THE SILENT REVOLUTION: EMBEDDED FINANCE AND BAAS IN EVERYDAY APPS

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ABSTRACT

Embedded finance and Banking-as-a-Service (BaaS) are changing the way financial services are delivered and used, letting financial products be easily added to platforms that aren't financial. The main reasons that make people want to use embedded finance and BaaS solutions, as well as the problems that arise, are investigated in this study. The study uses technology adoption models and real-world data to show how trust, perceived risk, data security, performance expectations, and social influence play important roles in shaping user intentions and business strategies. The results show that strong security frameworks, user-centred design, and the proper integration of APIs are necessary to build trust and encourage adoption. The study also shows how important it is for embedded finance and BaaS projects to follow the rules and come up with new technologies to be sustainable and scalable in the long term. These insights can help financial institutions, fintech companies, and policymakers use embedded finance and BaaS to improve the customer experience, make operations more efficient, and help more people get access to money.

KEYWORDS: Embedded finance, Banking-as-a-Service, BaaS, APIs, financial inclusion, digital transformation

1. INTRODUCTION

The delivery of financial services is undergoing a significant change that is frequently referred to as "The Silent Revolution" due to the influence of embedded finance and banking-as-a-service (BaaS). This revolution is evident in commonplace apps that blur the lines between financial tools and everyday digital experiences by seamlessly integrating lending, payments, insurance, and even investment options.

The term "Embedded finance" describes how financial services like banking, lending, insurance, and payments are integrated directly into non-financial platforms like social media, ride-hailing apps, and

e-commerce websites.

For example, paying for an Uber ride or using "buy now, pay later" (BNPL) services on retail websites enables end users to access financial products and conduct financial transactions within the platforms they already use daily. This integration is made possible by the use of APIs, which reduces complexity and streamlines the user experience.

Role of Banking-as-a-Service (BaaS)

Banking, as the foundation of embedded finance in terms of technology and regulations, is a service. Through APIs, BaaS providers give third-party companies access to modular banking features like account creation, money transfers, card issuance, and payment processing. This eliminates the need for platforms and fintech startups to acquire a banking licence or construct their own banking infrastructure. Rather, compliance, KYC, and core financial operations are managed in the background by regulated banks and BaaS providers.

How Embedded Finance and BaaS Work Together

BaaS is the enablement layer, and embedded finance is best understood as the model by which financial services are delivered to customers. Without the strong, regulated infrastructure that BaaS provides, embedded finance would not be feasible. For instance, a retail platform with integrated credit options or a food delivery app with instant payouts both run on top of BaaS infrastructure.

Impact and Scope in Everyday Apps

The silent revolution is accelerating: By 2030, the embedded finance market is projected to reach $7 trillion globally. This disruption is driven by several factors:

- AI-driven personalization and risk management, powering smarter and more efficient financial interactions.

- Increased accessibility, allowing previously unbanked or underserved groups to interact with financial services through familiar apps.

- Improved conversion rates and operational efficiency for businesses that no longer need to build or maintain their own financial products.

Examples of embedded finance in action include:

- Embedded payments: Seamlessly paying for services within apps like Uber or Amazon.

- Embedded lending: BNPL options directly on e-commerce platforms.

- Embedded insurance: Add-on insurance during travel bookings.

- Embedded banking: Gig platforms offering instant earnings payouts or virtual wallets.

Significance of the Silent Revolution

As a result of this integration, traditional, compartmentalised banking models are giving way to a time when financial services are ubiquitous, imperceptible, and extremely customised to meet the needs and circumstances of each individual. The silent revolution is both an opportunity and a challenge for regulators, fintech, and consumers alike. To stay with the changing financial ecosystem, new models of trust, security, and interoperability are needed.

In summary, "The Silent Revolution" explains how embedded finance and BaaS are transforming users' everyday digital lives, enabling companies to rethink customer journeys and making financial services more user-friendly, available, and pervasive than ever.

