Open Banking

Emergent Roles, Risks & Opportunities

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Research Paper

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Abstract

The phenomenon of financialization has received increasing attention, especially following the global financial crisis. We broaden the scope of research on financialization by investigating Open Banking initiatives. Such initiatives aim to enhance the banks' ability to personalise customer experiences. Consumers and businesses can now easily share their data with banks and third parties to manage personal accounts and compare banking services. Such initiatives raise important questions regarding the future role of banks as well challenges and opportunities inherent in the new Open Banking landscape. We empirically investigate five Open Banking initiatives through twenty-five interviews conducted with users of Open Banking APIs as well as those managing the various initiatives. From these interviews, we develop a taxonomy and identify four open banking roles: integrator, producer, distributor, and platform. A further contribution is made by identifying related challenges and opportunities faced by fintechs and incumbents in the shifting landscape of retail banking. The challenges identified include risk of disintermediation, loss of reputation and transformational failure while the opportunities identified include enhanced service innovation and risk mitigation. Overall, the study provides first insights into how the retail banking industry will adapt to new service innovations and increased collaboration with third party fintechs.

Keywords: Open Banking, Open API, Financialization, FinTech

1 Introduction

The phenomenon of financialization has received increasing attention, especially following the global financial crisis. Researchers have come to describe financialization as, "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" (Epstein, 2005: 3). Over time, and with the increased pervasiveness of financial actors, logics, and resources, financialization research has addressed areas other than discrete, purely economic activities (Leyshon and Thrift, 2007). Recent research on financialization has focused mainly on the role of financial actors in transforming practices for the creation and accumulation of wealth (Krippner, 2005) and in changing modes of management of the firm (Fligstein and Shin, 2004; Lin and Tomaskovic-Devey 2013). This paper broadens the scope of research on financialization by looking at the concept of open banking and the underpinning technology of Open-API[1]. To date, the term Open Banking is mainly used by practitioners. It refers to a shift from an old institutional regime of opacity to an increased openness and transparency (Currie, Gozman and Seddon, 2017).

The Open Banking initiative provides a working definition of this term, "Open Banking enables personal customers and small businesses to share their data securely with other banks and with third parties, allowing them to compare products on the basis of their own requirements and to manage their accounts without having to use their bank" (Open Banking, 2017). Open Banking therefore challenges many of the institutionalized assumptions in banking, such as the regime of opacity (Funk and Hirschman 2014; Scott and Bolotin 2016) and asymmetric information (Greenwald and Stiglitz, 1994). It creates new opportunities in service creation and distribution of banking services (EBA, 2016).

The experiences of those banks moving towards open banking is comparable to the first mover experiences of other industries during the past decade and holds major opportunities within a developing yet contested environment (Soulé, 2016). This environment is characterized as having zero tolerance for mistakes. Reputation and security risks are significant, not least as many banks play a crucial role in the economy as infrastructure providers. Providing security of funds and personal data as well as transaction banking can be seen as the core value proposition of a bank (Funk and Hirschman 2014). As a provider of underlying infrastructure, banks face additional pressures related to maintaining and making changes to running a large-scale operation with the considerations of constant uptime and numerous legacy systems (Deloitt, 2017; Scott and Bolotin, 2016). Banks also operate in a strict and changing regulatory environment (Gozman and Currie 2014). Although the roadmaps of the upcoming regulations have been clearly communicated to banks, their interpretation and understanding of strategic consequences and maintaining compliance in the most efficient way are time and cost intensive processes (Brodsky and Oakes, 2017). In addition, EU Directives are interpreted by individual regional regulators, which creates even more uncertainty for banks. Yet, banks are not unfamiliar to digitalization. They have already digitized their customer facing (distribution) side since the early years of the Internet (Zachariadis and Ozcan 2016).

The concept of open banking and Open API (Aitamurto and Lewis, 2013; Guibaud, 2016) is to enable organizations to decompose their value propositions into services, functionalities and even raw data, while simultaneously enabling new forms of distribution and enhanced servicing capabilities. Despite the increased attention of regulators, entrepreneurs, investors and banks, Open Banking and Open APIs have attracted little or no research in academia. In this paper, our motivation is to increase understanding of how open banking will influence changes in the retail banking sector. Consequently, we adopted the following research question: *How will retail banking change and what roles, challenges and risks will emerge through Open API Initiatives?*

[1] The term API (Application Programming Interface) refers to, "an interface or "go-between" that enables a software program to interact with other software. APIs have multiple features that facilitate, for example, information sharing, including real-time price quotations, trade execution and order and trade confirmations." See: https://www.investopedia.com/terms/a/application-programming-interface.asp

To address our research question, we conducted a multiple case analysis of five Open API initiatives in retail banking context. The findings contribute to the emerging body of literature on the financialization in two ways: first by developing a taxonomy of future banking roles; and second by identifying risks and opportunities. We structure the remainder of the paper in the following way. The next section reviews literature related to ongoing changes in the financial system. This is followed by our methodological section, where we describe our research design. Sections four outlines our case and empirical findings while section delineates outlines the risks and opportunities we derived from the findings. Finally, we discuss our study's contributions and limitations and calls for future research.

