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ASPECTS OF OPEN BANKING REGULATION: THE EXPERIENCE TO DATE

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Abstract: This article explores the growing body of knowledge regarding open banking regulation and offers some forward-looking ideas regarding the ongoing shift from open banking to open finance to open data, as well as the effects on competition and consumer safety.

Key words: open banking, open finance, data protection

Introduction

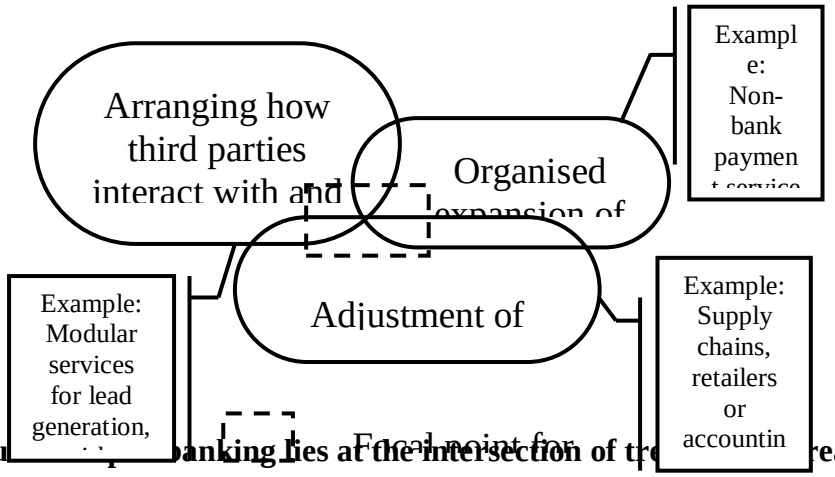
The term "open banking" was first used in the UK as a regulatory initiative that came up as a result of several inquiries aimed at improving competition in the banking industry. Commencing with the Cruickshank report from 2000 and, more recently, the Fingleton report[1] from 2014, which demanded that banks use open data frameworks to publish consumer data. Yodlee in the US was one of the first companies to offer "screen scraping," a somewhat earlier parallel development that involved using system-based interfaces to "scrape" data from online financial services and internet banking in order to create usable goods and services. Because third parties are essentially managing consumer credentials and are operating in an uncontrolled area, "screen scrapping" has been linked to worries about data security and privacy protection. In this environment[2], open banking has arisen as a method to allow clients to securely exchange their banking data and information with trusted third parties, as well as to open up and unbundle banking sector operations and services to increase competition.

Research method

Open banking initiatives have been driven by three intersecting trends in the real and financial sectors, which form a broader backdrop. The integration of third parties into financial

[1] September 2014, “Data Sharing and Open Data for Banks: A report for HM Treasury and Cabinet Office”
[2] Adapted from, “Regulatory Approaches to Open Banking”, World Bank, 2020.

sector business processes is the first trend. Prominent instances comprise lead creation, data analysis, and risk assessment. All of which need the capacity to start or initiate particular business operations as well as access to organized and standardized data. The second trend involves incorporating financial services into the new company models that the digital economy has produced. One prominent example is the extensive integration of financial service providers' systems with enterprises' accounting and financial management systems. Given their growing significance in the payments market, the third trend is the expansion of non-bank payment service providers' access to payment systems. The convergence of these more general themes is open banking – see figure 1.



Figu banking lies at the intersection of tr real sector and financial sector

Although consent-based access to data and the communication that it permits present many opportunities for innovation, they also bring up a number of policy issues. The primary goals of the regulatory frameworks that characterize open banking typically center on promoting competition and innovation, which leads to the creation of new goods and services for consumers at competitive prices, all the while minimizing and mitigating risks and striking the correct balance. The opportunities available to the various stakeholders and the difficulties they face are compiled in the table below.

