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Chapter 4: Platform-based banking models and the rise of embedded financial ecosystems

4.1. Introduction

Wherever we turn, we see firms adding financial services on their platforms. Grocery chains are offering checking accounts with no overdraft fees or monthly fees, along with high-yield interest rates while facing fierce competition from high yield savings accounts provided digitally by neobanks. Almost every significant online retailer providing cashless transactions on its platform is also issuing cards for a seamless digital experience. These cards issued by non-bank firms are also moving into the world of credit with big-ticket items. Transport networks are also moving into offering installment payment plans. Embedded financial services can be offered by transportation and delivery platforms at scale to gig workers because they are obliged to keep funds in their accounts for either receiving allocated work or delivering an item (Croxson et al., 2022; Flötgen et al., 2022; Telukdarie & Telukdarie, 2022).

We explore two bank business model trends that have far-reaching implications for delivery service firms who are either logistics service providers or parlors, with a focus on local delivery. First, we review how banks are evolving to become platform firms, typically through partnerships with multiple third-party technology vendors providing the tools to create embedded financial services. We refer to the bank partners as bank-embedded platform models because the fintech firms embedded on these banks provide services non-bank borrowers are seeking at competitive prices. By comparison, these models are positioned away from the equilibrium in frictional price theory which predicts the same level of service charges across all lenders whose business models differ due to sticking cost and difference in alternative funding risks. Second, banks are becoming transaction-centered mass merchants beyond traditional banking. We argue that embedded financial ecosystems will favor networks of microtransactions dominated by platform firms across all trades (Wolska, 2024; Wolska, 2025).

4.1.1. Background and Significance

The Banking-as-a-Service (BaaS) concept has emerged from the collision of market players in fintech and digital ecosystem strategies within technology platforms and operates in the shadow of Open Banking regulation. It is suggested that BaaS is more pertinent and its potential greater in areas still dominated by traditional banking intermediaries, such as the comprehensive provision of commercial bank products and services to the mass market.

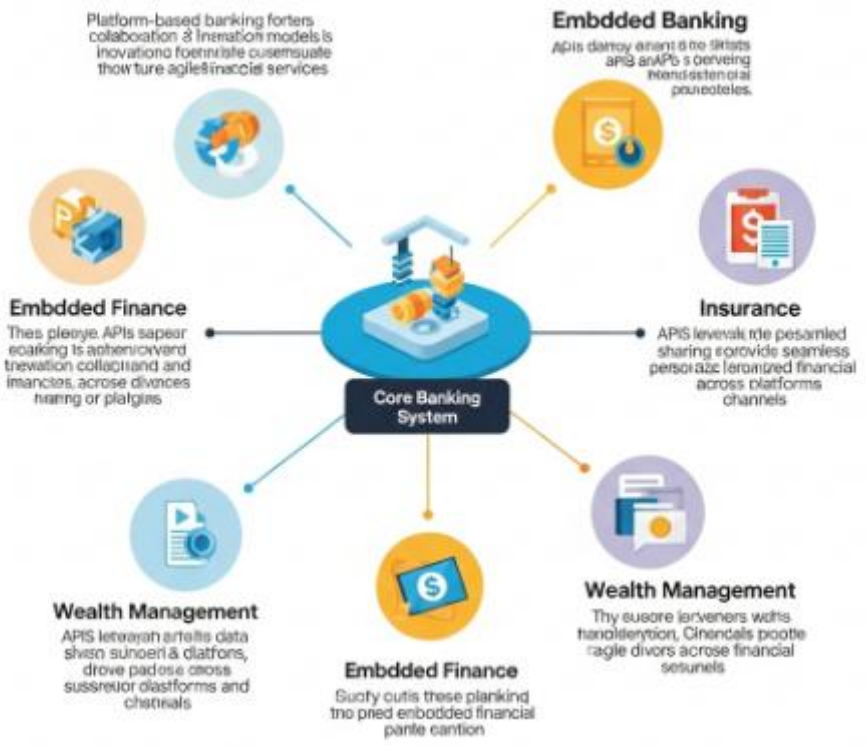

Fig 4.1: Platform-Based Banking Models

Concerning the unprecedented disruptions and opportunities coming from emergent integrated ecosystem strategies among the major IT platform players, this chapter focuses on Embedded Finance Ecosystems and in particular the transition pathways of the global retail banking industry. The chapter aims to expand our understanding of the implications for the future of retail banking of powering what traditionally have stood outside the activity of financial services for the first time with on-demand financial services for the first time, as well as of being stood outside embedded financial ecosystem value pools that are now being created, and how embedded finance models will lead to this transition. The chapter will initially outline what Embedded Finance Ecosystems are and their implications for Banking-as-a-Service models based on case

study and market analysis before going on to outline the implications for digital banking business models.

