

Ecosystem Banking: Redefining Banking Services in an Interconnected World

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ABSTRACT

Research background: The rapid digital transformation of the banking industry is accelerating the emergence of ecosystem banking as a new strategic paradigm in global finance. Technologies such as fintech, artificial intelligence (AI), open banking, and application programming interfaces (APIs) have transformed traditional banks into interconnected digital platforms. Furthermore, growing customer demand for fast, personalised, and integrated mobile banking services, together with evolving regulatory policies, is further increasing the importance of the ecosystem banking model.

Purpose of the article: This study aims to identify the main drivers of banking ecosystem development and assess their effects on competitiveness, operational efficiency, profitability, innovation, and customer satisfaction in the banking sector. It also analyses differences among banking ecosystem models in Europe, Asia, and North America.

Methods: The study adopts a mixed-methods approach combining quantitative and qualitative methods. Descriptive statistics and multiple regression models are used to analyse the relationship between ecosystem integration and bank performance indicators. The empirical analysis is based on data from 25 international banks and fintech companies operating between 2018 and 2025. The variables examined include API integration, AI adoption, fintech partnerships, profitability, customer loyalty, and customer satisfaction. Strategic ecosystem management and regional differences are further explored through a comparative analysis of Ant Group, BBVA, ING, DBS Bank, Revolut, and Goldman Sachs.

Findings & Value added: The results show that ecosystem-based banking significantly improves operational efficiency, customer satisfaction, innovation capacity, and digital revenue growth compared with traditional banking models. API integration, Banking-as-a-Service (BaaS), AI adoption, and collaboration with fintech companies are identified as key drivers of improved banking performance. The Asian market exhibits the highest level of platform integration, whereas European banks benefit from a robust open banking regulatory framework. The study extends the existing literature by examining the technological, strategic, organisational, and regulatory dimensions of integrated banking ecosystem models. The findings provide relevant implications for financial regulation, cybersecurity, and digital governance and contribute to the literature on emerging global economic trends and digital transformation.

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INTRODUCTION

Over the past decade, digital transformation has fundamentally reshaped the banking industry. Advances in financial technology (fintech), artificial intelligence (AI), open banking, cloud computing, digital platforms, and application programming interfaces (APIs) have created an environment in which banks increasingly operate within interconnected networks of partners and technology providers rather than as standalone institutions. Con-

sequently, ecosystem banking has emerged as a new paradigm for value creation in financial services.

Ecosystem banking is a strategic model in which banks collaborate with stakeholders such as technology companies, e-commerce platforms, insurance providers, fintech start-ups, and data firms to deliver integrated, personalised, and accessible financial services within a digital ecosystem (Boboshko et al., 2024). Unlike traditional product-centric banking, this customer-oriented approach transforms banks into open platforms capable of combi-

ning financial and non-financial services into seamless digital experiences.

The global adoption of ecosystem banking illustrates this transformation. In China, Ant Group integrates payments, lending, insurance, and asset management through Alipay. In Europe, banks such as BBVA and ING use open APIs to connect third-party services, while Africa's M-Pesa demonstrates how partnerships between telecommunications companies and financial institutions can expand financial inclusion. In the United States, companies including Apple, Google, and Amazon increasingly embed financial services within their digital platforms.

Rising customer expectations further accelerate this transformation. Consumers increasingly demand instant, personalised, and mobile-accessible financial services (Kim et al., 2026), while millennials and Generation Z tend to favour integrated digital experiences over conventional banking channels (Windasari et al., 2022). Consequently, banks must redesign their business models to remain competitive.

Regulatory initiatives have also encouraged ecosystem development. The European Union's Revised Payment Services Directive (PSD2) promotes open banking by requiring banks to share certain customer data with authorised third parties, thereby stimulating innovation while also raising concerns regarding cybersecurity, data protection, governance, and systemic risk (Casolaro et al., 2025).

Although digital banking and fintech have been widely studied, research on the governance, structure, and performance implications of banking ecosystems remains limited. Existing studies frequently examine individual components rather than the ecosystem as an integrated model.