	Banks	Fintech companies	Consumer	Regulators
Opportunities	New business models New revenue streams	Permits the formation of ecosystems Novel business structures	Greater selection and range of services	More stable exchange of information Enhanced security

	Deep customer insight More user-centric solutions	cooperative business arrangements with banks Grow more quickly	enhanced interaction with the user Reduced costs Inclusion of finances	Potent ial for suptech solutions
Challenges	Infrastructure for API development is required (cost and time) Competition and revenue loss New liability allocation Business model risk Disintermediation of customers Online safety	Security Compliance	Privacy Data security	Technical proficiency is required to analyze APIs. Conflicts between banks and TPPs must be resolved Cooperation between regulatory bodies

Table 1: Challenges and Opportunities of open banking[3]

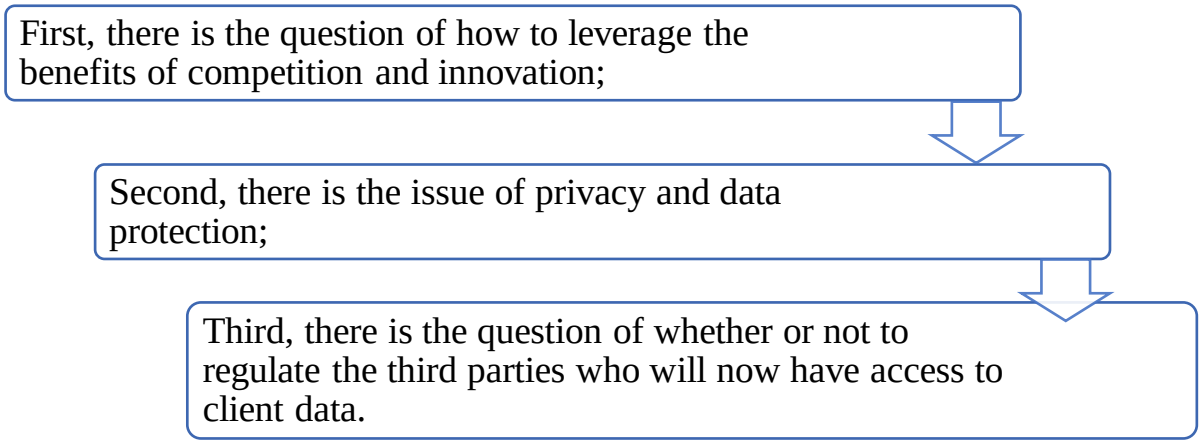
Open banking should be viewed within the regulatory framework of continuing efforts by regulators to modify it in order to allow new players to offer financial services in a variety of ways[4], most notably through the issuing of e-money and digital bank licenses. Telecom companies in Emerging Markets and Developing Economies (EMDEs), particularly in Sub-Saharan Africa, but also in other regions, have made use of e-money licenses. After reaching a certain size, e-money providers are eager to look for ways to grow their business and are forming alliances with banks and other financial service providers to offer their clients their products and services. They frequently do this by utilizing Application Programming Interfaces (API) for data exchange and

[3] World Bank, Open Banking Regulatory Approaches - Technical Study on Regulatory Approaches for Open Banking
[4] World Bank, Fintech and the Future of Finance, 2022.

transaction initiation. A similar business model is being explored by new entrants who begin with a limited product suite due to the emergence of digital banks. In order to provide the entry point to a wide range of banking services that fintechs and other financial institutions can utilize to bolster and grow their own offerings, several digital banks are also pursuing a "Banking as a Service" (BaaS) model. APIs are also heavily utilized by BaaS models. E-money providers have applied for digital bank licenses independently or in collaboration with other technology partners in certain jurisdictions. While BaaS is in some ways an alternative to open banking, it can also enhance open banking by providing functionality beyond the set of APIs covered by open banking. In this way, open banking may give an additional avenue for e-money providers to grow their offerings.

Regulators face three main types of policy questions as a result of open banking[5].