The last two decades have seen a dramatic transformation of the global banking industry, brought about by the emergence and subsequent rapid growth of Fintech driven by the proliferation in the use of mobile telecommunications. Peer-to-peer lending, account aggregation, mobile payments and many others have completely disrupted traditional banking activities and processes, from origination to distribution and underwriting to servicing, and thus the value chain. Traditional banks have been forced into partnership and commission spaces through which they deflect user journeys into process friction points away from their own platforms. This is the side of Banking-as-a-Service only visible within the framework of Open Banking.

4.2. Understanding Platform-Based Banking

Banking platforms do not represent a complete novelty, nor do they simply focus on advancing a pre-existing banking activity model; instead, they contribute to modifying an entire ecosystem. The platform concept has always been present in modern banking; for instance, external actors have historically provided key financial services - payments, insurance, savings - facilitated by a bank that acts as a platform collecting and coordinating these services. Technology has allowed banks to become digital service platforms that connect services offered by third parties. The aggregation of a diverse range of services to complete the offer has had the effect of creating appetizing and convenient ecosystems for clients, in which they admire the image and reputation of the bank, fondness for which relies on the client experience. This historical evolution has brought forth an offer that responds to ever-increasing client needs and has been enriched by the potential offered by financial technology companies. These innovative service providers specialize in bypassing traditional banking processes, offer their clients a niche product at comparatively lower prices, and enter into direct competition with banks in certain financial ecosystem areas.

The platform allows distributing specific functions of the bank across more agile and adaptable agents who can realize the service more efficiently. The bank that acts as a platform has the power of a pot-de-fer that guarantees the necessary conditions of security, reliability, trust, and compliance with the regulations typified with respect to the traditional banking model. These are indispensable conditions that allow the bank platform to continue distinguishing itself from specialized FinTechs with financial innovations but that cannot offer the same level of security as a bank.

4.2.1. Definition and Characteristics

The terms "platform" and "platform ecosystem" are often used in the context of the success of a business or business model, but the terms require clarification. Originally, a platform was a physical construction such as a raised level like a railway station, but the digital world has extended the meaning to include software such as Windows or an App Store. Over time, the connotation of platform has become more abstract. Thus, there are also SaaS platforms that provide business services such as customer relationship management (CRM). However, from a broader perspective, all businesses that create new value for consumers by connecting supply and demand can be considered as platform businesses. This paper adopts this more general definition of a platform.

These definitions suggest distinguishing features of a platform. First, a platform is a business that creates new value by matching producers and consumers and enabling frequent transactions between them. Examples from daily life are: a matchmaker for sellers and consumers of products; a service that connects advertisers with search users; and a platform that links users looking for lodging and hosts offering lodging for short stays. Second, a platform connects the activities of actors who cannot efficiently carry out these activities independently. For example, if a certain platform did not exist, small merchants would be forced to maintain their own websites at considerable expense, and consumers would have to search each site one by one. Third, affordances, a term coined and popularized by ecological psychologists, strongly emphasized by a philosopher, connect properties of the platform with the active abilities of actors.

4.2.2. Historical Evolution

In recent years, significant breakthroughs in research and development, for instance, cloud storage capabilities, have paved the way to transform barriers to entry and reduce operating costs. As a result, banking activity shifts from an institution-centric ecosystem to an interconnected digital financial ecosystem in which banks or financial service providers outsource banking functions and play different roles in the network. Changes in customer expectations, technology, and the open banking movement shape the future development of the banking ecosystem. The concept of embedded ecosystems is not novel but goes back to previous public-related initiatives.

The evolution of business ecosystems generally goes through five subsequent stages: project-based systems in the 1960 and 1970; vertical systems in the 1970 and 1980; horizontal systems from the 1980 to the 2000; hub-and-spoke systems emerged between 2000 and 2020; digital ecosystems in the post-2020. Financial services date back to the time of money market exchange in early core economies. These services were related to money settlement, transportation, and access constraints. Banking services evolved and

progressed over the centuries. The ecosystem banking concept provides an explanation of how and why financial ecosystems were initially developed. Therefore, understanding the roots of banking is vital for making sense of the banking role in embedded ecosystems today.