To address this gap, the present study adopts a multidimensional perspective to examine the organisational, economic, technological, and regulatory dimensions of ecosystem banking. Its objective is to identify the factors driving ecosystem development, assess their effects on bank performance and competitiveness, and evaluate their implications for innovation and customer satisfaction. The empirical analysis combines quantitative statistical methods with evidence from international banking data and case studies drawn from developed and emerging markets.

The remainder of the paper is organised as follows. Section 2 reviews the theoretical background and relevant literature. Section 3 describes the research methodology and data. Section 4 presents the empirical findings and compares them with international evidence. The final section concludes the study, discusses its limitations, and outlines directions for future research

THEORETICAL BACKGROUND

Theoretical Foundations of Ecosystem Banking

The concept of ecosystem banking is grounded in the literature on business ecosystems and digital platforms. Moore (1993) described business ecosystems as communities of interacting organisations that co-evolve their capabilities and jointly create value through both collaboration and competition. Rather than operating independently, firms succeed through complementary relationships and collective innovation.

Building on this concept, Iansiti and Levien (2004) argued that ecosystem health depends on productivity, robustness, and niche creation, highlighting the importance of coordination among diverse participants. This perspective helps explain how banks increasingly collaborate with fintech firms, technology providers, regulators, and other partners.

Platform economics provides an additional theoretical foundation for ecosystem banking. Parker et al. (2016) argued that digital platforms create value by facilitating interactions among different participant groups and generating network effects. These principles underpin Banking-as-a-Platform (BaaP), in which banks orchestrate relationships among customers, fintech firms, merchants, and complementary service providers.

Research on ecosystem governance further emphasises the importance of coordination mechanisms, standardised interfaces, trust, data-sharing protocols, and aligned incentives. Governance determines participation, resource allocation, and value creation, enabling banks to evolve from vertically integrated institutions into orchestrators of interconnected digital networks.

Evolution of the banking industry towards digital ecosystems

The shift towards ecosystem banking reflects broader developments in business ecosystem and platform theories. Traditionally, banks controlled most activities across the financial value chain. However, digital technologies, APIs, and cloud computing have enabled the development of collaborative networks in which multiple organisations jointly create customer value. As a result, banks increasingly act as ecosystem orchestrators rather than standalone service providers.

Digital transformation, changing consumer behaviour, and technological competition have accelerated this shift. Studies suggest that digitalisation enables technology firms to provide flexible and customer-centric financial services, thereby challenging the traditional role of banks (Akintola et al., 2026; Babina et al., 2025). Other research identifies digital ecosystems as a strategic response to competition from fintech companies and large technology firms (Adhaen et al., 2026; Matkovskaya et al., 2022).

In banking, a digital ecosystem consists of interconnected entities – including banks, fintech firms, insurers, technology providers, e-commerce platforms, and regulators – that create shared value through data and service integration. Liao et al. (2022) identify interdependence, modularity, and data as defining characteristics of such

ecosystems, supported by API-based and cloud-enabled architectures.

Rising customer expectations for instant, personalised, and integrated services further encourage banks to adopt platform strategies that combine financial and non-financial offerings (Kumar et al., 2022).

Technological Foundations of Ecosystem Banking

Research identifies open banking, APIs, artificial intelligence (AI), big data, blockchain, and cloud computing as the core technologies enabling ecosystem banking.

Open banking allows banks to provide authorised third parties with secure access to financial data through APIs (Modesti et al., 2025). Supported by PSD2 and similar initiatives, open banking promotes competition, innovation, and personalised services while facilitating collaboration with fintech firms (Babina et al., 2025).

AI enhances fraud detection, risk assessment, and product personalisation (Rodrigues et al., 2022), while machine learning improves decision-making through the real-time analysis of customer data (Najem et al., 2025). Big data supports predictive analytics and a deeper understanding of consumer behaviour (Arora et al., 2026).

Blockchain and distributed ledger technologies can improve transparency, security, and process automation through smart contracts (Wang, 2025). Cloud computing modernises banking infrastructure by increasing scalability and reducing costs (Cheng et al., 2022; Xue et al., 2020).

Banking-as-a-Service (BaaS) and Banking-as-a-Platform (BaaP) Models

Banking-as-a-Service (BaaS) and Banking-as-a-Platform (BaaP) are important components of banking ecosystems. Although the concepts are closely related, the literature distinguishes their functions and strategic implications.

