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Industry Disruption in UK Banking: The Evolution of Regulation, Technology Adoption and Business Models

by

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Dissertation

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Declarations

I declare that this thesis is my own work. This thesis has not been submitted for a degree in any other university and not published in any scientific journal.

Abstract

In this dissertation, I analyze how an established, regulated, data-sensitive industry is disrupted following a regulatory change. The research context is UK banking industry during its transformation to an Open Banking environment via a regulatory change. I adopt an inductive qualitative approach in this dissertation, utilizing data collected via semi-structured interviews with key industry actors and supported by archival resources to delve deep into how competition and industry architecture evolved during this period. In the first part, I start by explaining how regulatory technical standards for data access and transactions affected the industry architecture by leading to disintegration and emergence of new players. This contributes to our understanding of the relationship between standards, interoperability and industry disintegration, by unravelling how mandated standards introduced by regulation and their implementation affect industry architecture. In the second part, I focus on platform formation efforts of incumbents as well as new players during this transformation period, highlighting the limitations of platform strategies and dynamics in highly regulated, data sensitive industries. This chapter provides a nuanced view of platform emergence and industry transformation with attention to organizational context, interorganizational conflicts, and the regulatory environment. Finally, in the third part, I explore the business model design and evolution processes of AI-driven new ventures before and after Open Banking regulations came into effect. This study contributes to our understanding of business model design and evolution, interdependencies across business model components, and strategic growth potential of different business models in the context of AI-driven new ventures in a data-sensitive and regulated market. Overall, this dissertation contributes to our understanding of how a technological change in a stagnant industry affect industry architecture, dynamics and competition between different industry players, and emergence and evolution of new business models.

Abbreviations

AIS:	Account Information Service
AISP:	Account Information Service Provider
API:	Application Programming Interface
ASPSP:	Account Servicing Payment Service Provider
CMA:	Competition and Markets Authority
CMA9:	The nine largest banks and building societies in Great Britain and Northern Ireland, based on the volume of personal and business current accounts.
FCA:	Financial Conduct Authority
GDPR:	General Data Protection Regulation
OBIE:	Open Banking Implementation Entity
PIS:	Payment Initiation Services
PISP:	Payment Initiation Service Provider
PSD2:	Revised Payment Services Directive
PSU:	Payment Services User
RTS:	Regulatory Technical Standards
TPP:	Third Party Provider
SCA:	Strong Customer Authentication

Chapter 1 – Introduction

“PSD2 and Open Banking are designed to create positive disruption so it is inevitable there will be tensions.”

UK Regulator

1.1. Thesis Outline

European Union’s revised Directive on Payment Services (PSD2), and Open Banking regulations that incorporated the nationalized version of PSD2 in the UK, was announced in 2015 and had an implementation deadline in 2018. These new regulations brought significant changes and novelties causing a paradigm shift in how banking industry worked and how the payment transactions were conducted. After the announcement of new regulations, Open Banking framework was expected to revolutionize the architecture of UK retail banking industry. This regulatory change was a unique phenomenon not only in terms of the creation of this shock (i.e., primarily by regulators and not market-driven forces) and the way in which the industry was transformed, but also because how the shock was not an unexpected one - as it was announced 3 years before it was fully in effect, allowing the industry players to prepare and develop strategies beforehand to embrace the change.

This study aims to understand the effects of such a discontinuous change and its implications for incumbent as well as entrepreneurial firms’ strategies. Thus, I study this change at multiple levels. First, I analyze how open standards introduced by a regulatory change led to industry disintegration by redefining industry players’ roles and relationships. The analysis here takes place at the industry level. Then, I delve deeper into the ‘platformification’ of the retail banking industry in the UK following the announcement of Open Banking regulations, by comparing incumbent banks’ and entrepreneurial firms’ efforts towards creating bank platforms. The analysis in this part of the study is at the firm and inter-firm level. I then focus on entrepreneurial strategies of AI-driven fintechs, and analyze how their business models were affected by the institutional and industry context. The analysis here is at the firm-level. Overall, in this dissertation, I ask the broader research question of *how a disruptive regulatory change affects the industry architecture as well as the business models of incumbents and start-ups in a traditional, regulated, data-sensitive industry.*

More specifically, this dissertation aims to respond the following research questions in the subsequent chapters:

1. *What are the intended and unintended consequences of a regulatory-led standardization process to boost innovation in an established industry?*