Rivalry and Originality

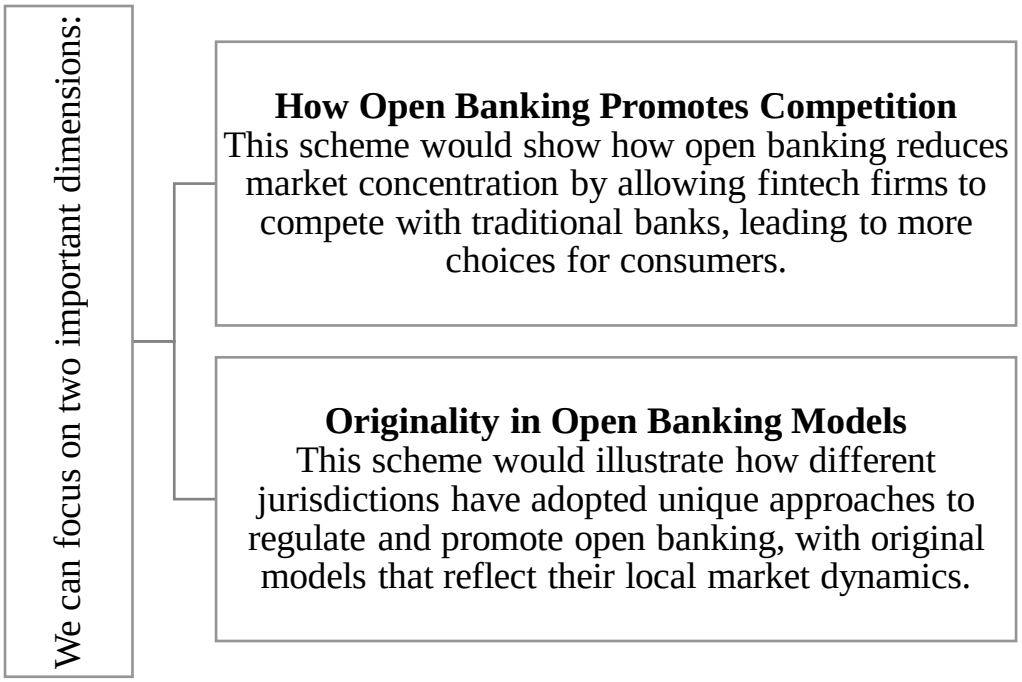


By enabling additional players to provide more appealing and customized services, open banking can increase the number of available goods and services, which will increase competition and positively impact efficiency, innovation, financial inclusion, and efficiency. Additionally, the incumbents can use open banking to provide integrated services and onboard clients more quickly. Regulators throughout the world have had to address a number of issues in their efforts to use open banking to promote innovation and competition. The two main queries are (i) Who: which established organizations ought to be required to grant access, and (ii) What: what kinds of data and services are available for use.

Regarding "who," some regulators have limited the requirement to the major banks (such as those in the UK and Brazil); others have mandated it for all banks (such as those in Mexico); yet

[5] Compiled by aftor

others have broadened the scope to include all financial institutions (such as those in Mexico and India). Regarding what, there are essentially two categories of access: written and read. The ability to access information is related to the former, whereas the ability to initiate transactions and hence modify data is related to the latter. In many jurisdictions, additional distinctions are being established between data at the product and service level, anonymized aggregate data, customer transaction level data, and customer demographic and other "static" data. Certain countries have taken a staged approach to answering both questions. Many countries that initially solely covered banks have begun to include the entire financial sector, making them more "open finance" in that sense.



The topic of how the access is to be organized and under what conditions is connected to the "who" and "what." Considering the breadth of technology, operational, and business model factors covered, this question has proven to be the most difficult. Regarding technology and operational models, deciding on the overall architecture and access method is crucial. Global research has identified three primary architectural styles[6]: (i) centralized, where a central organization acts as a middleman between data providers and recipients; (ii) de-centralized, where providers and recipients establish connections on their own; and (iii) hybrid, which combines elements of both decentralized and centralized architecture, such as the establishment of trust frameworks, but

[6] BIS, "API Standards for Data Sharing", 2022

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permits providers and recipients to locate and utilize the services through the trust frameworks. In general, centralized and hybrid arrangements are more common in nations that have regulated open banking. There are, of course, concerns with data format, client authentication and consent management procedures, and service quality that go beyond the interface models mentioned above. Regarding the business model, the essential query is whether or not to charge for open banking services, and if so, how much. Certain regions have delegated the task of identifying the technological and business model components to the private industry. Others have chosen to focus on certain aspects of technology and operational model, such as Europe (hybrid) and Korea and Turkey (centralized). A new category of businesses called "account aggregators" has been created in India, the country where the hybrid model has been selected. These entities function as a middleman between the data provider and the receiver on behalf of the data subject.