2 Related Literature: Contextualizing Fintech Innovations

Like many industries, the financial sector has come increasingly to rely on technology to underpin the services and products it offers. The financial innovations are transforming the financial industry (Funk and Hirschman, 2014; Hedman and Henningsson, 2015; Scott and Bolotin, 2016; Lagoarde-Segot, 2016, Currie and Lagorade-Segot, 2017; Eaton, Hedman, and Medaglia, 2018). One of the primary drivers for this change is 'digitalization' – a socio-technical process of applying technology across broader social and institutional domains (Eaton, Hallingby, Nesse, and Hanseth, 2014; Tilson, Lyytinen, and Sørensen, 2010; Yoo, Henfridsson, and Lyytinen, 2010). Banks have been utilizing digital technologies since the late 1960s when bank accounts became electrometrically held. Further digitization occurred and continued in the 1970s with electronic stock markets (NASDAQ) and the introduction of global communication networks (SWIFT) (Forester, 1985; Scott and Zachariadis, 2012). The latest trend in digital transformation, finalization and initialization goes beyond digitization of accounts, stock markets, and communication. New innovations are fundamentally changing the industry in terms of the character and structure of business models (Currie and Lagorade-Segot, 2017). Today, technological innovations have become deeply embedded and integral to the transformation of the financial services industry and business model design (Kazan, Tan, Lim, Sørensen, and Damsgaard, 2018). A contemporary example, upon which we focus in this paper, is the introduction of modularized architecture design and technologies (APIs) related to open banking.

2.1 Open Banking

Open banking is part of financialization process in which change is driven through complementarities and cohesion among supportive regulations, market forces and technological change, whereby new practices and arrangements emerge (Scott and Bolotin, 2016). Existing practice that collectively make up the current status que of financial services are in a state of evolution as open banking practices drive widespread change and transformation of current practice (EBA, 2016). We find new entrants who are attacking the incumbents with new technology innovations and business models, while the financial industry incumbents try to fight of the attacks by investing more and more in their existing infrastructure (Hedman and Henningsson, 2015). For financialization, where intermediate markets are not well filled as is typical in early phases of sectoral development, there are opportunities for firms to find new niches to populate, such as pure on-line banks or mobile payments. As new products and services are devised by the newcomers and adopted by consumers and incumbents, they transform the competitive landscape and change established practices. They stimulate competition among the newcomers and change the strategic vision of entrepreneurs to focus more on planning for takeover (Hedman and Henningsson, 2015, Kazan et al., 2018). They also shift the competitive criteria prevalent among the incumbents (Clemons, Croson and Weber, 1996).

Technologically enabled financial innovations may traverse and bridge traditional firm boundaries and business models leading to new sources of value creation (Funk and Hirschman, 2014; Lagoarde-Segot, 2016, Currie and Lagorade-Segot, 2017). Literature on financialization shows how agents, such as financial regulators, may introduce new rules and practices fundamentally challenging established norms (Fligstein and Habinek, 2013). In this conceptualization, boundaries of practice become more fluid and changeable and technology plays a pivotal role in introducing new products and means of distribution,. These theoretical perspectives are especially useful when investigating a field where new entrants and

innovations, such as open banking, are challenging long established business models (Hedman and Kalling, 2003). For instance, open banking allows for the cohesion of products and services, which previously were separated, into new and unusual offerings (Norman and Ramirez, 1989).

2.1.1 APIs and Interoperability standards

Before the term API was coined, the underlying idea of separating interfaces between software systems has been a dominant and important aspect in software development (e.g., service-oriented architecture or SOA in short) (Waldo, 1998). APIs describe operational, inputs and outputs of software components. APIs allow programmers to understand how to use a piece of software without knowing the internal algorithms and by following rules stipulating appropriate inputs and outputs. Thus, multiple software components can be connected and amalgamated to create new functionality (Orenstein, 2000).