4.2.3. Key Players in the Market

The key players in the platform banking space can be divided into two main categories: banks and third-party platforms. Banks have historically played the role of primary service providers, while third-party platforms are increasingly taking over this role, with banks becoming mere service providers through white labeling agreements. More recently, fintech startups seeking to make banking and financial services more accessible digitally have begun to enter the space as well. All these players have both their pros and cons.

Banks have the advantage of an installed base of customers as well as established credibility and trust. They also have the best risk management tools to develop strong credit scoring models. A bank has the historical advantage of being well equipped to serve the risk management function associated with financial services. They also have the history of having developed strong relationships with their customers who trust them for their financial services. This level of trust which was built over decades is hard to displace. Being licensed entities, banks have the added advantage of being able to offer a complete suite of services, as they are not restricted by regulatory limitations. They also have the capital at hand to develop a rich product suite to meet customer expectations. These core advantages will continue to help banks retain a large part of their customer base.

However, they face a major hurdle in being able to act quickly to changing market demands. Being large and legacy based, banks struggle with difficulties in integrating with modern technology and second, lack the willingness to make major pivots in strategy or harm existing revenue streams. Most banks are also unable to invest in building the necessary tech-savvy culture or the talent needed to adapt to the changes happening around them. Most regulatory functions seem to be designed more for a transactional banking environment rather than the platform atmosphere that is starting to evolve. Lastly, most banks do not have the access to the rich data ecosystem that other third parties do.

4.3. Embedded Financial Ecosystems

Concept and Significance Advancements in technology, greater usage of Application Programming Interfaces, and data analytics enable banks to open financial service capabilities to external market participants, including non-financial firms. Non-financial firms leverage these capabilities to embed financial services in their client interactions across their core ecosystems, enabling banks to co-create value as stakeholders work collaboratively at multiple client touchpoints to provide a holistic customer experience. Financial services embedded in non-financial ecosystems are termed as embedded financial services. The non-financial firm's ecosystem is termed as an embedded financial ecosystem. Embedded financial ecosystems in this context offer a collaborative model for making banking services easier and more accessible. The co-creation of customer value is achieved by stakeholder collaboration at multiple touchpoints in the customer's journey as wider accessibility of financial services from providers outside of banking is offered. A few reasons why embedded ecosystems are likely to be the key to capture a larger share of wallet of the consumers in the coming years include the relentless quest for customer experience, a holistic approach to meeting financial needs, sharing of insight across stakeholders, and enhancing convenience.

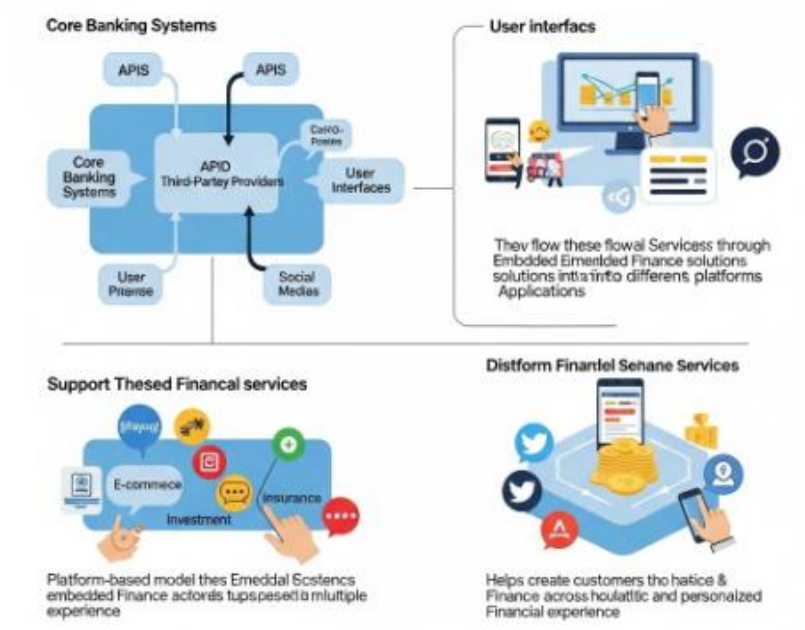

Fig 4.2: Embedded Financial Ecosystems

4.3.2. Types of Embedded Financial Services Embedded financial services are essentially the classical banking products in new places. They span the entire banking value chain including accounts, payments, cards, lending, investments, insurance, and treasure and cash management solutions. Retail banking products such as payments,

savings accounts, and digital wallets are among the most embedded. In the commercial banking arena, cash management services, credit cards, funded and unfunded lending, and corporate insurance services are frequently found to be embedded. With numerous players from different sectors collaborating to make banking services even more customer centric and location agnostic over time, there is a high probability that corporations will co-create value for customers to the extent that embedded financial services become the centerpiece of an entirely new model of globally coordinated bank-led banking services.

