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Open Banking

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ABSTRACT

As the name suggests, the open banking concept involves banks "opening" access to customer data to the public, specifically sanctioned financial institutions. Open banking is a practice where banks and other financial institutions provide access to consumer banking, transaction, and other financial data to third-party service providers through application programming interfaces (APIs), which are essentially software intermediaries that allow different applications to communicate with each other. It represents a transformative shift in the financial services landscape, offering unprecedented opportunities for both consumers and businesses. Its goal is to enable consumers to leverage their financial data to access better services, more competitive rates and innovative financial products. It has allowed financial service providers to unlock their vaults and share data responsibly. Open banking offers consumers the promise of accessing and managing financial information across multiple platforms to take advantage of decentralized banking services, new payment capabilities, and more innovative and personalized business models for financial services. This paper explains open banking and how it works.

KEYWORDS: *open banking, open bank data, finance, finance industry, application programming interfaces (APIs), API banking*

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INTRODUCTION

For centuries, banks have had a monopoly over the information about their customers. This makes them one of the few organizations that have such direct access to our personal information. Unauthorized access to this information would have led to severe direct financial consequences and loss of reputation and trust. Banks chose to protect themselves and their customers by isolating themselves and not sharing the information they owned. However, in the late twentieth century, technological development showed that the situation could change. Open banking broke the monopoly banks had. It did so by making them share information that we allow to be shared with the companies that we trust [1]. Open banking relies on a technological network of different financial institutions, enabling them to exchange information more efficiently. It allows non-banks to offer banking functionality.

WHAT IS OPEN BANKING?

Traditionally, financial data was siloed within banks, making it difficult for consumers to access, share, or use their own financial information. This lack of connectivity made it challenging for consumers to get a high-level view of their finances, made transferring money harder, and limited financial access for some consumers. That is rapidly changing due to open banking, a global shift that is redefining how financial data flows.

Open banking (OB) is defined as a system that allows consumers to securely share their banking, transaction, and financial data with third-party providers through standardized APIs. The technical backbone of open banking is the use of application programming interfaces (APIs). APIs constitute the technology used to share information. By leveraging the power of technology, particularly APIs, open banking allows financial data to be securely shared between banks and third-party providers. Open banking gives third-party service providers access to customer banking data and transactions via APIs, allowing them to offer personalized services and expand their range of financial products. Figure 1

shows the symbol of open banking [2], while Figure 2 shows an open banking ecosystem [3].

Open banking, also known as open bank data or API banking, is a system based on application programming interface (API) and intended for sharing financial information necessary for the development of financial products and services. It is a practice that enables secure interoperability in the banking industry. Its primary objective is to increase competition, innovation, and consumer choice in the financial services industry. Open banking involves real-time sharing of data, including statements and transactional data, from a customer's bank account with other authorized financial service providers. It has the potential to reshape our interactions with the various services we use in our daily lives. Figure 3 shows different components of open banking [4], while Figure 4 depicts the difference between traditional banking and open banking [5].

The financial concept of open banking emerged from the need to enhance transparency, promote competition and foster innovation in the financial sector. It was first introduced in 2015 with the launch of the payment services directive 2.0 (PSD2) in Europe. The rules set by PSD2 explicitly give the consumers the power to share or to not share. The European Union first introduced open banking policies, and the United Kingdom has been hailed as the global leader of open banking. While open banking began in the UK, it has spread to a number of countries in Asia and the United States. The concept of open banking facilitated a shift in the mindset of banks from acting as data stewards to looking at their customers' data as useful assets [6]. PSD2 made open banking mandatory in Europe – all banks had to furnish their APIs to third parties, giving customers higher control over their financials. Figure 5 shows a brief history of open banking [4].

How open banking works in shown in Figure 6 [7]. Open banking begins with requesting consent from the customer to share their data. Suppose a customer has an account with Bank A. This bank now has access to all the customer's data, including credit score, account balance, online purchasing habits, regular payments, and other metadata. Bank A will now make this data available to a fintech startup, who will now obtain access to the information. However, this cannot happen without the customer's informed consent and API authentication. A customer authorizes trusted apps to access their information. In order to access customer account information or financial information, these apps use a technology called open banking APIs. Open banking allows apps run by third-party providers to access user data with the prior consent of a customer. Technologically speaking, open banking relies on APIs (application programming interfaces). APIs are crucial elements for open banking, as they are the medium that allows communication between enterprises and banks. Open banking APIs can only function when the person or platform requesting the data has permission to view it [8,9].

Open banking is not one discrete product or service. Rather, it is a framework within which any number of financial services can be enabled. Open banking is creating a new wave of innovation in the financial sector, allowing third-party service providers to create banking products that improve data security, efficiency, and accessibility. Open banking platforms are used by a wide range of businesses and consumers to simplify financial transactions, enhance security, and unlock new opportunities.

Open banking is diffusing rapidly in some economies. Today, there are many countries around the world that are working towards an open banking framework. Financial institutions across the world are at various stages of their open banking capabilities. More and more countries, including Australia, Brazil, and the United Arab Emirates, are now progressing with their open banking regulations. Some of these countries are shown in Figure 7 [5].

