterprises (SMEs), reduce information asymmetry, and enhance financial inclusion. This study investigates the role of Embedded Finance in SME lending, examines international experiences from the United States, the United Kingdom, the European Union, China, and Singapore, and evaluates the prospects for implementing this model in Uzbekistan. The research employs a systematic literature review, comparative analysis, case-study methodology, and SWOT analysis. The findings indicate that Embedded Finance significantly improves lending efficiency through the use of Open Banking infrastructure, alternative data, and API-based integration. The study further demonstrates that embedded lending models can reduce loan processing times, expand financing opportunities for underserved SMEs, and create new revenue streams for commercial banks. However, successful implementation requires regulatory support, digital infrastructure development, data governance frameworks, and effective risk management systems. Based on international experience, strategic recommendations are proposed for commercial banks and policymakers in Uzbekistan. The study contributes to the emerging literature on digital finance by developing a conceptual framework linking Embedded Finance, alternative data utilization, and SME financing accessibility.

KEYWORDS

Embedded Finance;
SME Lending; Open
Banking; Banking-as-a-
Service; Alternative
Data; Financial
Inclusion; Digital
Finance; Commercial
Banks.

Introduction

The global financial sector is undergoing a profound transformation driven by digital technologies, platform-based business models, and the increasing integration of financial and non-financial services. Traditional banking institutions are no longer the exclusive providers of financial products, as

technological innovation has enabled financial services to be embedded directly into digital platforms used by businesses and consumers. This phenomenon, commonly referred to as Embedded Finance, represents one of the most significant developments in the contemporary financial ecosystem.

Embedded Finance refers to the integration of financial products and services into non-financial platforms, applications, and business processes. Through technologies such as Application Programming Interfaces (APIs), Open Banking frameworks, cloud computing, and artificial intelligence, financial services can be seamlessly incorporated into e-commerce marketplaces, accounting software, enterprise management systems, and digital platforms. As a result, customers gain access to financial products at the point of need without directly interacting with traditional banking institutions.

For small and medium-sized enterprises (SMEs), access to finance remains one of the most significant barriers to growth and development. Traditional lending models frequently rely on collateral requirements, lengthy approval procedures, and historical financial statements, limiting financing opportunities for many SMEs. The financing gap is particularly pronounced in emerging economies, where information asymmetry between lenders and borrowers constrains credit availability.

Embedded Finance offers a promising solution by leveraging alternative data generated through digital business activities. Transaction records, payment histories, inventory turnover, customer reviews, and platform-generated performance metrics can be utilized to assess creditworthiness more accurately. Consequently, embedded lending models have the potential to expand access to finance, improve risk assessment, and enhance financial inclusion.

Despite the growing importance of Embedded Finance, academic research remains fragmented. Existing studies primarily focus on technological innovation, payment services, and consumer finance, while relatively limited attention has been devoted to SME lending and the strategic implications for commercial banks in emerging economies. This research seeks to address this gap by examining international experiences and evaluating the prospects for implementing Embedded Finance within the banking sector of Uzbekistan.

The objective of this study is to investigate the impact of Embedded Finance on SME lending, analyze successful international practices, and develop strategic recommendations for commercial banks in Uzbekistan.

Literature Review

Embedded Finance has emerged from the convergence of FinTech innovation, Open Banking, and platform-based business ecosystems. Unlike traditional banking, where customers actively seek financial services, Embedded Finance integrates financial products into existing customer journeys. Industry analysts increasingly describe this transformation as a shift from “Banking as a Destination” to “Banking as a Function.”

The technological foundation of Embedded Finance is largely based on Banking-as-a-Service (BaaS), which enables licensed banks to provide financial infrastructure to third-party platforms through APIs. This model allows non-financial companies to offer lending, payments, and other financial services without obtaining banking licenses.

Table 1. Evolution of Financial Service Delivery Models¹

Characteristics	Traditional Banking	Digital Banking	Embedded Finance
Distribution Channel	Branches	Mobile Banking	Digital Platforms
Customer Interaction	Direct	Digital	Embedded
Credit Assessment	Financial Statements	Digital Data	Alternative Data
Approval Speed	Slow	Medium	Fast
Customer Experience	Fragmented	Improved	Seamless

As shown in Table 1, the evolution of financial service delivery models reflects the progressive transformation of banking activities under the influence of digitalization. While the traditional banking model is characterized by direct customer-bank interaction, reliance on financial statements for credit assessment, and relatively lengthy loan approval procedures, digital banking has significantly automated these processes through the adoption of modern information technologies.