4.3.1. Concept and Significance

Embedded finance and banking, simply put, means the integration of financial services and products into a merchant's offering at the point of commerce, enabling both to function seamlessly as one. Embedded finance blurs the lines that segregate the various elements of the value chain by allowing non-bank service providers to facilitate banking services and offer banking products. Embedded finances revamp our experiences with ubiquitous banking partners by seamlessly integrating personal finances within consumer experiences. With embedded Banking, banking activities are more frictionless with the banking core invisible – it makes sense for capital to be allocated to create withdrawal opportunities and funding sources when logically decided by the user experience.

Embedded Banking relies on integrated technologies that allow third parties to access a bank's services from within a non-bank application. Third-party providers embed a bank's services into their applications, thereby exposing them to end-users. Such embedded services can include digital banking, the movement of money, as well as the provision of credit and creation of merchant services. This allows for an uninterrupted transactional flow without the disruption of having to switch from a merchant app to that of the bank to complete the transaction. This allows merchants to create a better user experience that strengthens their relationships with customers, enhances brand loyalty, and deepens customer engagement – also creating new revenue streams and data insights.

4.3.2. Types of Embedded Financial Services

Embedded financial services can take various forms depending on the partner and the integration level. For example, one of the largest financial services groups in the Nordic region has integrated money transfers, banking accounts and even biometric payments into a messaging app. Yet, the bank itself does not offer these services, as they need to ensure that everything works perfectly in collaboration with the partner and offer users

a seamless experience. Other players immerse financial services tightly into their consumer journeys and even license their embedded fintech APIs for external use. Examples include dental service companies deploying embedded financing to help their patients get quick and easy approval for loans to cover the cost of their treatment. This enhances a seamless experience that bonds the service with the patient, while helping suppliers to identify, onboard and serve a new and valuable cohort of consumers.

Traditional financial service players also innovate by introducing embedded financial services. Banks and fintechs have introduced demand deposit accounts that provide users with an insured electronic payments account to which non-interest-bearing treatments and alternatives to overdraft credit transfers may be made. These accounts are offered on the entire prepaid card ecosystem, and particularly on prepaid card programs that target lower-income consumers as an alternative to subprime bank accounts. Research shows that there is a 21% interest among non-consumers in accessing insured accounts that eliminate overdraft and certain account maintenance fees while residents of low-income households are concerned about available balances. A large percentage of prepaid card companies rely on tax refund, payroll or government benefits linked. Even more remarkably, a significant percentage of Black Americans use prepaid cards, which is over three times higher than the national average.

4.4. Technological Innovations Driving Change

The power of API integration has fundamentally changed the management of technology within an organization. By opening up certain processes to third-party providers, companies no longer need to be responsible for the delivery of all technology solutions internally and can instead focus on those processes that differentiate them from the competition. In embedded finance, banks are working closely with third-party providers to integrate the delivery of financial services, often through a single integration point to a cloud-based financial services provider using APIs. This common bank/cloud provider solution allows third-party providers to offer the delivery of services such as credit risk, KYC verification, and payment settlement without having to build their own complex financial service architecture and ensuring compliance with national and international financial regulations.

Brands have proven that offering integrated financial services can create differentiated product offerings that are very attractive to customers. The combination of AI with analysis of larger and larger volumes of non-traditional data allows the offering of relevant services such as point-of-sale credit at the time of purchase to specific customer categories that have traditionally been reliant on expensive payday loan products.

The application of blockchain technology to banking operations has seen major investment from all mainstream financial institutions. Even though cryptocurrency may be viewed skeptically, the incorporation of widespread trust through shared ledgers and the offered assurance of transaction validation at practically no cost has the potential to hugely increase the efficiencies of many traditional processes. The transfer of cryptocurrency and digital assets could even allow for the specific replacement of normal financial payment infrastructure, given the assured economies of scale. As cryptocurrency approaches the top of its evolving wave of increased trust, banks may soon be forced to decide whether to embrace this new and expanding universe or concentrate on efficient traditional models.