2. *What advantages and challenges new players versus incumbents face in creating / transitioning to a platform business model in a regulated, data sensitive industry?*

3. *How AI-driven new ventures with no initial access to data build a business model in a regulated, data-sensitive industry?*

To be able to answer these questions, I conducted interviews with fintechs, incumbent and challenger banks, industry experts such as analysts and consultants, and regulators. I have also attended industry events to conduct observations over the period between 2016 and 2021. Additionally, I have used archival data to create a full history of cases and triangulate interview data. The methodological approach and details of each of the three papers that constitutes this dissertation is explained within their respective chapters. This study has implications for practice and policy, since the changes Open Banking regulations brought has been among the hottest subjects in financial services industry in the UK as well as around the globe, with the expansion of such initiatives across different countries and jurisdictions.

1.2. Motivation and Theoretical Background

Pettigrew (1979) indicates that an industry is no different from any other dynamic social system with its past, present and future (Meyer, Brooks, and Goes, 1990). Therefore, an industry is like a living organism, and it is continuously changing. These changes are either incremental, which can be handled by firms with relative easiness, or sudden and unexpected. The latter, shock-like changes can have a significant impact on industries, transforming them completely.

Meyer et al. (1990) define industry-level discontinuous changes as revolution, which is a period of market reconstitution and transformation, or ‘quantum change’, ending a long period of stability. Astley (1985) contributes to the discussion by introducing a biological term to the literature, *quantum speciation*, in order to offer an explanation for the emergence mechanisms of new organizational forms during a period of revolutionary change (Meyer et al., 1990). This shows that where the institutional framework of an industry is significantly transformed, new forms of organizations emerge in order to meet the requirements of the revolutionized environment. This, in turn, causes significant shifts in the industry architecture.

Thus, the disruptive potential of an innovation in technology or business models would depend on whether it sustains traditional industry logics and performance attributes or not. If it improves performance of products and services in dimensions the majority of customers care about, it would lead to sustaining innovations and be more likely to benefit incumbents. Disruptive innovation, on the other hand, can start with a relatively lower performance in terms of traditional performance metrics but involve new attributes that are appealing to unserved customers, gradually climbing up to overturn and disrupt traditional players (Christensen *et al.*, 2018). A disruptive new entrant do not only disrupt its incumbent competitors but also create significant changes in the ecosystem, shifting relational interdependencies among different members (Ansari, Garud, and Kumaraswamy, 2016).

Due to these effects, disruptive innovations can be considered as "'double-edged swords' – innovations that are breakthroughs with the potential to spawn new markets also imply breaking apart existing ecosystem arrangements, and fueling adverse reactions from incumbents." (Ansari *et al.*, 2016; p. 1846). Therefore, new entrants with disruptive technologies or business models trigger resistance by incumbents, where new entrants need to manage relevant tensions continually by pivoting and adjusting their strategy and business models, and incumbents need to respond to the emerging threats (Ansari *et al.*, 2016).

However, there is a gap in our understanding of disruption in systemic industries (Christensen *et al.*, 2018). Therefore, more studies are needed to approach a disruptive change systematically and analyze its impact at firm, inter-firm and industry levels. In this study, I address this gap by analyzing "how previously distinctive industries dissolve into complex ecosystems" (Ansari *et al.*, 2016; p. 1850) in the context of UK retail banking after the introduction of open APIs to facilitate interoperability in the industry's Open Banking ecosystem. The introduction of Open Banking regulations in the UK was akin to a discontinuous change (Meyer *et al.*, 1990), as it had remarkable impacts at both firm level, inter-firm level and industry level. This setting is appropriate to study the dynamics of industry disruption, as disruption literature is a phenomenon-driven research stream.

Impact of Disruption at the Industry Level

A technological discontinuous change helps market positions to become more fluid, causing shifts in competitive positions of firms and their relative market shares. In the new industry structure, entirely new actors can overpower existing firms and take important roles, even though entrepreneurs entering an established market are likely to face a coalition of incumbents and regulators due to status quo (Aldrich and Baker, 2001; Porter, 1985). In fact, there is a strong and negative relationship between static market environments and innovation (Sine and David, 2003), mostly because of incumbent strategies dominating the market as well as the limited resources for new entrants coming to the market.