Open banking is a key strategic component of the future of banking. Key features of open banking are [10]:

- Allowing access and control of consumer banking and financial accounts through third-party applications.
- Reshaping the competitive landscape and consumer experience of the banking industry.
- Offering promising gains while entailing risks to consumers as their data is shared widely.
- Third-party service providers are typically technology start-ups and online financial service vendors.
- Customers are normally required to grant some kind of consent to let the bank allow access to their data.
- Third parties can access banking data securely and in real time using application programming interfaces (APIs).
- Financial data uses might include analyzing customers' accounts and transaction history, aggregating data across participating financial institutions and customers to create marketing profiles, or making new transactions and account changes on customers' behalf.

- Customers have more options for managing their money, borrowing, and making payments.

EXAMPLES OF OPEN BANKING

Most often open banking providers are fintech startups that build their success stories on being third-party providers. We shortlist several examples of open banking companies in action [11,12]:

- *Plaid* acts as an intermediary between financial apps and banks so that app users can log in and share their data securely. Its Core Exchange aligns with the Financial Data Exchange (FDX) API specifications and meets consumers' expectations for data connectivity. Plaid's Privacy Controls give open banking customers more control over their financial data, from initial connection to ongoing oversight. Plaid's App Directory provides financial organizations with real-time insights into the apps their customers connect to. Businesses can monitor app connections and verify that apps have completed Plaid's onboarding process. This helps simplify risk management.
- *Affirm* uses open banking to determine a consumer's ability to repay in real time, creating a seamless buy now, pay later (BNPL) experience. By partnering with Plaid, Affirm securely connects to a bank account to evaluate factors like cash flow and account balances. This approach helps expand financial access for consumers allows Affirm to offer BNPL options at checkout
- *Moneybox* in UK helps their customers by streamlining saving and investing. It uses open banking to enhance its Payday Boost feature. This lets customers instantly transfer funds into their savings, investments, and retirement accounts. By integrating Plaid's Variable Recurring Payments (VRP), Moneybox eliminates the five-day delay associated with traditional direct debits.
- *Capital One* launched DevExchange with the motto, "Use our stuff to build your stuff." This DevExchange offers the ability to verify identity and move money via API calls. They also let third parties connect customers with a view of their Capital One accounts and transactions via tokens rather than credentials. Capital One gives third parties the ability to create accounts directly within these third-party products.
- *Citi*'s Developer Hub enables developers from various digital companies to connect to Citi via API. Notably, Quantas uses this connection for its credit card offerings. And, SingSaver uses it for Instant Account Verifications (IAV) with Citi cards. By creating this developer hub, Citi is positioning itself for flexibility and stronger connections for its customers who use third-party apps.
- *PayTo* builds on Australia's existing fast payments platform, the New Payments Platform (NPP). NPP created "PayID," a system that allows users to pay others using an alternative alias to a BSB, for example an email address or mobile phone number. PayTo bridges the gap from clunky multi-day bank transfers to seamless merchant-direct payments. It lays the groundwork for open payments to be launched under the Consumer Data Rights (CDR), a centralised body that will connect all the pieces of payments and data under a single authority. Although PayTo is not goverend by CDR rules, it is limited in its data sharing scope.
- *Tully* is the first completely digital debt adviser in the UK. It already helped over 13,000 people to build a budget online to understand their financial circumstances and, if needed, provide and set-up debt advice.

APPLICATIONS OF OPEN BANKING

Open banking is revolutionizing the use cases offered by banks and other financial institutions. Some of the most common applications include buy now, pay later (BNPL) services like Affirm and faster transaction posting. Common practical applications of open banking include the following [8]:

- *Accounting:* Companies can use solutions like Yapily to automate bookkeeping and general accounting to streamline data flow. Business owners can use open APIs to build account aggregators in order to view and manage all their accounts from a single dashboard. Financial software can access real-time transaction data, making it easier to manage accounts and reducing the need for manual data entry.
- *Loans:* Financial startups and loan management service providers can extract data from APIs to assess the creditworthiness (and credit score), net income, and overall cash flow of loan applicants.
- *Payments:* Startups and SMEs can integrate open banking platforms to help process payments faster. Financial institutions and credit card issuers can rely on open banking software like Plaid to manage recurring payments for mortgages, subscriptions, rent, insurance, and other services. The consenting users can set the payment parameters to control the timeline. Payment initiation is a form of electronic payment transaction that allows consumers to make payments directly from a bank account without

traditional tools like checks or credit cards. Retailers can initiate payments directly from a customer's bank account, bypassing the need for a traditional payment gateway.