4.4.1. API Integration

In the early days, the development of IT within the banking and finance sector followed a strategy of proprietary solutions, where systems were built in house, with no data being shared with other parties, creating closed ecosystems. The technological approach to become a one-stop-shop with a complete financial services offer was combined with the essential barriers to entry due to regulation and the high costs of operation. Proprietary technology developed banks' capability to operate in an efficient manner, with little customer or market knowledge. Banking systems developed into monolithic core-banking systems, often considered difficult if not impossible to change. However, this technology approach was not scalable to achieve the long-term lead that was planned. At the end of the 90, systems and operations of many financial institutions became under scrutiny due to the impossibility of sustaining the cost of infrastructure with traditional players questioning their capacity to operate profitably.

The new banking model could leverage a completely different technological architecture. IT developed into modular solutions, based on different approaches that were released on the market with a planned intention of not making the customer dependent on a single provider. The establishment of standards and protocols has enabled companies to present their modules to the market, sharing data, mainly based on the customer consent, providing banks with a connectivity infrastructure that demands the servicing of a huge number of customers. Module providers need to develop and maintain a trusted relationship with their customers, independent of the banks. This enables a completely different risk profile and a unique relationship with the clients that may not be easily replicated by banks.

4.4.2. Artificial Intelligence and Machine Learning

The emergence of machine learning (ML) and artificial intelligence (AI) technologies has moved from research to practice and from science fiction to reality in the lives of many people around the world. In banking and finance, there has been a substantial amount of research and discussion about the opportunities and implications that ML and AI offer. These discussions often focus on AI and ML shrinking the market opportunities for traditional banks and increasing the competitive pressure by allowing diverse actors to compete with banks' products and services at lower cost and higher efficiency. We discuss here the reasons for this thrust toward disintermediation, from the growing use of ML and AI by non-bank actors to the segmentation of the banking market and the ability of players in the non-bank sector to build on their existing relationships with customers.

Technologies based on ML and AI allow specific banking services at scale to be provided with lower costs than banks or non-bank sources could do relatively easily. This applies especially in the area of information-based services such as risk assessment. Increasingly sophisticated algorithms make it faster, easier, and significantly less costly to make credit assessments. On the consumer side, firms are using these technologies to determine if shoppers seeking to finance credit card purchases can repay what they owe. The advantage that these firms hope to exploit is the limited capacity of credit card issuers to assess and monitor the risk that each credit card user faces when making his or her next purchase. However, low wholesale interest rates reduce the profitability of even a lending operation with very low costs per transaction.

4.4.3. Blockchain Technology

Blockchain technologies have the potential to foster new decentralized banking models, establishing what has been referred to as a decentralized finance (DeFi) model. Blockchain technologies rely on a decentralized architecture based on consensus mechanisms where users enforce regulatory compliance, registering and storing a ledger of transactions in encrypted form with a high degree of privacy. While new cryptocurrencies can be created on the basis of blockchain technologies, thus competing with central banks in their key missions, the ultimate ambition is the establishment of trusted intermediary roles on the basis of protocols that eliminate the need for a centralized trusted intermediary for specific services in specific market niches. Traditional finance-based business models are subject to high organizational frictions that lead to high costs and inefficiencies. Blockchain technologies eliminate a large number of middlemen involved in traditional financial processes, thus reducing their inefficiencies and facilitating service access, especially for lower income groups.

The potential positive impacts of blockchain technologies can be attributed to the availability of digital identities, lowering verification and KYC costs that are traditionally high. Especially for small amounts, the savings realized can be considerable, notably compared to traditional banking services. On the other hand, for amounts with high variability and no specific reference point, high credit default risks remain. These transactions carry relatively high transaction costs that could be difficult to eliminate. Blockchain technologies enable the modeling of different risk-sharing and verification mechanisms, such as smart contracts that can be programmed on the underlying protocols.