BaaS enables banks to provide regulated financial infrastructure through APIs, allowing third parties to offer financial services without holding their own banking licences. According to Kitsios et al. (2021), BaaS lowers market-entry barriers and stimulates innovation. Partnerships such as that between Goldman Sachs and Apple for the Apple Card illustrate how financial services can be embedded within technology ecosystems.

BaaP transforms banks into digital coordinators of financial and non-financial services. Banks connect customers, fintech firms, merchants, insurers, and developers within multi-sided markets, creating value through network effects and partner participation (Maqbuli & Al-Mahmoudi, 2026). Consequently, competitive advantage increasingly depends on attracting suitable partners, governing interactions, and fostering innovation throughout the ecosystem.

The literature indicates that the successful implementation of both models requires modular digital infrastructure, interoperability, secure technological architectures, and

effective partnership management (Mansour et al., 2026).

Drivers of ecosystem banking growth

Consistent with ecosystem theory, the development of banking ecosystems is driven by technological, market, and regulatory factors. Key technological drivers include APIs, AI, cloud computing, blockchain, and advanced analytics, while market forces include changing customer expectations and growing competition from fintech firms and technology companies.

Consumers increasingly demand personalised and convenient digital services, with many preferring financial solutions integrated into the digital platforms they use in everyday life (Ru-Zhue et al., 2025). At the same time, companies such as Amazon, Alibaba, Google, and Tencent intensify competitive pressure by embedding financial services within broader digital ecosystems.

Regulatory initiatives, including PSD2 and comparable open banking frameworks, encourage collaboration and innovation by reducing barriers to data sharing (Rupeika-Apoga et al., 2025). Advances in cloud technologies, APIs, and automation also reduce development costs and improve organisational agility (Ren et al., 2026).

Challenges and risks associated with ecosystem banking

Despite its potential benefits, ecosystem banking presents significant challenges. Greater openness increases exposure to cybersecurity threats and API-related vulnerabilities (Wang et al., 2024), while data privacy remains a critical concern under regulatory frameworks such as the General Data Protection Regulation (GDPR) (Vinoth et al., 2022).

Dependence on technology providers may weaken banks' direct relationships with customers (Kariuki et al., 2025), while regulators must adapt supervisory frameworks to digital platforms and cross-sectoral collaboration.

Governance constitutes another major challenge. Effective mechanisms for partner selection, data ownership, accountability, cybersecurity responsibilities, and value distribution are necessary to maintain trust, support collaboration, and ensure ecosystem scalability.

Literature Review and Research Gaps

Recent studies demonstrate growing interest in open banking, fintech, and banking digitalisation; however, important research gaps remain. Existing studies frequently examine individual technologies rather than the integrated technological, strategic, regulatory, and organisational dimensions of ecosystem banking. Quantitative evidence on the effects of ecosystem participation on financial performance and customer satisfaction – particularly in developing countries – remains limited, while implications for financial stability and data governance are still insufficiently explored.

Accordingly, this study contributes to the literature by providing a multivariate empirical analysis of banking ecosystems. Specifically, it seeks to identify the key drivers of digital banking ecosystem development and assess their effects on the efficiency and competitiveness of financial institutions in an interconnected global environment.

Conceptual Framework

Drawing on business ecosystem theory, platform economics, and governance literature, this study conceptualizes ecosystem banking as a process in which technological, organizational, market, and regulatory drivers shape ecosystem maturity. Ecosystem maturity reflects the extent of integrated digital infrastructure, collaborative partnerships, open innovation, and interoperable platforms.

Greater ecosystem maturity is expected to enhance operational efficiency, innovation, customer experience, competitiveness, and financial performance. Governance mechanisms - including trust, security, regulatory compliance, and partner coordination - support sustainable ecosystem development while mitigating risks.

Within this framework, ecosystem maturity serves as the intermediary linking ecosystem drivers to organizational outcomes and provides the theoretical basis for examining banking ecosystems in the digital economy.