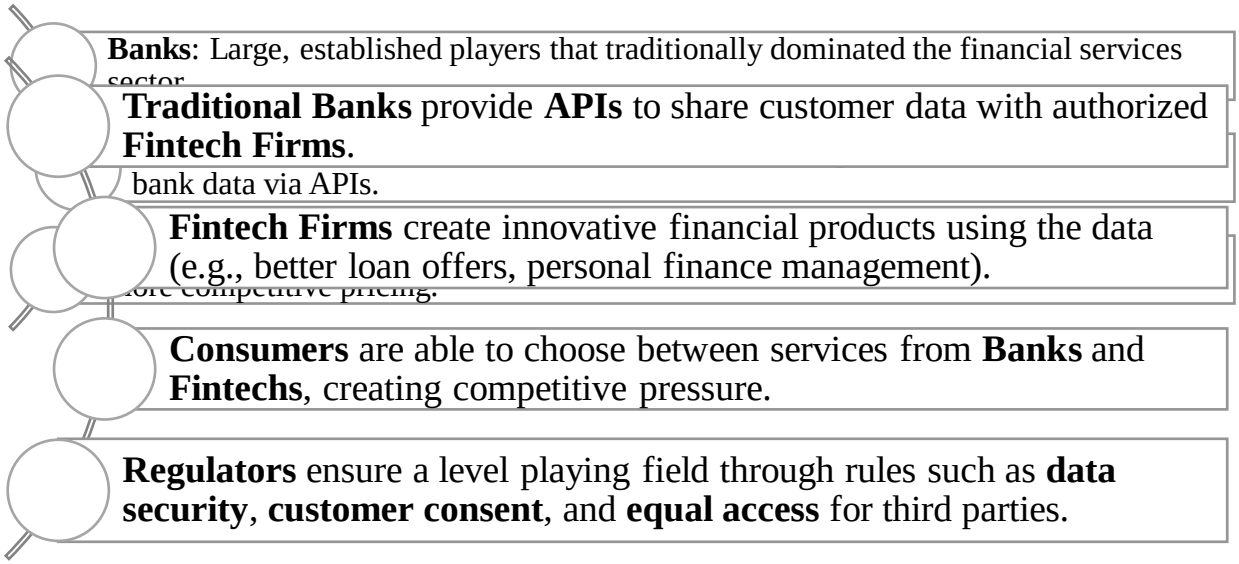
Dealing with the pricing issue has proven to be a very challenging task. In order to provide the service, the data suppliers must pay for the upkeep of the data and the related IT infrastructure, which results in actual expenditures. Nevertheless, consumers have a right to access their data, and a hefty cost might prevent open banking from growing. Furthermore, it can be difficult to come to an agreeable pricing in the absence of an organizational body. The goal of the centralized approach is to address this by having a central body fulfill that function; in India, for example, the NPCI handles payment initiation services. Such strategies might also work well with the hybrid model. Broadly speaking, open banking may benefit from adopting the interchange structure used by the credit reporting markets and the payment card sector. It is important to note that in both the centralized and hybrid models, the central organization manages essential operations that are comparable to, for example, a credit bureau or a "payment scheme." This raises the question of whether financial infrastructure regulations should apply to these central entities.

Scheme 1: **Open Banking Competition Landscape**[7]

This scheme illustrates the flow of competition introduced by open banking between traditional banks and fintechs.