One of the first concrete mentions of APIs, though in the name RCP, was from 1998 when a news article detailed how Microsoft was working on a protocol that allows you to do what they call Remote Procedure Calls (Waldo, 1998). This would later turn into the Simple Object Access Protocol (SOAP) which is still used today. Fielding (2000) published a thesis describing the concept of representational state transfer (REST), which is the standard today for designing APIs: so-called RESTful APIs. Recently, a new movement towards Open APIs (APIs that are open to the public) have been picking up speed. The first publicly available API is regarded to be the one released by Salesforce.com on February 7th, 2000 which allowed access to the Salesforce.com application through an XML-based API. Later, Ebay released an API to partners and selected developers.

Open API is the technical realization of Open Banking (McKinsey, 2014). Open' does not mean that every third party can access a firm's system at their discretion. There will always be some form of control by the firm, in order to preserve security, privacy and contractual conditions (Kim, Hwang, Jae, Jun, and Kwon, 2016). Most digital market participants have used API technologies to meet their business objectives and ultimately create customer or platform value. They have discovered that using APIs in 'opening up' systems (to the outside world) is essential for driving traffic to software assets, for co-creating end customer value in the ecosystem and for sharing the burden and benefits (including the profits) between the parties involved when unlocking new markets. An important means of value co-creation through APIs is through enabling third parties to build applications 'on top' of the platform Examples include Facebook, Amazon, eBay, PayPal, Twitter, and Google. Developers can reuse existing functionality or use multiple data sources to enrich their own applications. This lowers cost and speeds up time-to-market, but also creates additional dependencies on third party developers. For API providers, this way of value co-creation provides a wider distribution network, creating traffic and minimizing innovation costs, which are carried by third parties.

APIs which support modularity and dissemination of financial services have gained much traction recently. This is evidenced by the number of open-APIs created in the financial sector: according to Programmable Web (a directory of APIs), the 10th most populated API category is "financial" and in 17th place we find "payments". Open-APIs facilitate the establishment and the enhancements of digital platforms that can be easily accessed and connected to (Tilson et al., 2010) and the platform-based business model (Benamati, Serva and Fuller, 2010). Since 2015, Open APIs and Open Banking have increasingly gained attention and have grown from being purely technical topics to being of business relevance for banking practitioners and academics (Kim et al., 2016; Tilson et al., 2010).

2.1.2 Regulation and Competition

Opening services and making them available to other market participants challenges the traditional boundaries of the firm and may underpin new value creation strategies primarily aimed at banking customers but also impacting other stakeholders, including investors and regulators. Indeed, regulators have become increasingly aware of the power of APIs (Lloyd, She, and Gulamhuseinwala, 2017). One example is the UK's Competition and Market's Authority (CMA) who have led the "Open Banking Initiative." Their investigation concluded, "older and larger banks do not have to compete hard enough for customers' business, and smaller and newer banks find it difficult to grow. This means that many people

are paying more than they should for their banking activities and are not benefiting from new services." (Open Banking, 2017).

As a consequence of these issues, the CMA has focused on driving competition between and across new entrants and incumbents through innovations focused on the quality of services and product received by consumers of banking services. By early 2018, the larger retail banks operating within the UK will be obligated to create standards for APIs (Zachariadis and Ozcan, 2016). These APIs will have both read and write capabilities and will enable transaction data from personal and business account to be made available to third parties. In addition to allowing third parties to access transactional data sets this will also allow third parties to initiate payments directly without the need for credit or debit cards. A further related benefit is to make financial organizations more transparent regarding their product offerings, as well as their customer satisfaction scores and other service level indicators (CMA, 2017).

Similarly, the European Unions' Payment Services Directive (PSD2) will require banks to offer third party providers and vendors access to their customers' accounts through openly available APIs if their customers so request (European Commission, 2015). The aim is to create further competition by allowing third-parties to deliver new innovative services by leveraging the banks' data and infrastructure. Outside of the EU similar efforts by regulators are being observed in the Asian-Pacific region (Lloyd et al., 2017). To summarize, today's fintech movement and provisions for access-to-accounts are partly being driven by regulators keen to accelerate the competition and digital disruption that is reshaping the financial services industry and also to further increase transparency and reduce information asymmetries.