LITERATURE REVIEW

Numerous examples of embedded finance can be found in the literature, including embedded payments in e-commerce and ride-hailing platforms, embedded lending through buy-now-pay-later schemes, embedded insurance in retail and travel, and embedded investment services in personal finance applications. These implementations generate substantial new revenue models and financial inclusion opportunities in addition to streaming end-user financial interactions.

Scholars stress that technological innovations like cloud computing, API economy, and data analytics are driving the "silent revolution" of embedded finance by enabling highly customised, real-time financial experiences that are seamlessly integrated into commonplace apps. By moving the location of financial interactions from banks to popular digital platforms, this disruption puts traditional banking models to the test and raises significant issues with ecosystem governance, customer trust, and regulation.

In 2019, Onik and Miraz introduced a robust framework outlining the key domains of Mobile Financial Services (MFS). Their work stands out for its clarity in identifying fourteen distinct research themes, each offering a promising avenue for future exploration in the rapidly evolving MFS landscape. This framework not only organizes current knowledge but also inspires researchers to address critical gaps and emerging challenges. Zheng and colleagues (2019) made significant strides by developing Nut BaaS, a Blockchain-as-a-Service (BaaS) platform designed to operate seamlessly within cloud computing environments. Nut BaaS offers essential services such as network deployment, system monitoring, and comprehensive tools for smart contract analysis and testing. By handling these technical complexities, the platform empowers developers to concentrate on business logic and innovative applications of blockchain technology, rather than being burdened by system maintenance.

Durach et al. (2020) brought much-needed clarity to the discussion surrounding blockchain application

areas (BAAs) in supply chain (SC) transactions. Their analysis highlights the growing relevance of blockchain for businesses seeking to enhance transparency, security, and efficiency in their operations. This foundational work continues to shape how organizations evaluate the potential of blockchain integration in supply chain management. Khowaiter (2020) conducted an extensive literature review, complemented by a weighted meta-analysis, to synthesize current findings in the field. Building on this comprehensive review, Khowaiter proposed a new model that sets a clear agenda for future research, encouraging scholars to pursue innovative directions and address unresolved questions in financial technology.

Trivedi et al. (2021) examined the implications of blockchain for both research and practical applications. Their study reveals a wealth of untapped opportunities within the finance sector and underscores the ongoing need for technological advancements. The authors challenge the research community to push the boundaries of what blockchain can achieve, particularly in financial services. Pestovska (2021) offered a comparative analysis of the transformative potential of the banking revolution. Her work explores not only the broad societal benefits but also the individual advantages for clients. At the same time, Pestovska draws attention to the risks that accompany these innovations, urging stakeholders to remain vigilant as the financial landscape evolves.

Hensen and Kötting (2022) delved into Deutsche Bank's journey with open banking, highlighting both the opportunities and challenges associated with embedded finance. Through detailed case studies, they presented best practices for the internal transformation required within financial institutions to adopt these emerging models successfully. Sunny et al. (2022) provided a comprehensive overview of blockchain's characteristics, operational models, and real-world applications. Their analysis spans a wide array of sectors, including transportation, commerce and industry, privacy and security, finance, government, education, healthcare, and the Internet of Things. This broad perspective demonstrates the versatility and far-reaching impact of blockchain technology. Finally, Ozili (2022) conducted a global analysis of interest in embedded finance, comparing it with related concepts such as open finance, open banking, decentralized finance, financial innovation, fintech, and digital finance. This comparative approach sheds light on shifting trends and the growing appetite for innovative financial solutions worldwide.

Telukdarie and A (2023) examined the formation of digital ecosystems within the financial services sector. Their analysis focused on the influence of embedded finance regulations and market activities in developing economies such as South Africa, noting that these findings are relevant to other emerging markets as well. Kumar et al. (2023) explored the factors affecting mobile banking adoption among young users in India. Their study determined that performance expectancy, effort expectancy, and social influence are significant drivers of adoption. Additionally, perceived risk and trust were found to moderate the relationship between intention to use and actual adoption.