[7] Compiled by aftor

Elements:



Flow:

It should be highlighted that although the goal of open banking is to increase competition, in the absence of sufficient protections, competition may potentially worsen[8]. Open banking was not originally created with BigTechs in mind, but it is becoming increasingly clear that they stand to gain a great deal from it. It is becoming evident that BigTechs can benefit greatly from open banking, especially given their large customer base and apps that are integrated into end users' daily lives. In India, for instance, big techs were able to quickly expand their market share in the payments sector by utilizing the third-party payment initiation capability, which led to the implementation of volume caps. This has also led to suggestions for the introduction of the reciprocity principle, which would impose obligations on those parties using open banking services to likewise provide open access. Nonetheless, this presents a number of problems, beginning with the data's reach, which goes beyond the banking industry, and standardization difficulties. The Customer Data Rights project in Australia is one step in the direction of the widespread movement toward adopting an open data strategy, in which the data subject is granted the ability to view and share their data kept with any business.

Analysis and results

We can break the topic into several key components. Below are both qualitative and quantitative aspects that could be modeled[9]:

[8] Adapted from World Bank, Fintech and the Future of Finance, 2022.
[9] Compiled by aftor

1. ***Information Model: Open Banking Ecosystem***

An **information model** can be used to map the entities and their relationships within the open banking ecosystem. This can include:

Entities:

- **Banks**: Traditional financial institutions.
- **Fintech Firms**: Companies that use open banking APIs to develop financial products.
- **Regulators**: Government bodies that ensure compliance with open banking rules.
- **Customers**: Individuals or businesses using open banking services.

Relationships:

- **Data Sharing**: Banks provide customer data (with consent) to fintechs.
- **Regulation**: Regulators set rules on security, data sharing, and customer protection.
- **Competition**: Fintechs and banks compete to offer services to customers.

The relationships can be modeled as an entity-relationship diagram (ERD), which could visually represent the flow of data and regulatory oversight.

2. ***Mathematical Model: Adoption of Open Banking Services***

We can use a **logistic growth model** to represent the adoption of open banking services over time in a given market (e.g., the UK). The logistic model is suitable because it shows how the adoption starts slowly, accelerates, and then saturates as most consumers adopt open banking services.

Model:

$$\frac{dA(t)}{dt} = rA(t) * (1 - \frac{A(t)}{K})$$

Where:

- $A(t)$ = Adoption rate at time t
- r = Growth rate of adoption
- K = Carrying capacity, representing the maximum potential market size
- t = Time

This model predicts how fast open banking will reach widespread use and saturation in a market. You can adjust r and K to fit specific regional data.

3. ***Mathematical Model: Competition in Open Banking Markets***

To model competition in open banking between traditional banks and fintech companies, we can use a **Cournot competition model**, where each firm (bank and fintech) decides on the quantity of services they provide in the market.

Model:

For two firms (bank and fintech), the profit for each firm depends on the output q_1 and q_2 :

$\pi_1, \pi_2 =$ Profits for the bank and fintech, respectively

P(Q) = Price as a function of total quantity $Q = q_1 + q_2$

$C_1, C_2 =$ Costs for each firm

By solving the system of equations for profit maximization, we can predict how both banks and fintechs will behave in terms of pricing and quantity in a competitive open banking environment.

*4. **Statistical Model: Consumer Behavior in Open Banking***

To understand **consumer behavior** in adopting open banking services, we can use a **discrete choice model** (Logit or Probit model), which analyzes the probability that a consumer will choose a specific financial product (from either a bank or fintech).

Logit Model:

The probability that a consumer *i* chooses product *j* from a set of products is given by:

$$P_{ij} = \frac{\exp(\beta X_{ij})}{\sum_{k=1}^{J} \exp(\beta X_{ik})}$$

Where:

$P_{ij} =$ Probability that consumer i chooses product j

$X_{ij} =$ Attributes of product j for consumer i (e.g., price, convenience, trust)

$\beta =$ Coefficients to be estimated

$J =$ Total number of products

This model can be used to analyze how different factors (e.g., price, data privacy concerns, trust in fintech) affect a consumer's likelihood of adopting open banking services.

*5. **Game Theory Model: Regulation and Compliance***

A **game theory model** can be used to model the strategic interaction between **banks** and **regulators**. This can capture how banks decide whether to comply with open banking regulations based on the potential cost of non-compliance (penalties) versus the cost of compliance (investment in technology).