Embedded Finance represents the next stage in the evolution of the financial industry. Its defining feature is the integration of financial products and services directly into digital platforms and business processes. This approach enables the use of alternative data sources for assessing borrowers' creditworthiness, significantly reduces loan approval times, and provides a more integrated customer experience. Consequently, Embedded Finance is reshaping the traditional role of commercial banks, transforming them from standalone providers of financial services into providers of financial infrastructure for digital ecosystems.

Open Banking enables customers to share financial information securely with third-party providers through standardized APIs. This development has created opportunities for financial institutions to access broader datasets and develop more sophisticated lending models.

Alternative data has become a critical component of modern SME lending. Unlike traditional credit assessment methods, alternative data includes:

- Transaction histories;
- E-commerce sales data;
- Customer ratings and reviews;
- Supply chain information;
- Tax and payment records;
- Digital platform activity.

Recent studies indicate that alternative data can significantly improve credit risk assessment and reduce information asymmetry, particularly for SMEs with limited credit histories.

Research Gap

Although the literature on FinTech, Open Banking, and digital lending has expanded significantly, several research gaps remain:

1. Limited research on the relationship between Embedded Finance and SME lending.
2. Insufficient focus on emerging economies.
3. Lack of strategic frameworks for commercial banks.

¹ Developed by the author based on contemporary literature on digital banking and Embedded Finance.

4. Limited analysis of implications for Uzbekistan and Central Asia.

Research Methodology

This study adopts a mixed-method qualitative research design combining:

- Systematic literature review;
- Comparative analysis;
- International case study analysis;
- SWOT analysis;
- Conceptual modeling.

The study examines experiences from the United States, the United Kingdom, the European Union, China, and Singapore due to their advanced adoption of Embedded Finance and digital lending ecosystems.

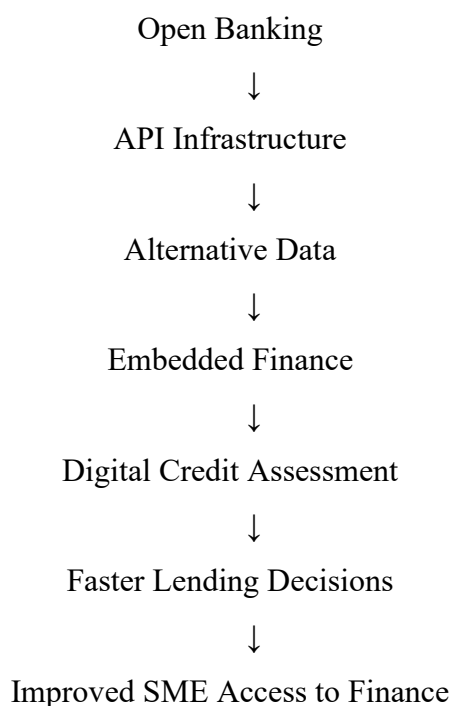


Figure 1. Conceptual Framework of Embedded Finance and SME Lending²

The development of Open Banking and API infrastructure provides the foundation for utilizing alternative data in the assessment of borrowers' creditworthiness. The integration of these elements into the Embedded Finance model facilitates the automation of the lending process, reduces loan approval times, and enhances access to financial resources for small and medium-sized enterprises (SMEs). The proposed conceptual framework illustrates the logical relationship between digital infrastructure, innovative financial technologies, and improved efficiency of SME lending.

The global Embedded Finance market has experienced rapid growth due to increasing digitalization and the expansion of platform ecosystems.

² Developed by the author.

Table 2. International Experience in Embedded Finance³

Country	Key Drivers	Major Platforms	SME Finance Impact
USA	BaaS, FinTech	Shopify Capital, Stripe Capital	High
UK	Open Banking	Tide, Funding Circle	High
EU	PSD2 Regulation	Solaris, Klarna	Medium-High
China	Super Apps	Ant Group, WeBank	Very High
Singapore	API Ecosystems	APIX	High

As shown in Table 2, the development of Embedded Finance across different countries is driven by a combination of technological innovation, regulatory support, and the maturity of digital ecosystems. Despite differences in national development models, a common trend is the increasing integration of financial services into digital platforms, thereby improving access to financial products for small and medium-sized enterprises (SMEs).

The United States has achieved particularly significant progress, with embedded lending models becoming widely adopted through e-commerce platforms such as Shopify Capital and Stripe Capital, which provide entrepreneurs with rapid access to financing based on the analysis of operational business data. China represents one of the most advanced examples of Embedded Finance, where digital ecosystems have successfully integrated payment services, lending, and other financial products into everyday commercial activities, substantially expanding access to finance for SMEs.