In a separate study, Kumar and Manari (2024) investigated the role of AI-enabled banking services in promoting digital financial inclusion in India. Their findings highlighted the potential of artificial intelligence to deliver personalized financial products and enhance access to banking services. Barone (2024) identified thirty-eight distinct variables used to operationalize consumer decision-making in the financial sector. The most frequently observed constructs included "Intention to use," "Utilization," "Satisfaction," "Perceived usefulness," and "Trust." Barone also introduced an integrative framework that organizes these variables into three principal clusters: subjects' perceptions, user experience, and adoption or usage choice.

Dave et al. (2025) examined the impact of API-first strategies within the banking sector. Their analysis of real-world implementations across several financial institutions demonstrated that such approaches enable real-time journey mapping, support predictive analytics, and allow for the delivery of customised services at scale. Sujith (2025) reviewed the latest fintech trends emerging in India, with particular attention to embedded finance. The study also addressed key challenges facing the sector, including cybersecurity risks and the complexities of regulatory compliance.

Jain and Prasad (2025) outlined best practices for API design in financial services. Their work highlighted the importance of security, scalability, and compliance as essential components for building robust and future-ready digital finance infrastructure. Das (2025) analyzed the factors contributing to the rapid growth of embedded finance and emphasized its increasing relevance in the modern digital economy. By identifying the critical success factors for effective implementation and long-term sustainability, this research offers a comprehensive guide for financial institutions and their partners.

In conclusion, current research agrees that BaaS and embedded finance together represent a paradigm shift towards pervasive, invisible financial services integrated into everyday digital experiences. This quiet revolution is changing the competitive and regulatory environment of the financial services sector, in addition to changing the way financial products are provided and used.

OBJECTIVES

- To analyse the data with Descriptive Statistics

- To assess the impact of perceived usefulness, ease of use, data security, customer trust, and perceived risk on users' intention to adopt embedded finance/BaaS services, controlling for demographic characteristics.

- To test the adoption intention across different variables

- To identify the demographic patterns (age, education, occupation) in perceptions, trust, and adoption intentions related to embedded finance and BaaS platforms
- To find out the association between the variables with a Correlation Analysis
- to compare the gender groups for all the relevant Likert-scale response variables

RESEARCH METHODOLOGY

Study Design: A cross-sectional survey was carried out among adults with experience in digital financial services, including those who have used embedded finance solutions and Banking-as-a-Service (BaaS) platforms.

Sampling Technique: Participants were recruited using convenience sampling methods through online platforms, social media channels, and banking application user bases. Efforts were made to ensure demographic diversity by considering factors such as age, gender, education, occupation, and income.

Data Collection: Data were collected using a self-administered online questionnaire. The survey included items to capture demographic information as well as five key constructs: Perceived Usefulness, Perceived Ease of Use, Data Security, Customer Trust, Perceived Risk, and Intention to Adopt.

Statistical Analysis
4.1 Descriptive Statistics
Awareness and understanding of embedded finance and BaaS among everyday app users

Awareness and understanding of embedded finance and BaaS among everyday app users reveal important patterns. Around 74% of users have heard of these services, with awareness notably higher (79%) in the 20-35 age group compared to about 50% in other age groups. Awareness levels are similar across genders, with approximately 75% of females and 71% of males being aware. Usage frequency patterns indicate that most users engage with embedded finance features on a monthly or weekly basis, and daily use is also significant. The types of apps offering these integrated financial services are diverse, predominantly including e-commerce, food delivery, ride-sharing, and social media platforms, signifying broad adoption and integration of financial functionalities in daily life apps.

Adoption rates and patterns of embedded financial services in non-financial apps

The adoption rates and patterns of embedded financial services in non-financial apps reveal interesting trends. Regarding the intention to adopt embedded finance or Banking-as-a-Service (BaaS) offerings, 48.4% of users agree that they intend to adopt such services, while 34.7% remain neutral, 13.7% strongly agree, 2.1% disagree, and 1.1% strongly disagree. When it comes to usage frequency, 36.8% of users engage with embedded finance apps monthly, 34.7% weekly, 20% daily, and 8.4% do not use them at all. The most commonly used types of financial services within everyday apps are payments and transactions, with 48 responses highlighting their prevalence. Other combinations include

payments/transactions together with investments or savings and various mixes involving loans, credit, Buy Now Pay Later (BNPL), insurance, and more. These patterns underscore how users access multiple integrated financial service types within non-financial platforms, indicating a growing and diverse adoption of embedded finance solutions in daily app usage.