RESEARCH OBJECTIVE, METHODOLOGY AND DATA

The main objective of this study is to examine the current state of ecosystem banking, which has emerged and developed as a new strategic paradigm in the global banking sector, and to assess its impact on the competitiveness, innovation potential, operational efficiency, and customer satisfaction of banks and financial institutions. This paper examines the transformation of traditional banking structures into interconnected digital ecosystems characterized by API integration, open banking, collaboration with fintech companies, cloud computing and artificial intelligence. Therefore, this study covers not only technological innovation but also large-scale systemic structural reforms in the banking sector.

This study is based on multiple interrelated research objectives. First, it analyzes the factors influencing the development of the banking ecosystem. Next, it evaluates the relationship between ecosystem integration and bank performance indicators such as profitability, customer retention, operational efficiency, innovation capabilities, and customer satisfaction. Furthermore, this paper investigates regional differences in the banking ecosystem model by comparing financial systems in Europe, Asia, and North America.

To achieve these objectives, this study employs quantitative methods to complement comparative case studies. The empirical analysis framework is based on a multivariate statistical approach designed to measure the relationship between ecosystem variables and bank performance indicators. This method combines descriptive

statistics, correlation analysis, regression modeling, and international benchmarks.

The first stage of the methodology is descriptive statistical analysis. This allows for a summary and comparison of the characteristics of ecosystem banks and traditional banks. Using central tendency and variability indicators, the following variables are analyzed:

Table 1: Measurement of Variables

Variable	Definition	Measurement
Ecosystem maturity	Extent of ecosystem integration	Composite index (0-100) based on API availability, partnerships, cloud adoption, embedded finance, and platform services
API integration	Degree of API openness	Number of public APIs normalized to 0-100
AI integration	Adoption of AI technologies	Score (0-100) based on AI-enabled products, automation, and reported AI investments
Cloud adoption	Cloud infrastructure usage	Percentage of core services migrated to cloud or standardized score
Customer engagement	Digital interaction intensity	Composite score combining mobile usage, active users, and engagement metrics
Innovation index	Innovation capability	Composite measure including new digital products, patents, fintech collaborations, and service launches
Customer satisfaction	Overall satisfaction	Standardized index derived from public surveys and NPS-type measures
Digital revenue growth	Annual increase in digital revenues	Percentage growth
ROA	Return on assets	Net income / average assets
ROE	Return on equity	Net income / shareholder equity

Source: own research

Composite indicators were normalized using min-max scaling to a 0–100 range. Where direct quantitative measures were unavailable, standardized scores were constructed from publicly disclosed information using consistent coding procedures.

Table 2: Descriptive statistics of principal variables

Variable	Mean	SD	Min	Max
Ecosystem maturity	68.4	15.7	35	95
AI integration	71.2	13.1	42	94
Customer engagement	76.5	11.3	50	96
Innovation index	70.8	14	38	93
Open API score	65.3	18.5	21	98
Cloud adoption	71.9	12.8	46	95
ROA (%)	1.47	0.51	0.40	2.93
ROE (%)	11.9	4.2	4.9	19.8

Source: own research

In the second stage, correlation analysis was conducted to assess the strength and direction of the relationship between bank ecosystem variables and institutional performance indicators. To determine the strength of relationships between variables such as API integration, Bank-as-a-Service (BaaS) implementation, AI implementation, collaboration with fintech companies, cloud computing, innovation capabilities, customer satisfaction, and profitability, Pearson correlation coefficients was calculated.

In the third stage of the empirical methodology, multiple regression analysis was employed and a regression equation was developed.

$$Performance_i = \beta_0 + \beta_1 API_i + \beta_2 EcosystemMaturity_i + \beta_3 AI_i + \beta_4 CustomerEngagement_i + \beta_5 Cloud_i + \beta_6 FintechPartnerships_i + \epsilon_i$$

The regression model was used to identify causal relationships influencing bank performance within the digital ecosystem. The regression equation used financial indicators such as profitability, operational efficiency, and customer satisfaction as dependent variables, and ecosystem-related indicators such as API openness, digital ecosystem maturity, fintech partnerships, cloud adoption, and AI integration as independent variables.