However, in the case of UK Open Banking, which was developed since the banks' innovative actions were deemed insufficient, was different from this generalization. The new regulations were challenging for the incumbents and threatened their positions in the industry by forcing them to allow 3rd parties to access customer data, providing entrepreneurs / new entrants (i.e., fintechs) with the customer access they lacked, helping them gain competitive power. Here, the regulators made a decision that might put the incumbents in a difficult position by forcing them to open up customer data, which was one aspect that the incumbents had the upper hand compared to new players. In other words, regulators took a step to increase innovation and competition in the market, favouring entrepreneurs/new entrants rather than incumbents, for the sake of protecting public interest (Gurses and Ozcan, 2015).

Following such a discontinuous change, the industry architecture defining how different industry players interact with each other and the way in which costs, benefits and risks are diversified was due to be reshaped (Ozcan and Santos, 2015). Since the products and the variety of firms in the industry were all affected and new businesses as well as new alliances among different actors emerged due to the changing division of work, the interactions and traffic within the industry were reorganised. Furthermore, these changes created an opportunity for big players from other sectors, such as Google or Amazon, to enter and grab a significant portion in the market during the redefinition of industry architecture, making the phenomenon an appropriate setting for this study.

Impact of Disruption at Firm and Inter-Firm Level

Porter (1985) indicates that innovative improvements in technology have impacts on strategies of firms in the market, transforming the competitive environment and redefining the market dynamics. Correspondingly, Open Banking regulations were expected to have similar implications for the players in UK banking. Thus, between the first announcement and the full implementation of Open Banking regulations, different firms functioning in the UK retail banking industry had to make important decisions.

After a discontinuous change, the industry environment is reshaped and has new competitive requirements that firms need to respond (Meyer et al., 1990). These requirements cause industry boundaries to be redefined, forcing organizations to undergo ‘metamorphic changes’ in order to conform to the new industry framework, which eventually lead to the emergence of new organizational forms (Meyer et al., 1990). This effectively means that the transformation at the industry-level spills over to the firm and inter-firm level, forcing firms to transform their organizational structures to survive and sustain their competitive position. Additionally, in such environments, the diversity of actors and selection of products tend to increase considerably, creating intense competition for existing firms.

Tushman and O'Reilly (1996) state that organizations should be ambidextrous, meaning that they should be able to manage both evolutionary and revolutionary change in order to remain successful for long periods of time. They address the organizations’ need for adapting to evolutionary changes while simultaneously being proactive to initiate innovative revolutionary changes. However, they underline that the majority of firms is not proactive in this sense as long as there is no decline in their market performance, because proactive change might be risky (Tushman & O'Reilly, 1996). However, in the setting of this research project, the regulators forced key industry players to comply with the regulations and publish open APIs that facilitate disruptive business models. Thus, the incumbent firms had to develop a strategy to respond.

Incumbent Response to Disruptive Change

Extant literature suggests that when faced with disruption, incumbents can adopt, ignore, attack or flee from the disruption (Constantinos *et al.*, 2003). When they attempt to adopt, the effectiveness of their response is highly dependent on whether the change is competency destroying or competency enhancing (Anderson and Tushman, 1990; Murmann and Frenken, 2006; Tushman and Anderson, 1986). For example, a radical, discontinuous, disruptive change would require significant transformation in employee skills or technological range of a firm (Eggers and Park, 2018). Furthermore, if these transformations are substitutive rather than additive, which requires firms to replace their existing knowledge and resources, it would be more difficult for incumbents to implement and adapt to the changes (Eggers and Park, 2018). This is because of their established organizational routines, which are built upon the firms' existing knowledge and experience (Benner and Tushman, 2002). While factors such as firm size, experience, and possession of/access to complementary assets increase the chance of survival for incumbents in case of a technological discontinuity; conflicts with cognitive frames, managerial logics and organizational identity/culture may prevent incumbent adaptation (Eggers and Park, 2018). For instance, Benner (2009) has found that in the photography industry, the existence of pre-set routines in the incumbent organization hindered their responsiveness to disruptive changes, but the negative effect was stronger for incumbents whose capabilities depended on the old technology (Benner, 2009).