3 Methodology

The study draws from collective interpretations of experiences across five cases studies (Credit Agricole, BBVA, Visa, Mastercard and SWIFT) of open API initiatives in the payments industry, to illustrate a rich tapestry of socio-technical issues being driven by shifts in the regulatory landscape (PSD2) and technological innovations (Patton, 1990). The dataset collated for this study includes twenty-five interviews and various forms of secondary data collected across the five cases. Interviews were conducted with users of the APIs as well as those developing and managing the various initiatives. Adoption of a typical case purposive sampling strategy required a search for information-rich cases which were illustrative of API Initiatives (Patton, 1990). As Symon and Cassell (2012, p.42) note: 'Typical case purposive samples are chosen to provide an illustrative profile that is considered representative, albeit not statistically.' Sampling criteria for selecting the cases focused on identifying replicable cases of Open API use in financial services (Yin, 1984; Stake, 2013). Thus, a multiple case (Yin, 2009) or collective case (Stake, 2013) method was adopted. Such an approach allows for inductive building of theory through the selection of cases which provide rich empirical descriptions of the phenomena under consideration (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). Indeed, each of the cases selected offered rich examples of how APIs were implicated in the distribution of new banking products and services. Case organizations were selected on the basis that they were using the APIs for retail banking payments, products and services and had extensive operations across Europe or USA.

The combination of comparable levels of industry focus and international operations was felt to ensure the necessary criteria to provide exemplary instances of API use. The data collected addressed similar topics so allowed for cross-case comparisons (Miles and Huberman, 1994). The number of cases of API initiatives (five organizations) was deemed an appropriate number (Eisenhardt. 1989). As Stake (2013, p. 22) observes: 'The benefits of a multi-case study will be limited if fewer than say, four cases are chosen, or more than ten.' Too few cases and the 'interactivity' between phenomenon and context would be lost, while too many cases, over ten, may create more 'uniqueness of interactivity' than may be manageable with the resources available.

A multi-case research design allows for both external and internal validity (Leonard-Barton, 1990). External validity was achieved by adopting a multiple or collective case study approach allowing 'literal replication' through 'typical case' sampling (Patton, 1990; Stake, 2013; Yin, 2009). This approach allowed for internal validity by allowing close inspection of the context and causes of changes in retail

banking through open API Initiatives. Internal validity was achieved by considering different empirical data sources. Scope, depth and consistency were enabled by discussing key concepts, constructs and terminology with each of the informants and triangulating the findings across primary and secondary data sources. For example, interviewee references to PSD2 were triangulated with the original regulations and industry commentary to ensure key points were fully understood and consistent across sources.

3.1 Data Analysis

Data analysis was conducted through long established interpretive techniques for analyzing data through the recursive identification of patterns, first through categorization and then abstraction (Miles and Huberman, 1994; Spiggle, 1994; Silverman, 2001; Gibbs, 2007; Guest and MacQueen, 2008; Saldana, 2009; Symon and Cassell, 2012). During the process of data analysis, primary and secondary data were closely reviewed to determine points of importance and interest. Common themes were identified and categories assigned. Thus, long interviews were simplified through the adoption of simple categories (Punch, 2005).

The analysis adopted a two-cycle approach to coding. The first cycle adopted a 'Descriptive Coding' approach for summarizing segments of data. This method is appropriate for inductive studies utilizing semi-structured protocols (Saldana, 2009). This approach requires the application of a content phrase to a segment of data representing a topic of inquiry and so related to approaches and design aspects of each of the five initiatives. For example, 'In-house distribution only' or 'Distributed by third party' or 'Re-packaging payment services'

The second cycle adopted a 'Pattern Coding' approach to identify major themes by searching for causes and explanations from the data. Such an approach builds on the first cycle of analysis and are, 'explanatory or inferential codes, ones that identify an emergent theme, configuration or explanation. They pull together a lot of material into more meaningful and parsimonious units of analysis' (Miles and Huberman, 1994, p.69). As a result, these codes were orientated towards roles, risks and challenges. Examples include, 'Producer' or 'Disintermediation Risk' or 'Enhanced Risk Mitigation.' By coding against major themes in the first cycle and then against more granular explanatory patterns in the second, we could draw out high-level challenges and risks. Consequently, the coding approach we adopted enabled us to address the research question.

Typically, interviewees were re-contacted during transcription and analysis in order to provide clarification on key issues. Scope, depth and consistency were achieved by discussing key concepts, constructs and terminology with each of the informants and triangulating the findings across primary and secondary data sources. For example, interviewee references to particular areas of regulation were triangulated with the original regulations and industry commentary to ensure key points were fully understood and consistent across sources.