In addition to quantitative analysis, this study also includes qualitative comparative research on selected international banking and fintech ecosystems. Financial institutions such as BBVA, ING, DBS Bank, Revolut, Goldman Sachs, and Ant Group were selected for analysis because they represent different banking ecosystem models and levels of digital maturity. These case studies provide deep insights into strategic practices, innovation mechanisms, and regional ecosystem dynamics that cannot be fully captured by statistical analysis alone.

The empirical analysis is based on a purposive cross-sectional sample of 25 internationally active banks and fintech companies observed over the 2018–2025 period.

Institutions were selected according to four inclusion criteria: (1) public availability of annual financial and operational reports; (2) documented implementation of digital banking or ecosystem initiatives; (3) significant operations in Europe, North America, or Asia; and (4) availability of comparable indicators relating to digital transformation, customer engagement, and financial performance. The final sample consists of 15 incumbent banks and 10 fintech or digital financial platforms.

Sample institutions: BBVA, ING, Santander, DBS Bank, HSBC, Standard Chartered, JPMorgan Chase, Goldman Sachs, Citigroup, Bank of America, Wells Fargo, Capital One, Revolut, Monzo, N26, Starling Bank, Wise, Adyen, PayPal, Stripe, Ant Group, Tencent (WeBank ecosystem), Grab Financial Group, KakaoBank, and Nubank.

The purposive sampling approach was chosen to ensure adequate representation of institutions exhibiting different levels of ecosystem maturity and digital transformation rather than to provide a statistically representative sample of the global banking industry.

The data used in this study were collected from a variety of reliable secondary sources. These include annual financial reports from banks and fintech companies, reports from international financial institutions, central bank publications, the World Bank database, OECD financial statistics, fintech industry reports, and datasets provided by regulators and banking associations. Furthermore, the scientific validity of the study was ensured by using research papers published in Scopus and Web of Science.

This study uses cross-sectional data from 2018 to 2025, a period of rapid acceleration in the digital transformation of the banking industry. This period includes numerous significant changes, such as the expansion of open banking regulations, increased collaboration between fintech companies and banks and the growing adoption of artificial intelligence (AI)-based financial services.

To ensure the reliability and validity of the data, normalization and statistical robustness tests were performed. Multicollinearity tests, variance expansion factor (VIF) analysis, and residual diagnostics were performed to validate the stability and robustness of the regression models. Additionally, regional comparative analyses were used to mitigate potential distortions arising from differences in regulatory levels and technological development.

The methodology employed in this study provides a comprehensive analytical framework for ecosystem banking. By integrating advanced statistical methods and international comparative analysis, this study contributes to academic research on the digital transformation of banks and provides empirical evidence regarding the strategic importance of ecosystem integration in the modern banking sector.

RESULTS

Empirical analysis demonstrates that ecosystem-based banking is a key driver of transformation in the global banking sector. Statistical analysis shows that the integration of digital platforms, api-based infrastructure, fintech partnerships, and banking-as-a-service (baas) models is significantly impacting operational efficiency, customer experience, innovation potential, and revenue diversification of banks and financial institutions.

An analysis of 25 international banks and fintech companies reveals that institutions with high levels of ecosystem integration outperformed traditional banks across various strategic metrics. Specifically, institutions adopting platform-centric business models showed higher digital revenue growth, improved customer engagement, and shorter innovation cycles.

Comparative performance of ecosystem and traditional banking

The analysis results shown in Table 3 reveal significant differences between ecosystem and traditional banking, highlighting the systematic superiority of ecosystem banks across several key performance indicators.

Table 3: Ecosystem and traditional banking

Indicator	Ecosystem Banks	Traditional Banks
Customer Retention Rate	92 %	74 %
Mobile Banking Usage	89 %	61 %
Average Transaction Speed	2.1 sec	8.6 sec
Cost-to-Income Ratio	42 %	60 %

Source: own research

First, customer retention rates are significantly higher for ecosystem banks (92%) than for traditional banks (74%). This 18-point difference indicates that the interconnected banking architecture has a structural impact on customer retention, likely due to improved service continuity and personalization.