User satisfaction, trust, and perceived benefits of in-app financial offerings

Users generally exhibit a favorable perception of in-app financial offerings, with a majority expressing satisfaction regarding ease of use 56.8% are satisfied and 12.6% very satisfied. Trust levels are moderate, with over half remaining neutral (52.6%) about the providers' alignment with their best interests, while 42.1% express agreement and a smaller fraction shows strong agreement. The most valued benefits perceived by users are convenience and speed, cited by nearly 74%, followed by rewards or offers, cost savings, and personalization to a lesser extent. Overall, these evaluations reflect a positive user experience with embedded financial services within apps, highlighting convenience as a key driver of satisfaction and trust, which are crucial for sustained adoption and use.

Barriers and concerns (e.g., security, complexity) affecting adoption or trust

Concerns about the potential misuse of financial data are prevalent among users, with 48.4% agreeing and 9.5% strongly agreeing that they worry about such misuse, while 36.8% remain neutral and 5.3% disagree or strongly disagree on this issue. Similarly, worry about privacy breaches is high, with 46.3% agreeing, 15.8% strongly agreeing, 32.6% neutral, and 5.3% disagreeing or strongly disagreeing. Additionally, a significant proportion of users—63.2%—reported experiencing technical, security, or misunderstanding issues while using in-app financial services, leaving 36.8% who reported no problems. These findings underscore substantial concerns related to data security, privacy, and technical challenges, which likely act as barriers to user trust and the broader adoption of embedded financial services in apps. Addressing these issues through robust privacy safeguards, effective fraud prevention measures, and enhanced technical reliability is crucial for fostering greater confidence and adoption in the embedded finance ecosystem.

4.2 Demographic patterns (age, education, occupation) in perceptions, trust, and adoption intentions related to embedded finance and BaaS platforms

Demographic patterns in perceptions, trust, and adoption intentions related to embedded finance and BaaS platforms were assessed through ANOVA tests (for age, education, occupation)

4.2.1 To test the perception of data security across different age groups

H_0:There is no significant difference in the perception of data security among different age groups.

H_1: At least one age group differs significantly in the perception of data security

F statistic value = 3.35, p-value = 0.023 and $\alpha = 0.05$

Interpretation: Since $p\ value < 0.05,$ there is sufficient evidence to say that age groups differ

significantly in their perception of data security.

4.2.2 To test the adoption intention across different education levels

H_0: There is no significant difference in adoption intention across different education levels.

H_1: At least one education level group differs significantly in adoption intention compared to others.

F statistic value = 3.28, p-value = 0.009 and α = 0.05

Interpretation: Since $p\ value < 0.05$, that education is significantly associated with differences in adoption intention.

4.2.3 To test the adoption intention across different occupation groups

H_0: There is no significant difference in adoption intention across different occupation groups

H_1: At least one occupation group differs significantly in adoption intention compared to others

F statistic value = 2.11, p-value = 0.086 and α = 0.05

Interpretation: Since $p\ value > 0.05$, There is no significant difference in adoption intention across different occupation groups.

4.2.4 To test the association between Age and Awareness of Embedded Finance/BaaS

H_0: There is no association between Age and Awareness of Embedded Finance/BaaS

H_1: There is an association between Age and Awareness of Embedded Finance/BaaS

Test statistic value, $\chi^2 = 6.42$, p-value = 0.093

and α = 0.05

Interpretation: Since $p\ value > 0.05$, The variables' Age' and 'Awareness of Embedded Finance/BaaS' are independent.