- *Buy Now Pay Later (BNPL):* Open banking powers payment services like buy now, pay later (BNPL) platforms like Affirm and services that facilitate faster transaction posting. Ecommerce stores can use open banking APIs to verify whether a customer or consumer qualifies for credit. This technology is available in apps like Klarna and Afterpay.
- *Wealth Management:* Wealth management fintechs use a customer's financial data, risk tolerance, and goals to give personalised investment recommendations. Businesses and startups can work better with clients when they have a 360 view of their assets across multiple banks. This will help them manage assets better and make informed business decisions.
- *Banking-as-a-Service (BaaS):* BaaS or white-label banking is the process where a bank gives financial and non-financial third parties access to their open banking APIs and other core banking functionalities. With BaaS, startups and corporations can go beyond open banking APIs and extend their services to include everyday financial operations like online payments and BNPL.
- *Credit Scoring:* This assesses consumers' creditworthiness based on their financial history and behavior, with open banking APIs pulling financial data in real time to build more accurate and informed credit profiles. Financial institutions and lenders can access real-time consumer data from open finance APIs to assess credit more accurately, speeding up loan approval processes. Open banking APIs can be used to evaluate the credit risk associated with a customer whether it is a company or a consumer through the analysis of their recent bank statements.

BENEFITS

Open banking represents a fundamental shift in the financial industry from product-centric to customer-centric business. It transforms the financial landscape by promoting competition, innovation, and customer-centric services. It promotes collaboration and consumer empowerment while strongly focusing on security and data privacy. It provides an opportunity for banks to stay ahead of the competition. Open banking allows you to see all your finances in one place. Other benefits include the following [6,13,14].

- *Convenience:* Consumers benefit from more personalized financial solutions, increased convenience, and greater control over their financial data. Customers can access and manage their financial data and services from various institutions in a single application. This streamlines the banking experience and eliminates the need to log in to multiple accounts. Gone are the days of standing in long queues or waiting for bank managers. Open banking, combined with digital services, brings the entire experience to the consumer's fingertips, enabling banking in the palm of their hands.
- *Transparency:* Open banking promotes transparency by guaranteeing that customers know how their data will be used. It prioritizes customer consent and control over their data, building trust among customers, financial institutions, and third-party providers. Customers decide what information must be shared and what's to be hidden securely, giving them higher financial transparency and control over their financial data. By promoting transparency and competition, open banking encourages financial institutions to innovate and offer better products and services
- *Financial Inclusion:* Open banking can promote financial inclusion by providing individuals with limited access to traditional banking services the opportunity to use alternative financial products and services. It can also help extend financial services to underserved populations who do not have a traditional credit history. By assessing non-traditional financial sources, individuals may be able to access loans and financial products they might otherwise be denied.
- *Democratization*: Open banking democratizes the financial landscape, enabling small and medium-sized enterprises to benefit from solutions and services that were previously out of reach. It places the customer at the forefront of strategy, emphasizing personalized services and experiences.
- *Opening Accounts:* Opening a new account with a bank is now much easier and faster. This is highly linked to the Know Your Customer (KYC) process. Often banks want to get as much information as possible about a customer before authorizing a new account opening. This is obviously for security reasons, but also to limit the risks of fraud. Moreover, this onboarding process also can help in profiling the new customer.

- *Account Aggregation:* Most people have multiple bank accounts – for salary, investments, savings. Open banking allows information on all these different accounts to be consolidated into one platform, which makes it so much easier to view and manage multiple accounts. Open banking APIs can be used to aggregate financial data from multiple sources. This allows consumers to manage their finances and get a comprehensive view of their financial situation.
- *Expense Tracking:* Open banking allows for instant budget tracking and notifications for account activity. Users can receive alerts for large transactions, low balances, and unusual spending patterns.
- *Increased Competition:* Traditionally, the banking sector has been dominated by large, established institutions. Open banking levels the playing field by granting new players access to the same data, allowing them to innovate and offer more affordable alternatives. Open banking fosters competition by allowing new entrants, including fintech startups, to produce innovative financial products and services. This leads to a more diverse range of offerings and better pricing for consumers.
- *Better Customer Experience:* Open banking integration drives competition, thereby necessitating a race to please consumers and break into untapped markets. Startups, credit card companies, and lenders can now focus on providing value to customers. They want to make the banking process (and other non-banking services) as convenient and painless as possible. For example, the introduction of mobile payments and contactless technology such as Google Pay is a testament to the focus on better customer experience. By putting consumers in the driver's seat, financial providers can build trust and improve relationships, leading to greater customer satisfaction and loyalty.
- *Personalized Services*: Open banking can assist you in the creation of personalized financial services based on a comprehensive view of your financial situation. This can include expense tracking, credit score monitoring, and other solutions that cater to individual financial goals. By analyzing their financial data, businesses can identify specific customer needs or preferences and tailor their offerings accordingly. By offering more personalized services, businesses can create a stronger connection with their customers, leading to increased loyalty and retention.
- *Access to Finances:* Open banking mandates banks to open up access to customer financial data (with customer consent) to third-party providers. This shift creates a landscape where data is more freely accessible, allowing for innovative financial services and applications. Open banking can improve access to credit and financial services, especially for underserved populations. Alternative credit scoring models that consider a wider range of data help more people qualify for loans.
- *Easier Payments and Transfers:* Open banking facilitates seamless payments and fund transfers directly from third-party applications. This reduces the need to switch between different platforms for financial transactions.
- *Increased Referrals:* The collaboration from open banking brings in referrals quickly, both for the third party and the bank.
- *Competition:* Today, banks face competition from FinTechs, neobanks, and technology giants like Amazon, Google, and Facebook that are improving existing financial services by enhancing capabilities, improving convenience, or lowering prices and fees for consumers. By breaking down traditional barriers and enabling entrants to offer new financial products and services, open banking promotes increased competition and innovation in the financial industry. In addition, increased competition among banks and third-party providers (TPPs) can lead to lower pricing for financial products and services, with customers benefiting from lower fees, better interest rates, and improved terms and conditions.