Second, mobile banking adoption rates show an even more significant difference (89% vs. 61%). This reflects a significantly higher penetration rate of digital channels in the ecosystem environment compared to traditional banks. This trend aligns with the hypothesis that technology integration improves omnichannel customer engagement and access to financial services. (Lee & Zhou, 2026).

Average transaction speed is also a key indicator. Ecosystem banks process transactions in an average of 2.1 seconds, compared to 8.6 seconds for traditional banks. This significant reduction in processing time indicates improved efficiency related to automation, open APIs,

and cloud infrastructure. (Kajol et al., 2022). Finally, the cost-return ratio was found to be significantly better for banks operating within the ecosystem (42% vs. 60%). This indicates improved operational efficiency and resource allocation, likely due to reduced fixed costs resulting from digitalization and partnerships with fintech companies.

These results support the idea that integration into the digital banking ecosystem leads not only to improved customer experience but also to optimization of cost structure and overall operational efficiency.

Impact of ecosystem integration on bank profitability

Table 4: Impact of ecosystem integration on bank profitability

Level of integration	Average ROA (%)	Average ROE (%)	Revenue growth (%)
Weak	0.9	6.1	3.5
Average	1.4	10.6	6.7
High	2.2	16.8	12.3

Source: own research

Table 4 demonstrates a significant positive correlation between the degree of ecosystem integration and banks' financial performance. Banks highly integrated into various ecosystems, such as fintech, commerce platforms, energy, and logistics services, exhibit significantly higher profitability. This is consistent with existing research on financial platforms (fintech ecosystems) that emphasize network effects as a driving force for value creation (Ghosh & Golder, 2026; Iqbal et al., 2026).

Impact of ecosystem integration on financial performance

Table 5: Elements of the banking ecosystem and financial performance

Variable	Coef.	Std. Error	t	p-value	VIF
API Integration	0.41	0.11	3.72	<0.01	2.11
Finance Adoption	0.37	0.12	3.11	<0.01	1.93
Digital Ecosystem Maturity	0.44	0.10	4.43	<0.001	2.36
Customer Engagement	0.52	0.09	5.69	<0.001	2.41

Source: own research

The regression analysis results (Table 5) show positive, strong, and statistically significant correlations between various elements of the banking ecosystem and financial performance. Customer engagement was identified as

the most influential factor ($\beta = 0.52$, $p < 0.001$), demonstrating the crucial role of user experience in value creation within banks. These results indicate that banks operating within the ecosystem not only improve operational efficiency but also enhance customer-value-creator interaction. (Blanchard et al., 2026).

The maturity of the digital ecosystem ($\beta = 0.44$, $p < 0.001$) also emerged as a decisive factor, supporting the idea that a well-developed digital infrastructure is a structural determinant of performance.

API integration ($\beta = 0.41$, $p < 0.01$) and the adoption of integrated financial systems ($\beta = 0.37$, $p < 0.01$) also showed significant positive effects, suggesting that technical openness and interoperability are important catalysts for enhancing banks' competitiveness.

Table 6: Regression diagnostics

Statistic	Value
Adjusted R ²	0.73
F-statistic	24.83 ($p < 0.001$)
Observations	25
Maximum VIF	<3
Breusch-Pagan test	not significant
Shapiro-Wilk residual test	not significant

Source: own research

The model explains approximately 73% of the variation in financial performance. The overall regression is statistically significant (F-test, $p < 0.001$). Variance inflation factors remain below conventional thresholds, suggesting that multicollinearity is not a major concern. Residual diagnostics do not indicate significant departures from homoscedasticity or normality.

Relationships between ecosystem variables and institutional performance

The correlation matrix (Table 7) shows a strong positive correlation between components of the banking ecosystem and performance indicators.

Table 7: Components of the banking ecosystem and performance indicators

Variables	Digital Revenue Growth	Customer Satisfaction	Innovation Index
Open APIs	0.80	0.75	0.84
Fintech partnerships	0.72	0.66	0.78
AI integration	0.77	0.83	0.81
Cloud adoption	0.67	0.71	0.76
BaaS implementation	0.79	0.73	0.90

Source: own research

The strongest correlation is observed between the adoption of Banking as a Service (BaaS) and the innovation index ($r = 0.90$). This result is particularly important as it supports the idea that the platform model acts as a structural accelerator for product innovation and service diversification.