4.2.5 Chi-square test to understand the association between

(i) Education vs Experience of Issues:

Test statistic value $\chi^2 = 5.18$, p = 0.394 and α = 0.05. (As $p\ value > 0.05$, not significant)

(ii) Occupation and Awareness, Experience of Issues

Occupation vs Awareness: $\chi^2 = 1.64$, $p\ value = 0.801$ (As $p\ value > 0.05$, not significant)

Occupation vs Experience of Issues: $\chi^2 = 10.21$, $p\ value = 0.037$ (As $p\ value < 0.05$, significant)

(iii) Awareness and Usage Frequency, Experience of Issues

Awareness vs Usage Frequency: $\chi^2 = 4.32$,

$p\ value = 0.229$ (As $p\ value > 0.05$, not significant)

Awareness vs Experience of Issues: $\chi^2 = 0.39$, p = 0.533 (As $p\ value > 0.05$, not significant)

(iv) Usage Frequency vs Experience of Issues

Usage Frequency vs Experience of Issues: $\chi^2 = 5.93$,

p = 0.115 (As $p\ value > 0.05$, not significant)

4.3 Correlation Analysis

Likert-scale items on trust, comfort, reliability, perceived risk, intention to adopt, and recommendation were mapped numerically and correlated.

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Table 1: Correlation Cross Table

	Trust	Comfort	Reliable	Risk	Privacy	Intend	Recommend
Trust	1.000	0.384	0.566	-0.117	-0.036	0.448	0.475
Comfort	0.384	1.000	0.457	-0.257	-0.429	0.194	0.286
Reliable	0.566	0.457	1.000	-0.106	-0.153	0.486	0.538
Risk	-0.117	-0.257	-0.106	1.000	0.708	-0.032	-0.142
Privacy	-0.036	-0.429	-0.153	0.708	1.000	0.073	-0.084
Intend	0.448	0.194	0.486	-0.032	0.073	1.000	0.739
Recommend	0.475	0.286	0.538	-0.142	-0.084	0.739	1.000

Interpretation:

(i) Positive correlations are observed among trust, comfort sharing information, perceived reliability, intention to adopt, and recommendation.

(ii) Perceived risk items (concerns about misuse and privacy breaches) show low or negative correlations with trust and comfort items, as expected.

(iii) Intention to adopt and recommendation items are strongly correlated.

4.4 t-test to compare the gender groups for all the relevant Likert-scale response variables

Independent samples t-tests were conducted for all the relevant Likert-scale response variables comparing the two gender groups (Male and Female), and the results are given in Table 2

Table 2: t-test Results

Variable	t-statistic	p-value	Male Mean	Female Mean
Trust embedded finance/BaaS providers to act in my best interest	-1.264	0.211	3.60	3.43
I feel comfortable sharing my financial information with these platforms	0.000	1.000	3.00	3.00
I believe these services are reliable	-1.261	0.211	3.63	3.45
I am concerned about the potential misuse of my financial data	1.465	0.149	3.43	3.70
I worry about	0.970	0.336	3.60	3.78

privacy breaches				
I intend to use embedded finance/BaaS services in the future	**-0.803**	**0.425**	**3.80**	**3.67**
I would recommend these services to others	**-0.511**	**0.611**	**3.74**	**3.65**

Interpretation: As p value > 0.05, not significant. Thus, none of the differences between Female and Male respondents on these trust, comfort, risk, intention, and recommendation measures were statistically significant at the 0.05 level.

CONCLUSION

The comprehensive statistical analyses of survey data on embedded finance and Banking-as-a-Service (BaaS) in everyday apps reveal some significant findings. Most users engage with a variety of app categories, including social media, ride-sharing, food delivery, and e-commerce, on a monthly or weekly basis. In general, younger adults between the ages of 20 and 35 have a moderate to high level of awareness regarding these integrated financial services. The primary perceived advantages are speed and convenience, with user satisfaction generally being high. However, many respondents remained neutral, indicating that provider trust is only moderate. Users' intentions to use embedded finance services are significantly influenced by their perceptions of data security, which outweigh other factors, such as perceived utility, customer trust, or ease of use.

Concerns about data misuse, privacy violations, and the majority of users' experiences with technical or security issues are important barriers that could stop broader adoption. Age and education are associated with demographic differences in data security perceptions and adoption intentions, respectively, but gender has no discernible effect. The aforementioned findings highlight how crucial it is to strengthen data security and address privacy concerns in order to build trust and encourage wider integration of financial services into everyday applications.

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