4 Findings and Analysis: Four roles in the banking value chain

Based on our data analysis, we identified service creation and distribution as important yet discrete factors for understanding Open Banking and so these two concepts make up the dimensions of our taxonomy. It is also illustrated by Lars Sjögren, Global Head of Transaction Banking at Danske Bank, who summarized Open Banking as: "This is all part of the much bigger trend of Open Banking which goes further than the requirements set by lawmakers. In our view, Open Banking is about letting third parties build applications and services around the platforms of the financial institutions." Open Banking enables more actors, e.g., Fintech firms or internet giants, to develop re-usable and scalable banking services and thereby 'open up' systems for third parties to develop and distribute new services. Similarly, the distribution of services also 'opens up' third parties to new markets. The two dimensions leads us to identify four generic roles in the retail banking value chain as illustrated below: integrator, producer, distributor and platform. We found that most of the larger financial institutions already play roles 1, 2 and 3 (integrator, producer and distributor) simultaneously across different business lines, whereas role 4 (platform) is still at a very early stage of development. In the following sections, we will describe the four roles in the financial value chain.

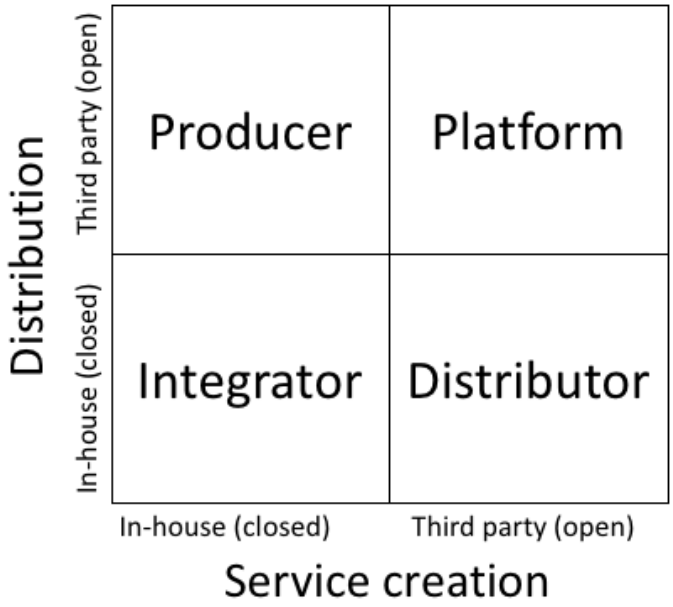

Figure 1. Taxonomy of roles in banking.

4.1 Role 1: Integrator

In this role, the offering to the customer is exclusively created and distributed in-house by a bank. The result is that distribution and offerings are provided under one brand and that the customer experience is fully controlled by the bank. In addition, the bank controls the underlying infrastructure. Currently, most banks play the role of integrator, as they control the whole value chain and have also done so in the digital space since the early days of the Internet. For instance, account information and payment services are distributed via the bank's online and mobile channels to the customer. The integrator role is the current prevailing norm in today's banking.

4.2 Role 2: Producer

In this producer role, the offering to the customer is created by a minimum of two parties. The bank creates the service, while a third party (e.g. fintechs or internet giants) distributes the service to the customer. When it comes to partnering in this way, customer ownership and branding could be challenging issues for the parties involved. This is particularly true for fintechs, which focus on the end-consumer (B2C). However, some fintechs can be regarded as innovative IT providers to the incumbents (B2B) and therefore customer ownership remains with the bank. In this case, banks are not part of the producer role but of the distributor role (see section 4.3).

The PSD2 'Access-to-Account' provisions underline the producer role as banks open up and move from the integrator to the producer role, in particular with regard to account information and payment initiation services. While most of the larger banks are working on a fintech collaboration strategy, some banks are less inclined to adopt a producer role. Extra revenues and innovation may seem attractive but may carry with them increased regulatory and compliance risks. In the B2B space, producer roles are already institutionalized for distribution purposes, in general through private APIs for functionalities such as data sharing and payment initiation (European Commission, 2015).

The producer role is being increasingly explored by banks nowadays, as is evident from the number of bank sponsored 'accelerators', 'incubators', 'developer portals' and 'hackathons' across the globe. A large part is still experimental, as 'opening up' involves many challenges, especially when the business needs to continue to function while undergoing change. "Running the business" involves legacy systems, mature compliance functions, bureaucratic silos in organizations, potential reputational risk and

often divergent internal positions regarding the appropriate strategic direction. All of these elements are bank-specific and do not yet apply to fintechs. Banks typically provide services, functionality and data either directly or through partners. Again, this institutionalizes the role of integrator and/ or producer. A bank is unlikely only to play the role of distributor (4.3) or platform (4.2), without being an integrator or producer at the same time.