AI integration shows a high correlation with customer satisfaction ($r = 0.83$), indicating that intelligent automation and algorithm-based personalization play a crucial role in improving the customer experience.

Open APIs (correlation with innovation: $r = 0.84$) and fintech partnerships (correlation with innovation: $r = 0.78$) also directly link open banking systems to increased innovation potential.

Cloud adoption, while showing a relatively low correlation, remains a significant contributor to performance improvement, indicating the crucial technological role of cloud technology in modern banking architectures. (Tsin-deliani et al., 2022).

Qualitative analysis shows that banks such as BBVA, DBS Bank and Revolut stand out with their high API density and modular architecture strategies. These financial institutions embody a platform banking model that enables rapid innovation, seamless integration of fintech services, and personalized real-time banking through technological openness.

International Comparison

International experience indicates that the development of ecosystem banking has followed different trajectories across regions, shaped by regulatory frameworks, technological maturity, and market structures. Rather than representing a quantitative comparison based on this study's dataset, the following discussion provides a qualitative overview derived from the existing literature and publicly documented industry practices.

In Europe, the evolution of ecosystem banking has been strongly influenced by open banking initiatives and the implementation of the Revised Payment Services Directive (PSD2). Financial institutions such as BBVA, ING, and Santander have developed application programming interface (API) platforms and digital partnerships that facilitate collaboration with third-party service providers. The European approach is generally characterized by:

- robust regulatory oversight and standardization;
- strong emphasis on data protection and consumer privacy;
- increasing collaboration between incumbent banks and fintech firms;
- a gradual transition toward integrated financial ecosystems through open banking frameworks.

In Asia, ecosystem banking has developed alongside large digital platforms and super-app business models. Organizations such as Ant Group, Grab Financial, and

Tencent have integrated financial services with e-commerce, mobility, and digital lifestyle applications. Existing studies suggest that these platform-based ecosystems are associated with extensive customer interaction and broad adoption of digital financial services, although their structures and performance vary across countries and regulatory environments.

In North America, ecosystem development has generally been driven by technological investment and strategic partnerships rather than comprehensive platform integration. Major financial institutions, including JPMorgan Chase and Goldman Sachs, have invested in cloud computing, artificial intelligence, and collaborations with fintech and technology companies. A frequently cited example is the partnership between Goldman Sachs and Apple for the Apple Card, which illustrates how banks can expand digital service offerings through cooperation with non-financial technology firms. Compared with many Asian platform ecosystems, North American initiatives are often described in the literature as more bank-centered and partnership-oriented.

Overall, international evidence suggests that there is no single model of ecosystem banking. European developments emphasize regulatory-enabled interoperability, Asian markets demonstrate the potential of platform-based integration, and North American institutions often pursue innovation through technology investments and strategic alliances. These experiences provide useful context for interpreting the broader evolution of ecosystem banking but should not be interpreted as direct empirical findings of the present study.

DISCUSSION

The results of this study support the view that ecosystem-based banking represents an ongoing structural transformation of the global banking system. The empirical evidence indicates that digital ecosystems are fundamentally changing the traditional role of banks, shifting them from isolated financial intermediaries towards interconnected platform orchestrators.

One of the key findings is the strategic importance of APIs and modular digital infrastructure. Banks that employ open technology models outperform their competitors in their ability to rapidly develop new financial services and respond to changing consumer behaviour. These results are consistent with the platform economics perspective discussed by Guerra-Leal et al. (2023), according to which value creation is no longer based primarily on vertically integrated structures but increasingly arises from interactions among interconnected entities.

Furthermore, the study highlights artificial intelligence (AI) as a critical driver of competitiveness. Banks that effectively use AI to personalise services, automate transactions, and analyse customer data achieve superior operational performance and commercial outcomes (Pilatín, 2024). The findings also demonstrate the significant role of fintech firms within contemporary banking ecosys-

tems. Strategic partnerships between banks and fintech companies accelerate digital transformation by combining banks' regulatory expertise and institutional capabilities with the technological innovation and agility of fintech firms.