Incumbent firms can respond successfully to a technological change by adaptation, if they possess the relevant knowledge regarding the new technology as well as the resources and capabilities to commercially benefit from the new technology (Eggers and Park, 2018). They can also obtain these resources by acquiring them or accessing them externally, i.e., via collaboration or open innovation (Eggers and Park, 2018) or by experimentation, acquisition or alliances (Cozzolino, Verona, and Rothaermel, 2018). Thus, in the face of a potential disruption, incumbents can either be an early mover in responding so that they can take and likely maintain the lead, especially when they adopt a more 'open' approach; or they can catch up later by making large acquisitions (Birkinshaw, Visnjic, and Best, 2018). Consequently, a firm's adaptation to a technological discontinuity is mainly a matter of "acquiring and organizing technological and complementary resources" (Eggers and Park, 2018; p. 360).

Furthermore, a firms' ability to adapt to a technological change will also be dependent on the nature of change as well (Eggers and Park, 2018). Therefore, when studying disruption, it is important to account for the characteristics of the technological change on hand to complement and generalize our knowledge in terms of incumbent strategies for adaptation. Before such disruptive technologies emerge, there usually are 'eras of ferment' (Anderson and Tushman, 1990). Such periods are characterized by high technological uncertainty (i.e., in terms of technology performance, duration of this period, and whether the new technology will be the dominant design or not), competing standards (across and within different technology generations), and trade-offs in resource allocation (Christensen and Bower, 1996; Eggers and Park, 2018). These uncertainties increase even more when the pace of substitution is slow (Adner and Kapoor, 2016). When the process of disruption is uncertain or very slow, the incumbent response strategies currently suggested by literature (such as creating a separate business unit to respond) might not be appropriate (Birkinshaw *et al.*, 2018).

Entrepreneur's Perspective and Business Models

The disruption process consists of two stages: first, the disruptive technology emerges; and second, it is followed by an influx of new entrants (typically, start-ups) with disruptive business models that force incumbents to respond (Ansari *et al.*, 2016). Disruptive business models can be defined as "business models that disrupt an established model or redefine what value creation and capture mean" (Cozzolino *et al.*, 2018; p. 1170).

The combination and interaction of technology and business models is an important competitive factor especially for new ventures in digital markets, as the same idea or technology that is introduced to the market with different business models would create different outcomes. In fact, a mediocre tech combined with a great business model is likely to yield better outcomes than a great tech combined with a mediocre business model (Chesbrough, 2010). This notion emphasizes the importance of creating a good combination of technology and business model for entrepreneurs to achieve optimal results. However, the interaction of technology, entrepreneurship and business models from a strategic management perspective remained an underexplored area of research (Nambisan, Wright, and Feldman, 2019). Furthermore, the majority of extant studies typically analyze disruptive entrants in a stable and stagnant industry context with low levels of innovation, where entry is not highly regulated and data is not sensitive. Thus, more research is needed to understand how disruptive business models are designed and leveraged in highly regulated industries.

Overall, new players entering with innovative business models and products need to manage competitive tensions with incumbents. They do so by dynamically adjusting their competitive / collaborative stance against incumbents and aiming to strike the right balance of co-opetition, so that they can increase the diffusion of their innovation in an established ecosystem (Ansari *et al.*, 2016). Disruptive start-ups can also adjust their strategies by selecting to accept and use the tensions to their advantage, by pivoting and dynamically switching across different tensions to manage, or by repositioning and framing their technology as a sustaining innovation (Ansari *et al.*, 2016). However, more research is needed to complement our knowledge on how disruptive new entrants 'pivot' and adjust their business models in order to survive and grow in established and regulated industries.

1.3. Overview of the Phenomenon of Interest: Open Banking Regulations in the UK

In recent years, the regulators in the UK and Europe have declared that there was a lack of competition within the retail banking sector, which had a negative impact on consumers, highlighting the oligopolistic nature of competition in the banking sectors (Molyneux et al., 1994). In the UK, acknowledging that retail banking customers were deterred from switching providers by the unnecessary obstacles put in their way, the British Government's Financial Conduct Authority (FCA) launched the Current Account Switching Service (CASS) in 2013. The aim was to make it easier and faster for customers to switch providers, including all direct debits and standing orders for consumers and SMEs. However, given the current structure of the industry, comparing relevant products and services remained challenging for customers. Thus, to introduce more pressure on "the older and larger banks which account for the majority of the retail banking market" to work harder for customers, another regulator, Competition and Markets Authority (CMA) set out to produce further regulation that would introduce more 'openness' in the sector and help "unbundle" or "separate" banking services.