Some of these benefits are displayed in Figure 8 [4].

CHALLENGES

While open banking offers many benefits, it also comes with some challenges, risks, and limitations. From integration issues to security vulnerabilities and regulatory concerns, here are some of the potential drawbacks of open banking. While open banking adoption is growing, there are rising concerns around security, privacy and fraud. As open banking continues to spread globally, a focus on standardization and interoperability will keep integration seamless across institutions. Businesses should exercise prudence when adopting this technology and take stringent steps to safeguard security and privacy. Other challenges include the following [6,13,14]:

- *Privacy Concerns:* One of the potential concerns for customers is privacy with regard to data sharing. The more places your data is held, the more vulnerable. Sharing financial data between institutions and third-party providers increases the risk of data breaches and unauthorized access. Customers may be concerned about the security of their sensitive financial information. Prioritize data security by implementing strong encryption, multi-factor authentication, and secure APIs. Regulatory frameworks will evolve to address privacy concerns and technological shifts.
- *Security Concerns:* Security is a paramount concern in open banking, ensured by strict regulatory frameworks like the European Union's PSD2. Consumers must explicitly grant permission for data sharing, maintaining control over their information. Open banking operates with multiple security measures in place to protect the confidentiality, integrity, and availability of financial data and transactions. It could provide new avenues for frauds and cybercriminals to leverage vulnerabilities and conduct scams that target both consumers and financial institutions. When integrating with an open banking API, the user has to go through an authentication and authorization process to verify their identity. Open banking solutions are designed with security measures in place to protect the confidentiality, integrity, and availability of financial data and transactions.
- *Customer Rights:* You need to ensure that adopting the open banking API concept does not hamper the rights of your customers. You will need a powerful grievance redressal system to protect customer rights. Also, you need a consent-based data exchange system, which allows customers to accept or reject data exchange requests from banks or fintech companies. Protecting the rights of your customers should be your primary responsibility.
- *Regulatory Compliance:* The regulatory landscape for open banking can be complex, with differing standards in various regions, like PSD2 in Europe. Financial institutions and third-party providers (TPPs) must navigate these regulations if they operate in multiple countries with different compliance standards, and ensuring interoperability among different systems and complying with multiple regulatory frameworks can be technically challenging.
- *Uneven Implementation*: The implementation of open banking standards varies among different banks and financial institutions. Inconsistent APIs and data formats hinder smooth data exchange.
- *Inequalities in Access*: Not all customers have access to, or are comfortable with, using digital tools and platforms. This can lead to inequalities in access. Lack of access can only be combated with inclusivity, which presents as open banking.
- *Risk of Misuse:* As power concentrates in the hands of a few monoliths, this leads to the misuse of consumer data. Third-party providers might exploit customer data for advertising or other purposes without proper oversight, potentially causing privacy concerns and customer dissatisfaction.
- *Risk of Data Breaches:* A main concern is data breaches due to poor security, hacking, or insider threats that are widespread today as more data is interconnected in many ways. The sharing of customer financial data between banks and third-party providers (TPPs) increases the risk of data breaches, and robust authentication and encryption is of paramount importance for safeguarding customer and account information. Clear and user-friendly consent mechanisms are needed to ensure that customer consent is not misused and that customer data is accessed and used only with the customer's explicit permission, in compliance with data protection and privacy regulations.
- *Customer Trust:* Customers might be skeptical about sharing their financial data with third-party providers, especially if they are not adequately educated about the benefits and risks of open banking.
- *Dependency on Technology:* Open banking heavily relies on technology infrastructure and APIs. Technical glitches, system outages, or cyberattacks could disrupt services and compromise customer experiences.
- *Limited Standardization*: The absence of universal standards complicates the way services talk to each other. Regulatory changes, technological advancements, and consumer demand have created momentum for a more interconnected and competitive global financial landscape. As open banking initiatives continue to expand, with more countries adopting open banking regulations and standards, the need to achieve cross-border interoperability becomes crucial. Standardized protocols and methodologies are needed to facilitate the seamless exchange of financial data and services across borders.

- *Hidden Costs:* Beyond API subscription fees, there may be hidden costs tied to compliance or technical adjustments. These expenses can mount over time, possibly offsetting any cost-saving benefits of open banking.

Figure 9 shows some of these challenges or barriers [4].