Challenges and Risks

Despite the observed benefits, the study also identifies several significant risks associated with banking ecosystems. As financial systems become increasingly interconnected, the attack surface for cyber threats expands. Institutions operating extensive API ecosystems face greater exposure to data breaches, unauthorised access, and operational disruptions (He et al., 2023).

Another critical issue is dependence on large technology platforms. Banks participating in ecosystems controlled by BigTech firms may gradually lose direct relationships with their customers and experience a reduction in strategic autonomy (Mundaca & Heintze, 2024).

Regulatory inconsistency also constitutes a major obstacle to ecosystem scalability. Differences in data governance frameworks, digital identity standards, and financial regulations may restrict cross-border integration and increase the complexity of managing international banking ecosystems.

Comparison with previous international research

The findings of this study are consistent with recent research on innovation in digital banking services. Similar to Peng et al. (2026), the present study confirms that API infrastructure and partnerships with fintech companies significantly accelerate banking innovation.

The findings concerning artificial intelligence are also consistent with Soyupak and İpek (2025), who identify AI as a major driver of personalisation and automation in financial services.

Moreover, the dominance of platform ecosystems in Asia observed in this study supports the analysis by Yang et al. (2025) regarding the convergence of digital finance, platform economies, and super-apps.

However, this study makes an additional contribution by integrating Banking-as-a-Service (BaaS), open banking, and embedded finance into a unified banking ecosystem framework and providing a comprehensive comparative analysis of these models. Overall, the empirical results indicate that ecosystem banking enhances operational performance, innovation capabilities, and customer-centric service delivery.

The findings suggest that the future of banking will increasingly depend on financial institutions' ability to operate not as isolated service providers, but as interconnected participants and orchestrators within broader digital ecosystems.

CONCLUSION

This paper demonstrates that ecosystem banking has emerged as an innovative paradigm that is fundamentally

transforming traditional banking models through digital integration, open banking, collaboration with fintech companies, artificial intelligence, and platform-based financial services. The empirical analysis indicates that banks with higher levels of ecosystem integration outperform traditional banks in terms of operational efficiency, customer engagement, innovation capabilities, profitability, and customer satisfaction.

Furthermore, the study identifies APIs, Banking-as-a-Service (BaaS), AI adoption, and partnerships with fintech companies as the principal drivers of competitiveness and long-term growth in the digital financial environment. The international comparative analysis also reveals important regional differences: Asian markets lead in the development of highly integrated platform-based ecosystems, European markets place greater emphasis on regulated open banking, and North American markets are characterised by technology-driven banking innovation.

Despite these findings, the study has several limitations. First, the empirical analysis is based on a relatively small sample of international banks and fintech companies, which may limit the generalisability of the results across financial systems and regions. Second, because the study

relies primarily on secondary data covering the period from 2018 to 2025, its ability to identify long-term trends and causal relationships within evolving banking ecosystems is limited. Third, some ecosystem-related variables, including digital maturity and customer experience, encompass qualitative dimensions that are difficult to capture using relatively simple statistical indicators. In addition, differences in national regulatory frameworks, technological infrastructure, and levels of financial development may affect the comparability of the results across countries.

Future research should therefore expand the scope of analysis by incorporating larger datasets, longer time horizons, longitudinal research designs, and a broader range of emerging markets. Further investigation is also needed into the effects of banking ecosystems on financial stability, systemic risk, cyber resilience, and digital governance. Finally, more detailed interdisciplinary research integrating perspectives from finance, technology, regulation, and behavioural economics could provide a deeper understanding of how ecosystem-based finance will shape the future of the global banking system.

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AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, R.M.; methodology, R.M.; software, R.M.; validation, R.M.; formal analysis, R.M.; investigation, R.M.; resources, R.M.; data curation, R.M.; writing-original draft preparation, R.M.; writing-review and editing, R.M.; visualization, R.M.; supervision, R.M.

DATA AVAILABILITY STATEMENT

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

AI DISCLOSURE

During the preparation of this manuscript, the authors used ChatGPT to improve language quality, grammar, and stylistic clarity of the text. After using these tools, the authors carefully reviewed, revised, and approved all content and take full responsibility for the accuracy and integrity of the published work.

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