Embedded Finance and SME Lending

Embedded Finance transforms SME lending through several mechanisms:

Improved Access to Finance

Financial products are integrated directly into digital business platforms, reducing barriers to financing and facilitating SMEs' access to credit resources.

Faster Loan Processing

The use of automated underwriting systems and alternative data analytics significantly reduces loan approval times and enhances the efficiency of the lending process.

Reduced Information Asymmetry

The use of real-time business data provides lenders with a more comprehensive understanding of borrowers' financial condition and operational performance, thereby improving the accuracy of credit risk assessment.

Enhanced Financial Inclusion

Embedded Finance creates additional financing opportunities for small and medium-sized enterprises that have traditionally faced limited access to bank credit due to insufficient credit history or inadequate collateral.

³ Compiled by the author based on an analysis of international practices.

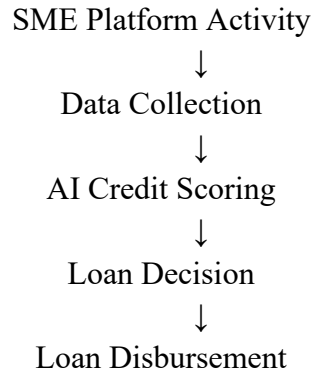


Figure 2. Embedded Lending Process⁴

As illustrated in Figure 2, the embedded lending process begins with the analysis of SMEs' digital activities on business platforms, where operational data are collected automatically. These data are then processed using AI-based credit scoring models to assess borrowers' creditworthiness and support lending decisions. This approach significantly reduces loan processing time, improves the accuracy of credit risk assessment, and enables SMEs to gain faster access to financing.

Strategic Implications for Commercial Banks

Embedded Finance is fundamentally reshaping traditional banking business models by transforming the way financial services are delivered, customer relationships are managed, and competitive advantages are created.

Table 3. Benefits and Risks of Embedded Finance Implementation for Commercial Banks

Benefits	Risks
New Revenue Streams	Cybersecurity Risks
Expanded Customer Base	Data Privacy Concerns
Better Risk Assessment	Regulatory Uncertainty
Improved Customer Experience	Platform Dependency
Lower Acquisition Costs	Operational Complexity

As shown in Table 3, the adoption of Embedded Finance creates significant opportunities for commercial banks while simultaneously introducing new challenges and risks. Integrating financial services into digital platforms enables banks to diversify revenue streams, expand their customer base, and improve lending efficiency. At the same time, increased reliance on digital infrastructure requires stronger cybersecurity measures, robust data governance, and compliance with evolving regulatory requirements.

Commercial banks are facing growing competition from FinTech companies and digital platforms. To remain competitive, they must shift from traditional product-centric business models toward ecosystem-oriented strategies that emphasize partnerships, platform integration, and embedded

⁴ Developed by the author.

financial services. Such a transformation will enable banks to strengthen their market position, enhance customer experience, and create sustainable long-term growth opportunities.

Practical Developments of Embedded Finance in Uzbekistan

One of the most significant recent developments in digital lending in Uzbekistan is the launch of the digital credit marketplace **tadbircore.uz** in 2026, designed for small and medium-sized enterprises (SMEs) and individual entrepreneurs. The platform serves as a unified digital marketplace that enables businesses to submit a single loan application simultaneously to multiple commercial banks, thereby significantly simplifying the financing process.

A key feature of the platform is its integration with government information systems, including the databases of the Tax Committee, the Credit Bureau, and other public authorities. Through automated data exchange, entrepreneurs are no longer required to collect and submit extensive supporting documentation manually, which reduces administrative costs and accelerates the loan application process.

At the initial stage, the platform employs a risk assessment system based on predefined risk factors. In the next phase of development, it is expected to introduce an AI- and machine learning (AI/ML)-based credit scoring model, which will further improve the accuracy of borrowers' creditworthiness assessment and enhance the efficiency of lending decisions.

Although **tadbircore.uz** is currently operating as a pilot project, its launch demonstrates Uzbekistan's transition toward a platform-based lending model. The initiative reflects the core principles of Embedded Finance, including the digitalization of lending processes, the use of alternative data, integration with external information systems, and the development of partnerships among commercial banks, government institutions, and FinTech companies.