CONCLUSION

The iron-clad banking world has seen a paradigm shift, where access, efficiency, and ease of execution of any action have become the primary drivers of their business. Open banking is a financial services model that allows third-party service providers to access consumer data from traditional banking systems through application programming interfaces (APIs). It stands as a pivotal transformation in the financial landscape, ready to usher in a new era of connectivity, innovation, and empowerment. It allows third-party payment services and other financial service providers to access banking transactions and other data from traditional banks and other financial institutions through application programming interfaces (APIs). It is changing the financial services industry, paving the way for innovations that are redefining how businesses and financial institutions interact.

Open banking is quickly becoming the norm across banks and fintechs. Its future is poised for dynamic growth, with several key trends on the horizon. As technology advances, we can expect more personalized and efficient financial services. The future of open banking is depicted in Figure 10 [15]. Emerging technologies like artificial intelligence (AI) and blockchain have the potential to significantly impact the future of open banking by enhancing security and enabling innovative financial services. More information on open banking can be found in the books in [16-24] and a related journal: *Financial IT*.

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Figure 1 Symbol of open banking [2].

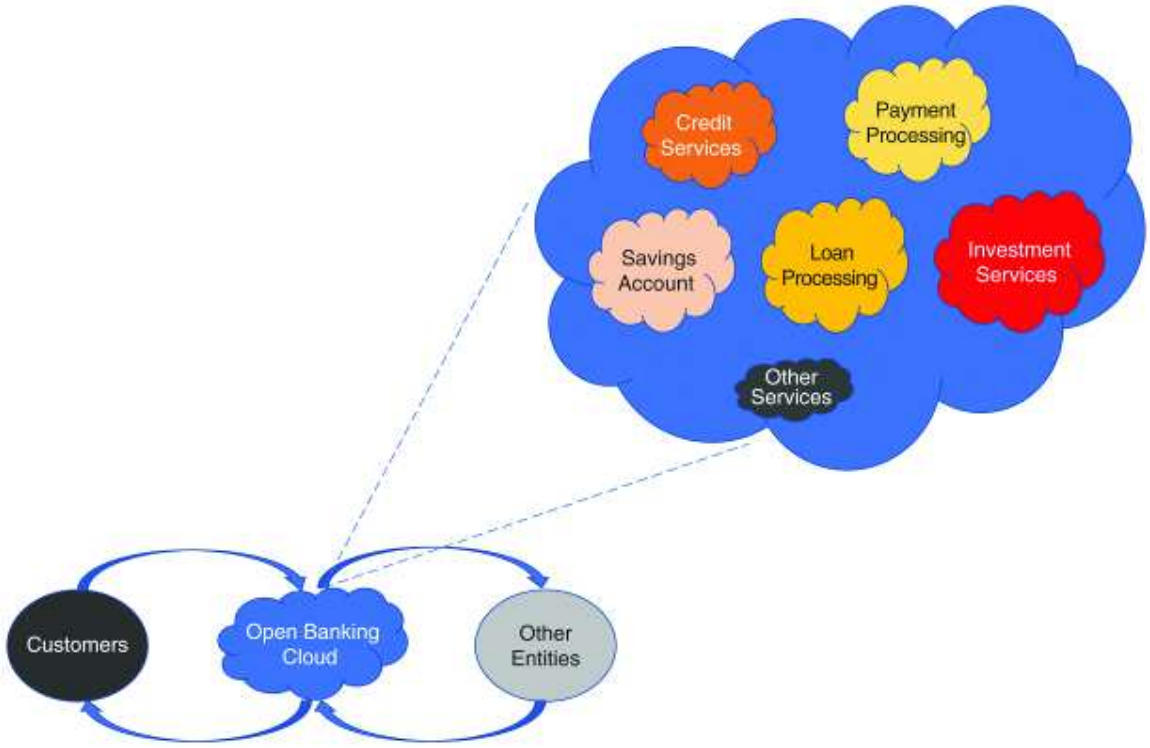

Figure 2 An open banking ecosystem [3].

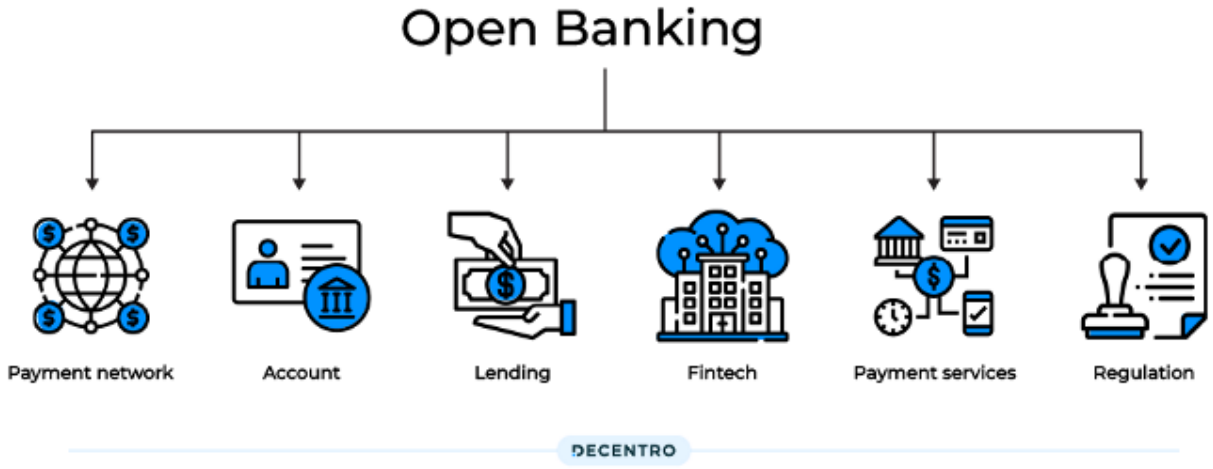

Figure 3 Different components of open banking [4].