4.3 Role 3: Distributor

Open Banking strategies can also be instrumental in leveraging a bank's Internet and mobile 'distribution channels', which have built up a digital customer reach over the past 15 years. As banks 'open up' they may extend their digital market presence by distributing third parties' services and thereby adopting the role of a distributor. In this role, a bank offers third party products through its own distribution channels. This is not a completely new concept as, for example, banks have been distributing funds of other institutions or payment services of card schemes. Challenges regarding customer ownership and branding are similar to the ones faced by 'Producers' (see 4.2). Today many fintechs typically act as distributors within the payments industry. For example, e-commerce payment service providers (PSP) repackage and distribute payment services created by banks and other payment service providers such as PayPal, ApplePay and Sofort. However, banks could also, according to the PSD2 provisions, extend their role as distributors to become third party providers themselves, perhaps through amalgamating account aggregation and payment initiation services, held at one or more depository organization.

4.4 Role 4: Platform

A platform facilitates the business of others by acting as an intermediary. This is often referred to as 'peer-to-peer' business. As a platform, banks could offer matching of parties, security, Know Your Customer (KYC)/ Anti Money Laundering (AML) and traffic. Note that the meaning of 'platform' is different from platforms in the IT world, where a platform refers to the IT infrastructure needed to run a bank in general. Banks as platforms are not common, although Germany's Fidor Bank is an example. A number of fintech market participants have adopted this model as a starting point in lending, crowdfunding and broker roles. The platform role is characterized through the bank acting as a facilitator for third parties and their customers. Peer-to-peer or platform business does not affect the balance sheet of a bank. Again, it should be noted that banks may allocate different roles to different lines of business and this includes the platform role.

In today's networked and digital era, the competitive landscape is increasingly defined by platforms, which have transformative potential in keeping with the motto "build a better platform, engage a community and you will have a crucial advantage". For the financial industry, the phenomenon of platforms still has to be further developed. For payments and personal information this is expected to gain traction through the PSD2 provisions, as third parties can engage in service provisioning without directly owning or maintaining banking assets, legacy or otherwise.

5 Discussion: Practical Challenges and Opportunities

The result shows that Open Banking and Open API is a multifaceted phenomenon and creates challenges and opportunities for the banking industry. This echoes Leyshon and Thrift (2007) claim that financialization will cover areas other than economic activities, such as technology, market, regulation, and social, cf. Lessig (1998; 1999. And the work by Zwan (2014, p 10) who views finacialization as a "web of interrelated processes – economic, political, social, technological, cultural, etc. – through which finance has extended its influence beyond the marketplace and into other realms of life". As demonstrated by the taxonomy, it will affect the distribution and creation of banking services and in the long run the structure of the industry. This will create both challenges and opportunities, which we address in the reminder of the section.

5.1 Practical Challenges

The roles for future banking entails some challenges that we will outline in the section. The first challenge that banks face is the risk of disintermediation by third parties. This will in particular affect the banks' ability to retain its customers, since 3rd parties have direct access to customers Zwan, 2014). Open Banking might become the new normal for certain groups of customers in the near future. Consequently, this might lead to accelerated disintermediation of the banks' role as the de facto financial services provider.

The second challenge banks face is the risk of losing its reputation and trusted brand. This is mainly related to security-related challenges of Open-API, such as potentially fraudulent third parties, digital intrusion, personification, illicit use of data and customer privacy concerns. Providing security of funds and personal data are the core pre-requisites for the financial industry by means of transactional and custodial services. Banks are trust providers and from a customer perspective trust is the common denominator and the basis of these services. The reputation of a bank depends on how trustworthy the customer perceives it. The implications of openness and the PSD2 Access- to-Account provisions will further increase customer awareness of data ownership and security. Banks therefore need to consider how to set up a governance model to ensure that participating third parties will not damage their reputation.

The third challenge relates to transformational challenges. Banks most have the resources, organizational and financial, to manage the technical side. Banks must provide the API functionality with its associated load of boundary resources to third parties while maintaining their current operational standards. The existing capabilities, such as fraud detection and KYC/AML as well as general security and transaction monitoring standards, will also need to be updated to address security concerns. The revenue-related facets of Open APIs pose a range of technical challenges to banks. These consequences could include deterioration of the customer base to the point that the bank may not be able to benefit from economies of scale anymore. As a result, banks whose business model relies on high-scalability will experience cost pressure due to decreased volumes. The technical challenges and the challenges arising from the transformation of the banks' value proposition can also be described as the organisational challenges that a bank faces on its way to becoming a digital services provider. Another challenge will be co-opetition and dispute resolution with third parties. At an industry level, the changes that come with Open APIs will also change the current business models.