Open Banking Regulation was published in 2015 as a framework for the introduction of open APIs in banking. It coincided with the 2015 Revised Payment Services

Directive (PSD2)[1] of the European Commission, which was set out with the same purpose as well as to improve European payment market's level of integration and efficiency. The directive, which was expected to transform the landscape of European payments industry, was required to be implemented throughout the EU member countries by January 2018. These regulations would bring more 'openness' in the sector, create a more level playing field and boost innovation.

To fulfill this goal, both regulations required banks to create standard *interfaces*[2] through which 3rd party providers (TPPs) who aimed to offer competing services could connect to customers' bank accounts to access their transaction data and initiate payments. This novelty had a disruptive potential that was likely to change the face of banking. These processes were also required to include journeys for customer consent and Strong Customer Authentication (SCA), constituted of a two-step authentication process, both of which needed to be renewed periodically. Correspondingly, banks were forced to open up their customers' account data to third parties as per the consent of their customers, allowing account information and payment services to be handled by TPPs, via standard open APIs in the UK.

An API is a tool that is developed and used by firms in order to share or exchange content internally and/or with external partners (Aitamurto and Lewis, 2013). In the case of Open Banking, the communication between a TPP and a bank would be provided by an API when customer requested a payment to be processed or their financial data to be shared with a chosen 3rd party. This change was expected to increase the competition by giving customers a new scale of alterative actors to choose from as well as innovation by enabling the creation and digital delivery of data-driven products and services. By increasing customer choice, the regulators aimed to promote better services and lower prices for customers.

Thus, these regulations recognized the consumers' right to allow access to and utilize their financial data (current account and payments data in UK's Open Banking; payments data in PSD2) to obtain better services. They could do so by using 3rd party service providers, which were called Account Information Service Providers (AISPs) and Payment Initiation Service Providers (PISPs). Thus, via standard APIs, the UK regulator enabled service provision by external TPPs that could both access and leverage data to provide account information services[3] (AIS) as well as payment initiation services[4] (PIS). These providers were regulated by the FCA, who started issuing AISP and PISP licenses to these 3rd party providers. AISPs could provide account information services by accessing accounts from different banks, aggregating customers' all financial data in a single place, which was expected to facilitate easier switching across providers by increasing transparency, allowing comparisons and providing data-driven insights. PISPs, on the other hand, would enable payments to be initiated directly from customers' bank accounts. This would create an alternative for credit cards and enable instant payments, benefitting both customers, by allowing a more frictionless experience and presenting a real-time financial picture, as well as merchants, by reducing their costs. Thus, service providers for a payment transaction and account information providers for customers were differentiated with Open Banking regulations[5], disrupting the existing industry patterns, networks and roles. Overall, these capabilities enabled by the API-driven interconnectivity were expected to facilitate new, disruptive business models and transform the industry architecture.

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[1] EU legislations need to be transposed into national law in each member country, so PSD2 constituted the legislative and regulatory foundation for UK's Open Banking.

[2] UK required these interfaces to be open Application Programming Interfaces, or APIs, whereas PSD2 only required having a dedicated interface, without specifying the technology to be used.

Additionally, the model brought by the use of open APIs would enable customers to get services from multiple service providers, so they would not be limited to a single bank to see and manage their finances. This, in turn, would allow customers to have more transparency around available products and services, enable them to obtain more personalized services by sharing their data, and benefit from the rise of new technologies and innovative services (i.e., by financial technology, or fintech, start-ups).

The majority of fintech start-ups that existed in the market with such business models were previously leveraging a technology called *screen scraping* to create value, which was one reason that regulators introduced open APIs. Screen scraping posed security risks, as it required customers to share bank credentials with their chosen 3rd parties –

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[3] Account Information Service (AIS) was simply defined as an online service providing a combined information regarding one or more accounts of the user.

[4] Payment Initiation Services (PIS) was defined as the services that initiate a payment at the request of the payments service user (PUS).

[5] For this purpose, the regulations introduced a new term to emphasise this distinction by referring providers that held customer payment accounts (such as banks) as the Account Servicing Payment Service Providers (ASPSP).

then, these 3rd parties could access customer data by pretending to be the customer and logging in to their bank account. Thus, regulators intended to give smaller firms such as fintechs secure access to key resources that were held by incumbent banks, to boost entrepreneurship and competition. Open APIs would enable that by increasing the security of transactions handled by these blooming businesses, so that customer take-up of such competitive, innovative solutions could be increased.