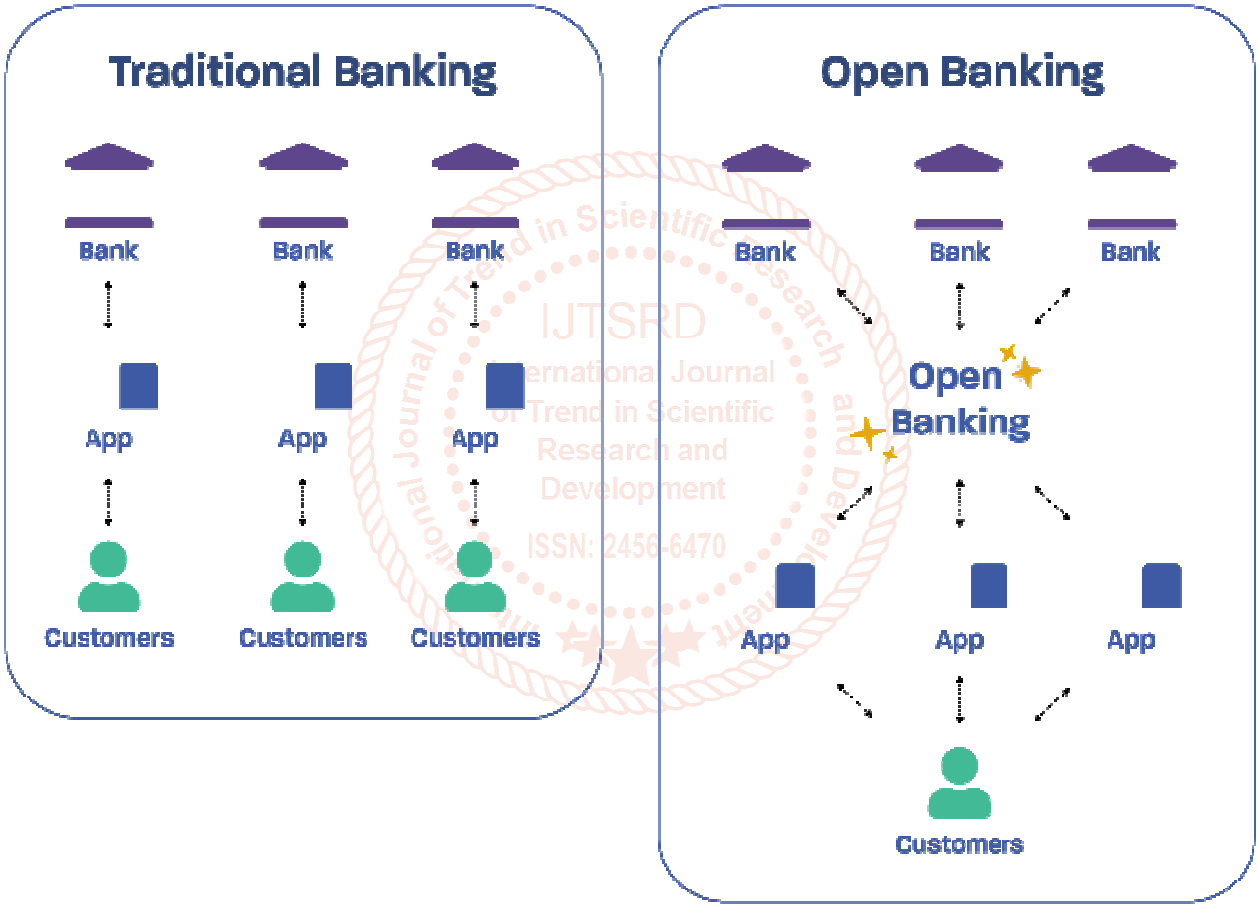

Figure 4 The difference between traditional banking and open banking [5].