The implementation of **tadbircore.uz** illustrates the practical applicability of the Embedded Finance model in Uzbekistan and demonstrates the country's readiness for broader adoption of digital lending solutions within the commercial banking sector. In the long term, such initiatives are expected to improve SMEs' access to finance, reduce loan processing times, enhance credit risk assessment, and contribute to the further development of Uzbekistan's digital financial ecosystem.

Practical Implications

The recent launch of the digital credit marketplace **tadbircore.uz** demonstrates that Uzbekistan has already taken important steps toward the implementation of Embedded Finance within its financial sector. The platform illustrates how digital technologies, automated data exchange, and collaboration between commercial banks and public institutions can simplify SME lending and improve access to finance. However, the successful scaling of similar initiatives will require coordinated efforts from all stakeholders in the financial ecosystem.

Commercial Banks

Commercial banks should accelerate the development of API-based banking infrastructure and integrate alternative data into their credit assessment models. Expanding partnerships with FinTech companies and digital platforms will enable banks to deliver embedded financial services more efficiently and improve the accessibility of financing for SMEs.

Central Bank of Uzbekistan

The Central Bank should continue promoting Open Banking standards and establish a comprehensive regulatory framework for secure data sharing among financial institutions, FinTech companies, and government agencies. In addition, strengthening cybersecurity and data protection requirements will be essential to ensure trust and resilience within the digital financial ecosystem.

FinTech Companies

FinTech companies should focus on developing innovative digital lending solutions and AI-driven credit scoring models that utilize alternative data. Such technologies can improve credit risk assessment while expanding financing opportunities for SMEs with limited credit histories.

Government Authorities

Government authorities should continue investing in digital public infrastructure and encourage financial innovation through regulatory sandboxes and digital transformation initiatives. Further integration of government databases with financial platforms will reduce administrative burdens for businesses and increase the efficiency of lending processes.

The experience of the *tadbircore.uz* platform demonstrates that Uzbekistan possesses significant potential for the wider adoption of Embedded Finance. Building on this initiative through regulatory reforms, technological innovation, and stronger collaboration among banks, FinTech companies, and public institutions will contribute to improving SMEs' access to finance, enhancing the efficiency of commercial banking, and accelerating the country's digital financial transformation.

Scientific Novelty

The scientific novelty of this study is reflected in the following contributions:

1. **A conceptual framework** linking Embedded Finance, alternative data utilization, and improved access to SME lending is developed.
2. **International experience** in the implementation of Embedded Finance is systematized across countries with different levels of digital financial ecosystem development, including the United States, the United Kingdom, the European Union, China, Singapore, and Uzbekistan.
3. **The strategic implications** of Embedded Finance for commercial banks are identified, with particular emphasis on business model transformation, platform banking, and the integration of alternative data into lending processes.
4. **Practical recommendations** for the development of Embedded Finance in Uzbekistan are proposed based on international experience and an analysis of the country's first national initiatives, including the launch of the digital credit marketplace *tadbircore.uz*.

Conclusion

Embedded Finance represents one of the most significant transformations in the modern financial services industry and has profound implications for SME financing. This study demonstrates that integrating financial products into digital platforms improves access to finance, reduces information asymmetry between lenders and borrowers, and enhances the efficiency of lending processes. The findings further confirm that Open Banking, API infrastructure, and alternative data constitute the technological foundation of embedded lending models.

The analysis of international experience indicates that the successful adoption of Embedded Finance contributes to the emergence of new banking business models, promotes financial inclusion, and accelerates the development of digital financial ecosystems. The study also shows that Uzbekistan has favorable conditions for the implementation of Embedded Finance, supported by the ongoing digitalization of the banking sector, government initiatives aimed at financial innovation, and the emergence of the country's first platform-based lending solutions. In particular, the launch of the digital credit marketplace **tadbircore.uz** illustrates Uzbekistan's transition toward a digitally integrated lending model based on collaboration among commercial banks, government institutions, and business entities.

Nevertheless, the successful implementation of Embedded Finance will require further improvements in the regulatory framework, the expansion of Open Banking standards and API infrastructure, wider adoption of alternative data analytics, and stronger cybersecurity and data governance mechanisms. Addressing these challenges will enhance the competitiveness of commercial banks, improve SMEs' access to finance, and accelerate the digital transformation of Uzbekistan's financial sector.

Future research should focus on the empirical evaluation of the impact of Embedded Finance on SME financing, credit risk management, and commercial bank performance. Particular attention should be given to developing quantitative models for measuring the effects of Embedded Finance on financial inclusion and the sustainable development of the banking sector.

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