1.4. Research Approach and Contributions of Thesis

The environment that this study was conducted is a unique one. The setting was different in the sense that a regulatory change, of which general framework was known and enforcement date was announced years ago, created a discontinuous change in an established, regulated industry. Although industry players were aware of this revolutionary change, the details of the new regulation and how it would be implemented were initially not clear.

Literature either looks at evolutionary change, where firms need to be flexible for unknown incremental changes in the long term, or the effects of sudden external shocks. However, in this phenomenon-driven project, I analyze the industry dynamics and firm strategies in the context of a previously known revolutionary change, where the rules of the game as well as the players were expected to change significantly. Therefore, the distinctive nature of this setting has lent a fruitful context to investigate how incumbents and entrepreneurial firms prepared for, implemented and leveraged such regulatory shocks, and how industry landscape was reshaped in response to this change. The setting offered the possibility to start observing the changes within the industry before the Open Banking regulations came into full force and continue on the research as the implementation process unfolded. Therefore, it presented an opportunity to gain insights from relevant actors while they were preparing and determining how they would position themselves in the new regulatory environment, before the rules were explicitly set out by the regulator and the Open Banking regulations were fully implemented by industry players. This created a chance to observe in real-time how the industry prepared for this shock, how they developed and implemented their strategies, and what new business models emerged in the industry.

In this dissertation, I had the chance to examine this unique environment in real-time and analyze the phenomenon while it was unfolding, not afterwards. Since the research on this topic was limited and the discussion was generally led by industry reports at the start of the project, I adopted an inductive approach with a multi-level design, where I analyzed firm-level strategies in response to industry context and institutional constraints, along with the analysis of the industry-level transformation in the UK banking. Multiple cases were employed as a basis to build the theory inductively (Eisenhardt and Graebner, 2007), which were used to build a theoretical structure to explain the dynamics of the firm and inter-firm level transformations as well as the industry-level revolution.

I collected primary data through semi-structured, in-depth interviews. I also conducted observations at industry events and supported this data by using archival resources, in order to understand firm-level strategies, inter-firm relationships and industry-level interactions better. By this way, I triangulated the data to strengthen the robustness of the findings. Throughout this process, I conducted interviews with key informants from financial services providers such as incumbent banks, challenger banks, and fintechs as well as regulators and industry experts to better understand the dynamics at firm, inter-firm and industry levels. The theory was constructed by following iterations among data, proposed theory and existing literature.

In the remainder of this dissertation, I approach a disruptive change in the context of UK banking and tackle the process of disruption in two phases; the emergence and implementation of disruptive technologies and the emergence of disruptive business models (Cozzolino *et al.*, 2018), also with a focus on incumbent response. In Chapter 2, I discuss how a disruptive technology was introduced to an established and regulated industry via a regulatory change. I first discuss how regulatory technical standards for data access and transactions evolved during the standards implementation process. I then explore how this change in technology and regulatory standards led to the emergence of new industry roles and facilitated changes in industry architecture. This contributes to our understanding of the relationship between standards, interoperability and industry disintegration, by unravelling how mandated standards introduced by regulation and their implementation affect industry architecture. In addition, I discuss the disappearing industry boundaries via embedded finance applications as well as growing interest of non-financial corporations (such as Google, Apple or Amazon) in the banking industry.

In Chapter 3, I focus on new entrants entering with disruptive business models, how incumbents respond to the emerging threat by transforming their business models and incumbent-new entrant dynamics in this process. More specifically, I focus on platform formation efforts of incumbents as well as new players during this transformation period, highlighting the limitations of platform strategies and dynamics in highly regulated, data sensitive industries. This chapter provides a nuanced view of platform emergence and industry transformation with attention to organizational context, interorganizational conflicts, and the regulatory environment.

In Chapter 4, I examine how disruptive new entrants design their business model and how these business models evolve due to context-specific challenges and constraints. Here, I explore the business model design and evolution processes of AI-driven new ventures before and after Open Banking regulations came into effect. This study contributes to our understanding of business model design and evolution, interdependencies across business model components, and strategic growth potential of different business models in the context of AI-driven new ventures in a data-sensitive and regulated market.

Finally, Chapter 5 closes this dissertation with concluding remarks. Overall, this dissertation contributes to our understanding of how a technological change in a stagnant industry affects industry architecture, inter-firm dynamics and competition between different industry players, and emergence and evolution of new business models. I discuss and highlight several trade-offs faced by different types of firms, the birth of new organizational forms and metamorphic transformations of some existing actors in response to this disruptive change, as well as which new actors, industry roles and business models emerged / transformed as a result of this revolutionary change.