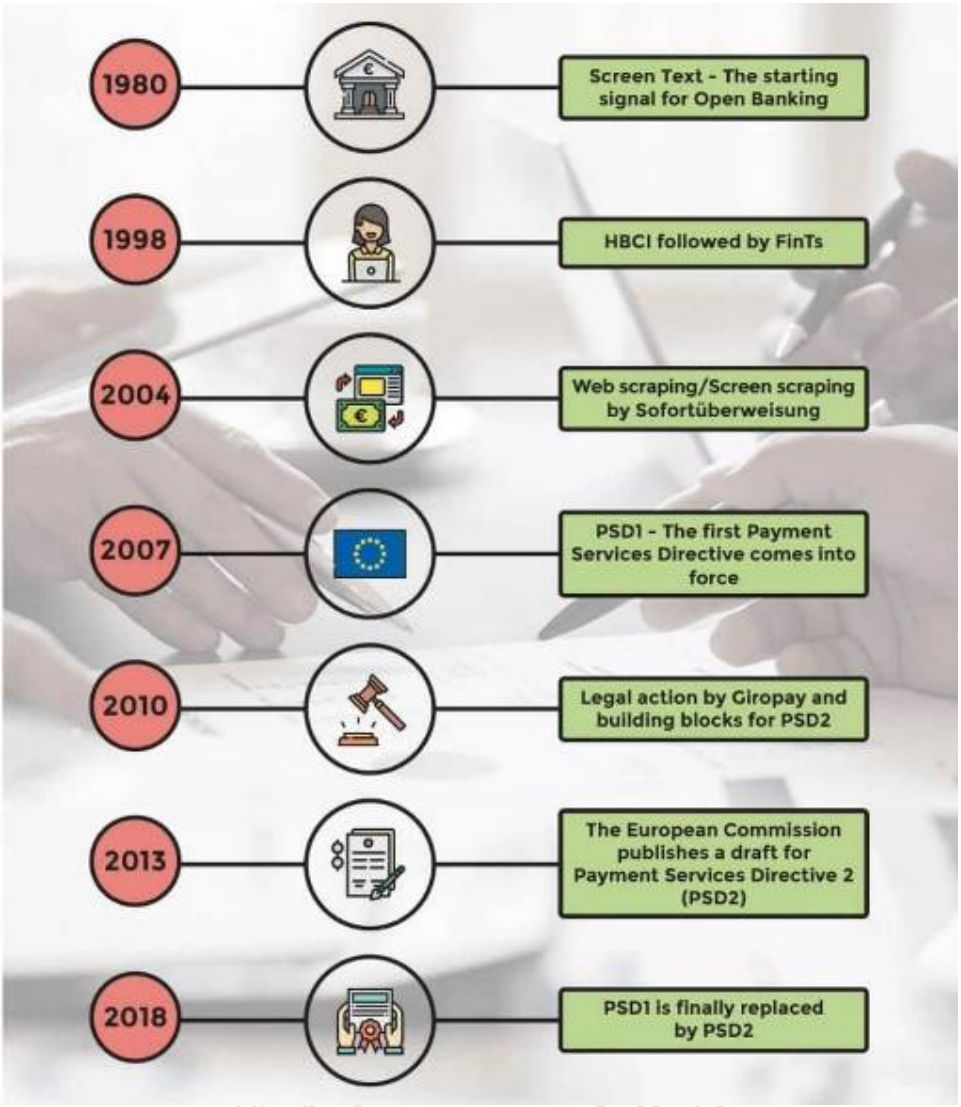

Figure 5 A brief history of open banking [4].

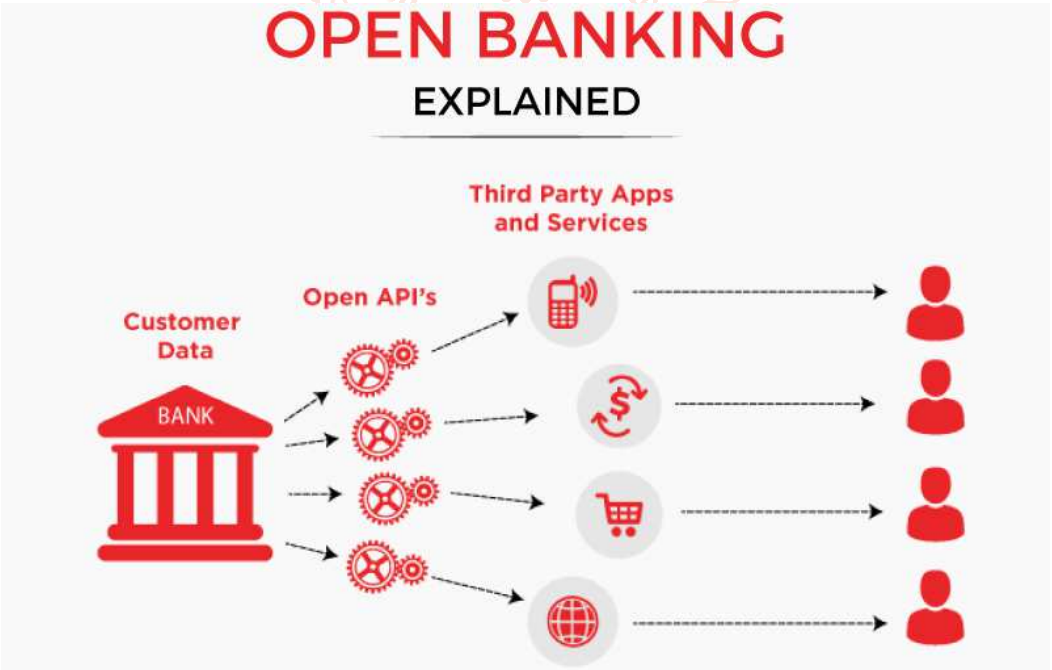

Figure 6 How open banking works [7].