4.5. Conclusion

As previously indicated for platform business models in other industries, we also recommend that platform-based banking models capitalize on the strong potential for convergence and interoperability that embedded ecosystems, open networks, and open technology stacks favor and enable. This recommendation applies to both traditional banks as well as for fintechs. By directly or indirectly leveraging the strength of already-established applications and ecosystems, Banks 4.0 can enhance customer value propositions, thereby creating embedded financial ecosystems, improving user experience and engagement, and further shortening service time. Through an agile, cost-effective, modular, and timely integration of new services, Banks 4.0 can strengthen collaboration with third-party providers, hence consolidating a core service-agile ecosystem identity that is likely to favor the evolution of Banks 4.0 as platforms. Infrastructure and technology layer fintechs play a key role here today as they facilitate a platform model for Banks 4.0, by shielding them from the high investment and implementation complexity ordinarily associated with in-house solutions that are still largely proprietary today. The direction of travel indicated by the performance of the Bank 4.0 core ecosystem — a foundational, tech-enabled bank architecture for data transparency and self-sovereignty, open-enabled agility, solution modularity, end-to-end partnership, integrated BaaS, and empowering customer engagement — aims to be ecosystem core, embedded banks as well as customer-centric integrators of trust and privacy across ecosystems.

We recognize, however, that this may not be possible for every bank. The ongoing phase of consolidation in the banking industry can indeed also result in a reduction of the number of players providing an extensive range of regulated financial services that users will trust for financial management, especially in periods marked by high levels of uncertainty, volatility, and crisis. In the longer run, however, the trend is for Banks 4.0 as hybrid platform-based ecosystems, hence favoring competition as well as innovation in the development of new solutions, services, and use cases.

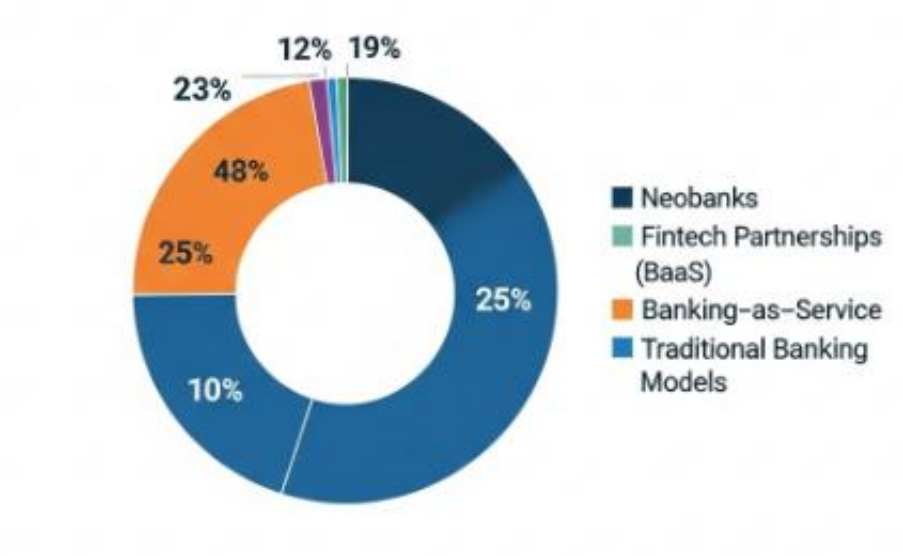

Fig : Banking Models and the Rise of Embedded Financial Ecosystems

4.5.1. Future Trends

This paper contributes to the current conversation on banking and platforms in a novel way by studying the relationship between platform business models and banking through a novel approach: embedded finance and embedded financial ecosystems. In doing so, the paper emphasizes that while financial services as a significant part of life are still entirely distinct from the rest of life, other life transactions may have financial service components alongside. But there are also related developments outside tax and risk perspectives. New contingencies of digital dependencies between users increase the attractiveness of third parties performing escrow and transaction security functions. A different way of expressing the point is that banks must learn to offer user services that, for all users, change the current perception that banks, not users, are benefiting the most from the relationship. In other words, banks must explore and develop various aspects of reciprocity. To be accepted by users as a utility function of benefit to them, banks' services must enable them to express and channel the digital interdependencies of different users. Additionally, by expansion of compensating parties, banks gain complimentary business opportunities and the new ecosystem-oriented, agile bank culture.

With the developments and evolution of digital technologies, banks must explore new service offering possibilities that tap into the promising potential of emerging technologies, such as:

- Smart contracts to increase automation of underlying transactional functions, with the escrow function as a focal point for a wide range of transaction types.

- Decentralized identifiers that provide a verifiable means of establishing identity for the customers of both banks' operating units and user ecosystems associated with banks service offerings.

- Digital native currencies and wallets that reduce the cost of moving money for cross-border transactions, are used for micropayments and enable the introduction of payouts for participating users.

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