Chapter 2 – The Process of Standard Setting and Its Consequences for Industry Architecture: The Case of UK Open Banking

"Everybody's working very hard on it and it seems it's going to change the world, I think it's going to be the biggest change in banking and payments in our lifetime, I'm genuinely convinced of that. It's a jump from the Nokia to the smartphone, it's basically allowing third party creativity on a platform."

(Industry Expert)

2.1. Introduction

Standards can play a key role in supporting innovation and technology diffusion. Their role is becoming even more crucial considering the movement towards digitalization in many traditional industries and the consequent rise in platform-based businesses. Standards were studied by different management disciplines, focusing on the concept of standards (e.g., Farrell and Saloner, 1988), dominant designs (e.g., Tushman and Anderson, 1986), standards battles (e.g., Shapiro and Varian, 1999), competing systems (Katz and Shapiro, 1994), as well as the standards-enabled businesses (e.g., Rochet and Tirole, 2003) and ecosystems (Jacobides, Cennamo, and Gawer, 2018; e.g., Tiwana, Konsynski, and Bush, 2010). Additionally, different modes of standardization depending on the actors responsible for the development and diffusion of standards have been identified (Wiegmann, de Vries, and Blind, 2017).

However, the majority of extant studies assumes that standardization depends on a single mode (Leiponen, 2008; Schilling, 2002), so there are fewer studies exploring how multi-mode standardization unfolds in different contexts (Wiegmann *et al.*, 2017). Standardization process also has significant implications at the firm and industry level. Additionally, even though simplified communication across different industry players has been identified as a key factor affecting industry structure (e.g., Jacobides, 2005), more studies are needed to examine how standards and industry architecture co-evolve together, especially as "large technical systems made up of many interacting components are becoming more common every day" (Baldwin, 2018; p. 1). In such contexts, understanding the technical architectures as well as the industry architecture holds the key to both value creation and value capture (Baldwin, 2018).

Thus, in this chapter, I ask: *What are the intended and unintended consequences of a regulatory-led standardization process to boost innovation in an established industry?* To answer this question, I study how open API standards introduced by a regulatory change was implemented and how this process interrelated with the industry architecture in the UK retail banking. This chapter adopts an inductive qualitative approach to study this process of standardization and industry transformation. From an industry-level perspective, I study the adoption and implementation process of policy-driven technology standards and their co-evolution with the industry architecture.

First, the findings present a novel case of multi-mode standardization (Wiegmann *et al.*, 2017). In this case, the standardization process was initiated by regulators, who then set up a public-private entity to develop API standards collaboratively. Then, regulator led the diffusion of standards by mandating the largest incumbents to implement and publish standard open APIs. The expectation was that standard APIs implemented by the largest players with established customer bases would trigger network effects and motivate other industry players to implement the standards. However, the variances in implementation of mandated players led to incompatible, 'non-standard standards', which significantly slowed down the industry's standardization process. The issues experienced in this period forced an iterative process of regulatory adjustment in standards and their implementation.

Secondly, the interoperability enabled by standard interfaces initiated an industry change towards a more modular architecture and also led to the emergence of new players that were born to address the emerging bottlenecks in UK's Open Banking ecosystem. Overall, I observed patterns of disintegration in the UK retail banking following a regulatory-led standardization process and subsequent emergence of disruptive business models (Cozzolino *et al.*, 2018; Jacobides, 2005). A significant difference that enabled me to contribute to theory was that this disintegration process was triggered by the regulators introducing a specific data access technology and technology standards. Therefore, the approach of the regulator towards the standards implementation as well as the delays and challenges experienced by the industry players during this process played an important role in the disintegration process. As the transition to an Open Banking ecosystem created an architectural shift, I observed emergence of new business models by new entrants as well as incumbents. It contributed to the disappearance of industry boundaries and enabled a model where financial and non-financial organizations could build ‘embedded’ services.