5.2 Practical Opportunities

Challenges also means opportunities. The first opportunity is enhanced service innovation. 'Opening up' provides banks with the ability to enhance their current service offering in two distinct ways: The first is to extend current products and services beyond payment or account services, i.e. towards digital identity services. The second is to move into new space by taking advantage of sharing and aggregating client data from different accounts and enriching existing data with that of partner banks and/or fintech market participants. This can lead to enhancements in innovation by means of improved data analytics.

The second opportunity is broader and improved distribution of services. The uncertainties surrounding service provisioning currently prevent banks from distributing their product offering through the digital platforms of other banks or third parties. An Open Banking environment provides a standardised shared service provision model. This model can be used to distribute multiple products and services across multiple platforms and devices in tandem with other banks and/or fintech market participants. Within an Open Banking environment bundling can now be easily used as the vehicle with which products and services can be distributed to the customer. This enables the client to pick and choose a range of specific product offerings (possibly across different banks and fintech market participants) thereby increasing customer relevance through customisation.

The thierd opportunity is enhanced risk mitigation. A standardised approach to the distribution of products and services also allows for a standardised approach to security. In this way banks can enhance

their branding as a safe and trusted party while benefitting from improved reach. The improved information sharing between banks is also expected to improve decision-making and mitigation measures regarding fraud prevention, KYC and AML.

Summing up the challenges and opportunities. This paper contributes to the extant literature on financialization in several ways. First, by filling a gap in understanding effects of financialization that go beyond the area of economic behaviour, such as open banking and open-API (Krippner, 2005), and modes of management of banking firms (Fligstein and Shin, 2004; Lin and Tomaskovic-Devey 2013) by focusing on how open banking and open-API is influencing the transformation of the sector and, potentially, of technology in general, such as blockchain systems, automated auditing systems and compliance systems (Gozman and Currie, 2014).

6 Concluding Comments

Our findings show that Open Banking is transforming banking (Currie et al., 2017) as we know it (Gozman, Liebenau, and Mangan, 2018). and will create new roles and business models in the banking sector (Deloitte, 2017). This is a starting point in expanding the domains of financialization research (Leyshon and Thrift, 2007) beyond the economic actor (Epstein, 2005). In the paper, we focus on the idea of open baning, regulatory changes, such as PSD2, and technology innovations, such as Open-API. In the process, we identified four roles: integrator, producer, distributor and platform. The most important observations can be summarised as follows: (1). Open APIs could pave the way for Open Banking (EBA, 2016; Open Banking, 2017). The current fintech developments and in parallel the adoption of PSD2 have fuelled the discussions on openness in banking, i.e. the use of Open APIs to enable Open Banking business strategies (Kazan et al., 2018). During and following this study at least ten community initiatives on Open APIs and Open Banking have appeared, none of which are driven by banks. (2). Open Banking affects existing processes in products and distribution. Product and distribution strategies have always been at the core of what banks do. Open Banking with its digital technologies provides new possibilities and challenges in terms of scale and scope to products and distribution in the digital era. (3). Banks may have to make strategic choices in dealing with Open Banking. Banks are challenged to find and express their own unique selling proposition to co-create value in open business environments. Bank practitioners might need to review their strategies in terms of products and distribution as well as to explore new business models that move beyond current offerings. This suggest that research not only could but should address the offering, see e.g. Norman and Ramirez (1988). (4). Industry API standards could maximise the benefits and value of openness in banking if they move beyond being mere technical standards. Enhanced standards are required to create interoperability and enable cost-effective and easy integration. The level of acceptance in the industry of API standards is key to success and is determined by the scope of the user group (individual, community, industry, and universal) defining the standard, as well as the scope of standardisation (i.e. technical, functional, operational and legal). Financial services require security, privacy and compliance, therefore API standardisation will have to develop beyond technical and functional aspects by including legal and operational aspects, as well as governance. Last but not least, using standards could reduce the overall investment and risk per institution. (5). Open Banking with standardised APIs as the enabling technology is still in an infancy stage. Given all current developments, rapid and collective maturity can be expected. This could lay the foundation for an industry-wide dialogue, engaging bank and non-bank stakeholders. An essential period lies ahead of the payments industry in which new strategies will have to be forged, partially driven by regulation and partially driven by opportunities arising from changing customer demands.