Payoff Matrix:

For a simple two-player game:

	Regulator Enforces (*E*)	Regulator Does Not Enforce (*N*)
Bank Complies (*C*)	Compliance cost $-C$, no fine	No compliance cost *0*, no fine

Bank Does Not Comply (*D*)	Fine $-F$, no compliance cost *0*	No cost *0*, no fine

The bank will choose to comply if the potential fine F is greater than the compliance cost C. Otherwise, they may choose to avoid compliance if they believe enforcement is weak.

These models provide a variety of perspectives to understand the "Aspects of Open Banking Regulation." You can use logistic growth models to predict adoption rates, competition models to analyze the interaction between banks and fintechs, statistical models to understand consumer behavior, and game theory models to assess regulatory compliance. Each of these offers valuable insights into different aspects of the open banking ecosystem.

Privacy and Data Protection[10]

The foundation of open banking is the processing of personal data with customer agreement. Open banking raises questions regarding privacy and the protection of personal data, even as it improves transparency in the financial markets by encouraging data sharing. Such information may be used in a number of ways, such as empowering Third-Party Providers (TPPs) to provide payment initiation services or serving as a basis for comparators that utilize account information to evaluate services and goods made available to a certain customer across various service providers. Data security and privacy are becoming progressively more crucial as more data sources are used to analyze financial activity. Data protection and privacy safeguards, including permission, can boost the uptake and usage of digital financial products and support the formal economy by fostering customer trust and a sense of control.

Data security, including cybersecurity, data governance and enforcement, and data protection principles are only a few of the many factors pertaining to privacy and data protection in data-sharing scenarios. Personal data protection regulations are often based on another well-known European benchmark, the GDPR, and are a component of the larger legal framework for open banking in many jurisdictions. Although information confidentiality is important, open banking has placed more emphasis on how customers may manage and make the most of their banking data (Leong 2020). In this situation, obtaining the customer's consent is essential to protecting their interests.

[10] Adapted from “Role of consumer consent in open banking”, World Bank, 2021.

Although consent by itself is insufficient to guarantee privacy and data protection, when used effectively, consent is an essential tool that offers users some control over their data. Consent is a mechanism that gives the data subject control over how his data is processed, provided it is used appropriately, according to the European Data Protection Board (EDPB). Consent is an improper foundation for processing, and if it is handled improperly, the data subject's control becomes illusory (EDPB 2020b).

Furthermore, in the context of open banking, a number of broad consumer protection considerations also apply and must be taken into account. Notably, provisions pertaining to data protection and privacy regulations that set time limits for the use of personal data can incentivize customers with poor performance episodes to raise their game, thereby lowering the likelihood that certain customers will face temporary economic marginalization. In order for customers to be better self-advocates and to support the enforcement of legal requirements and market discipline, consent can also offer a chance to educate them about their rights and duties in the financial markets and with regard to data use.

Consent ought to be viewed as a component of a broader all-encompassing strategy for safeguarding the interests of customers; in order to properly protect customers under open-banking programs, a sufficient framework for both data and consumer protection is required. These can sometimes require feedback, oversight, and involvement from customers. In other cases, they have to do with the "privacy architecture" incorporated into financial services and products, which users would never be aware of. Furthermore, in the context of open banking, more general talks about the possible drawbacks arising from insufficient protections around data analytics and algorithm development are pertinent to take into account.

The main policy factors for data protection, privacy, and general consumer protection in the context of open banking are outlined in the table below.

Regulating third parties

New types of regulated financial firms are brought about by open banking regulations. Globally, the Account Information Service Provider (AISP) and Payment Initiation Service Provider (PISP) are two new kinds of organizations that were introduced by the PSD2 concept. Regarding the implementation of prudential regulations, financial conduct rules, and supervisory procedures, there is, nonetheless, some difference in the approaches. In India, an alternative model involves not regulating the PISP but rather treating it as a particular product made available by a

regulated payment system via its affiliated banks or payment institutions, and depending on the payment system's operational guidelines and protocols to meet regulatory requirements.

However, a new class of organizations known as "Account Aggregators" is presented; these organizations function as "data fiduciaries," coordinating data requests from organizations with a legitimate interest, information suppliers, and data subjects' consent. Although this model first resembles AISPs, it really reflects a different regulation strategy. Notably, it permits all institutions governed by any of the Indian financial sector authorities and the Department of Revenue, Government of India, to participate as data receivers and does not prejudge the kind of services the data receivers would offer.