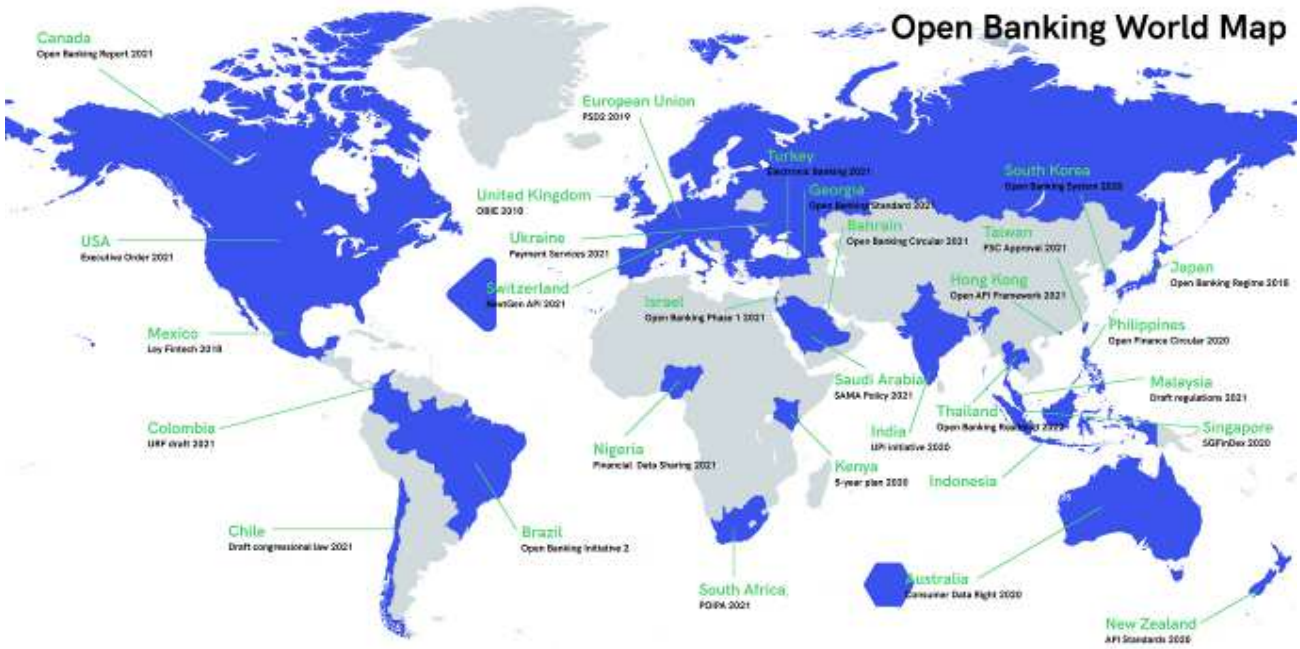

Figure 7 Countries working towards an OB framework [5].

Figure 8 Some benefits of open banking [4].

Figure 9 Some challenges or barriers of open banking [4].

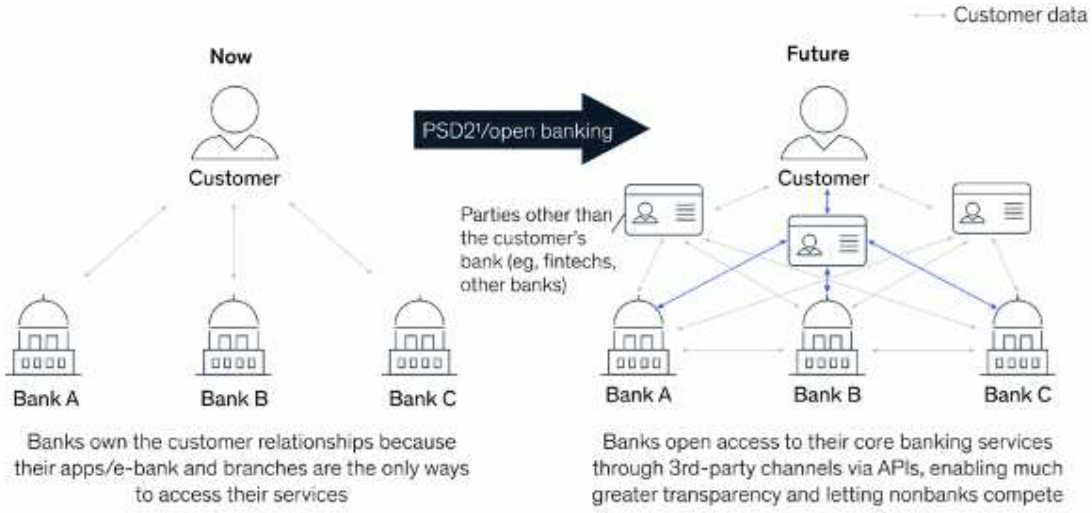

Figure 10 The future of open banking [15].