Before concluding the paper, we address some of the limitations of the present study and outline some paths for future research. Open Banking and Open-API are clearly important for the banking sector but the implications for bank customers are so far un-known. This is one limitation of the study. Therefore, we suggest that future studies investigate the implications of Open Banking and Open-API on end customers, both private and corporate customers. The study provides knowledge about current Open Banking and Open API initiatives but lacks ability to generalize beyond the taxonomy. A further weakness is that area is still in its infancy. PSD2 does not require banks to make available APIs until early in 2018

and so it is too early to tell how the roles, risk and opportunities will play out. Thus, for future research, we encourage researchers to investigate the complex interplay between banks and fintechs, which we have made a first step towards analysing in this paper.

Appendix 1: Case studies of Payments Open API Initiatives

Organization	Operating model	Consumer relevance
Credit Agricole	**Name of initiative:** API CA Store	**Customers:** Improving engagement and customer relationships with clients. Applications include social applications and games as well as an application that supports sight-impaired clients.
	Chief objective: Enabling developers to develop applications 'on top of' the platform.	
	Offering: 14 APIs that provide API authentication, credit and location-based functionalities amongst others.	
	Launch date: September 2012	
	Supporting initiative: The CA App store. Cocreation with developers via branches. Ongoing workshops with developers and clients. Dedicated Software Development Kit (SDK) for application development.	
	Additional figures: Over 100,000 site visits per month for the first three months. 42 applications built upon APIs that provide authentication, credit and location-based functionalities.	
BBVA	**Name of initiative:** BBVA API_Market	**Customer:** Applications that enable intelligent consumer lifestyle choices such as timing of restaurant visits and recommendations and money transfer services **Corporate:** Applications for the assessment of new business ventures, sporting events and direct marketing in shopping malls
	Chief objective: Enabling developers to develop applications 'on top of' the platform.	
	Offering: APIs that enable authorised third parties access to money transfer and other services on behalf of the client, profile and account data and aggregated card profiles.	
	Supporting initiative: InnovaChallenge – a competition for application creation with the BBVA APIs. BBVA also created the Head of Open API role at the bank.	
	Additional figures: During the Innovachallenge in 2013 BBVA had 144 applications developed from 780 developers from 19 countries. The approximate development time is estimated at €2.9 million.	
Visa	**Name of initiative:** Visa Developer Customer	**Customer:** To provide customers with new commerce experience based on Visa technology. Example APIs include Visa Checkout.
	Chief objective: Enabling developers to develop applications 'on top of' the platform	
	Offering: The 40 APIs are classified in four categories namely Payment Methods, General Services, Risk and Fraud as well as Trial.	
	Launch date: February 2016	
	Supporting initiative: A trial with selected financial partners was held before the launch and there are dedicated Visa Developer engagement centres in San Francisco, Dubai, Singapore, Miami and São Paolo.	

	Additional figures: Visa had been in existence for close to 60 years before they made the decision to open their payments network.	**Corporate:** Providing support to their industry partners to deliver these customer experiences. Example APIs include the Funds Transfer Attributes Inquiry API. Visa's goal with the platform goes beyond it being a network access point but a global distribution platform for its products and services by using APIs to unbundle their services.
Mastercard	**Name of initiative:** Mastercard Developer Zone	**Customers:** To enable an improved retail customer experience and provide merchants with higher conversion rates through APIs such as the Masterpass In APP Purchasing API. **Corporate:** MasterCard's API such as the Masterpass In-APP Purchasing API provides e-commerce merchants with the ability to provide purchases within their applications and improve conversion.
	Chief objective: Enabling developers to develop applications 'on top of' the platform.	
	Offering: 21 APIs classified in three categories namely payment, data services and security. The APIs were developed for the acquirer, issuer, merchant and "other developer" user types.	
	Launch date: May 2010	
	Supporting initiative: In 2015 the Developer Zone was supported by Masters of Code, a serious of international hackathons that focused on connecting innovators with venture capitalists.	
	Additional figures: The Masters of Code hackathon prize is valued at US$ 100,000 and is held in ten cities worldwide.	
SWIFT	**Name of initiative:** SWIFT APIs	**Customers:** SWIFT's API provide a supporting function to the core messaging service to enable worldwide funds transfer. **Corporate:** SWIFT alliance members can develop custom code, retrieve financial data and access additional resources and services.
	Chief objective: Enabling developers to develop applications 'on top of' the platform	
	Offering: SWIFT Integration API (custom-code development) and SWIFTRef API (reference data look-up) and Alliance Access Developer Kit (access to resources and services for business add-on development).	
	Launch date: April 2014	
	Supporting initiative: 5-day course for development and testing teams.	
	Additional figures: SWIFT connects 11,000 banking and securities organisations in more than 200 countries and territories.	

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