Conclusions and suggestions

Lastly, even though certain subjects are outside the purview of this article since they haven't been included in any regulations yet, they are still up for debate in a lot of nations. In the near future, authorities will almost certainly be focusing on topics like the role of bigtech companies in the data economy, the expansion of data sharing to other economic sectors (referred to as "smart data"), or prospective initiatives toward international interoperability.

According to this article, creating an ecosystem and making intelligent use of data to offer clients new products and promote competition are key components of open banking. There isn't a single methodology or way to accomplish these goals. The approaches and breadth of the models outlined in this article vary, as do the definitions of the accountable governing bodies and the degree of strictness of the norms or principles. The following are some preliminary takeaways from the experience with open banking legislation thus far:

- For open banking concerns to be effective, the operational, business model, and technological aspects must be addressed. Regulating frameworks should, at the at least, encourage the creation and acceptance of industry-wide standards and coordination mechanisms, even as they correctly avoid delving too deeply into these areas. It would be crucial to make use of currently operating trade associations and market infrastructure, such as payment and credit reporting systems. Nonetheless, in order to guarantee that the intended goals of public policy are met, regulators must make sure they have the power to affect and mold the governance structures.
- One must take into account every facet of an open financial transaction during its whole life cycle. For instance, what happens in the event that a consumer challenges a transaction that was started using open banking or has their consent revoked?

- The sector should be assisted by authorities in creating suitable service level agreements covering things like response speeds, API uptimes, and data quality. It's also important to take into account suitable enforcement methods.
- Finally, choices and laws pertaining to technology, operations, and business model elements should be informed by sufficient industry engagement. Although the advantages of open banking are more evenly distributed, the costs may fall mostly on the incumbents. In order to guarantee that incentives are in line, this necessitates active consultations and suitable procedures.

Creating governing organizations and regulations, standardizing API frameworks, improving security, building infrastructure, and establishing authentication procedures have been the main focus of early regulatory initiatives. Next on regulators' agendas in the open banking space are things like open banking's future reach, rivalry with other sectors of the economy, particularly with major tech companies, and global interoperability.

In this regard, industry players and regulators are beginning to discuss how open banking's scope is evolving to include open finance and smart data. The ability of customers to access their data through a variety of financial products, such as mortgages, savings accounts, insurance, pensions, and so on, is referred to as "open finance." However, smart data implies that consumers in nonfinancial services sectors—like electricity, water, and mobile—will be able to access personal data as well as data from giant tech companies. Even though Australia is the only nation that has so far regulated the spread of open banking to other industries, conversations about it are happening elsewhere, albeit at different levels. Banks are beginning to assert that the concept of reciprocity when granting access to data is essential to achieving fair competition. The United Kingdom's Smart Data Review and the Canadian Senate Committee on Open Banking's report both suggest expanding data availability to industries other than banking.

Over bigtechs, concerns have been expressed over the implications of their access to data from financial in situations due to their growing interest in and positioning as suppliers of financial services, particularly through banking-as-a-service models. In an effort to ensure fair competition, several banks are beginning to assert the notion of reciprocity in the access to consumer data. Regulatory bodies, on the other hand, are examining the consequences for consumer protection and financial stability as well as the allocation of duties between bigtechs and the banks who work with them.

Open banking has significantly impacted the financial landscape, offering consumers greater choice, transparency, and control over their financial data. However, the journey has been marked

by challenges and evolving regulatory frameworks. Moving forward, focusing on balancing innovation with robust security, fostering global harmonization, and promoting consumer education will be crucial for realizing the full potential of open banking and open finance. International interoperability is the final item on the open banking agenda that may help the growth of global markets, albeit it is still very much in the debate phase. The lack of a universally accepted API standard and the possibility that TPPs would have to employ several API standards in order to interact with banks in various jurisdictions might result in issues like fragmentation of the digital financial ecosystem or inefficiencies for third parties.

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