2.2. Literature Review

Role of Standards in Facilitating Innovation, Technology Adoption and Jumpstarting or Catalyzing Industries

Standards play a key role in facilitating technological innovation by “defining and establishing common foundations upon which innovative technology may be developed; […] and allowing interoperability across products and systems” (Ho and O’Sullivan, 2017; p. 301). Thus, standards lead to innovation and consequent emergence of a dominant technology (Fichman and Kemerer, 1993; Wiegmann *et al.*, 2017), where the benefits of adopting a new technology or standard “usually depend on the size of the current and future network of other adopters” (Fichman and Kemerer, 1993; p. 9). Thus, expected installed base is a key determinant of adoption, pointing to the impact of network effects. In line with this, the literature has identified five characteristics of innovations that increase its rate of adoption, which are higher advantage, high compatibility, low complexity, trialability and observability (Fichman and Kemerer, 1993). These characteristics underline the critical role of having well-designed standards in catalyzing adoption of new technology and diffusion of innovation.

Diffusion of technology is connected to the acceptance and diffusion of relevant standards as well. Uncertainties and unevenness regarding the benefits of a new technology in the short term, an installed base using the old technology, associated transition/switching costs as well as adoption costs all affect how fast and widely the standards are adopted (Fichman and Kemerer, 1993). In this process, strong sponsorship subsidizing early adopters, committing to the new technology and positive expectations that the standard would become dominant can help new standards to overturn the old ones (Fichman and Kemerer, 1993). On the other hand, adoption of a better technology or standard can be blocked because of the risks around incompatibility during transition period, i.e., due to delays in standards adoption or being left out with a non-adopted standard in case it is not implemented by a critical mass (Farrell and Saloner, 1988; Fichman and Kemerer, 1993).

Extant research studied standard setting (e.g., Shapiro, 2001), standard battles (e.g., Shapiro and Varian, 1999), advantages and disadvantages of being an early mover vs. a late comer (e.g., Funk, 2003). For example, having a single standard significantly accelerates market development in comparison to having competing standards, due to network effects and economies of scale advantages (Shapiro and Varian, 1999). In this case, the presence of network effects gives the leading actor / first movers with the dominant standard an advantage. On the other hand, competing systems encourage continuous R&D and innovation by not locking-in a certain technology that might become inferior over time (Gruber and Verboven, 2001), typically leading to higher quality standards (Cabral and Kretschmer, 2006). Yet, having a set of competing technology standards impedes the fast adoption of a new technology, since it curbs the benefits that can be gained from network externalities (Gruber and Verboven, 2001). In this case, firms can use adapters or converters to translate the technology and ensure interoperability across different actors until a single standard becomes dominant (Shapiro and Varian, 1999; Shy and Shy, 2013).

Since compatibility is a key determinant of the rate of technology adoption (Adner and Kapoor, 2016), the timing of standardization and associated technical challenges also impact firms' adoption by affecting the provision of compatible services/components (Masucci, Brusoni, and Cennamo, 2020; Tassey, 2000). Thus, such challenges negatively affect the quality of offerings and continuity of value provision by 3rd parties whose business models rely on these standards. Consequently, lack of standards, poorly structured standards or delayed standards can result in economic inefficiencies and/or losses, negatively impacting industry structure (Tassey, 2000). Additionally, delays and technical problems in standardization can hinder innovation through "imposing constraints by increasing irreversibility and decreasing flexibility, locking in inferior standards or technologies (e.g., the QWERTY keyboard), and risking monopolies, especially in network industries where standards can become technological bottlenecks" (Ho and O'Sullivan, 2017; p. 301).

Therefore, standardization of interfaces typically requires a complex design process, and thus, should usually be managed as a system to realize the expected benefits (Tassey, 2000).

Technology standards are a key factor for not only innovation but also for industry evolution. Standards and successful standardization affect competitive structure of an industry, as standards can promote "technology-based, entrepreneurial economic development. Some of these policies allow firms to exploit OI and platform-based systems" (Nambisan, 2017; p. 365). Therefore, standards affect not only innovation and the diffusion of technology but also industry structure, leading to emergence of new business models and ecosystems as well as determining who would benefit from the technological change (Tassey, 2000).

Standardization in Digital Platforms and APIs

The impact of standardization in technologies and interfaces especially increased with the rise of digitalization in many industries. Digital economy is facilitated by standard interfaces and the subsequent interoperability, which lead to more modular industries and different digital business models (i.e., platforms). Here, 'modules' are defined as individual parts of a system that "can be designed and implemented independently as long as they obey the design rules" (Baldwin, Clark, and Clark, 2006; p. 1117), interacting via interfaces. Therefore, standard interfaces are crucial tools in complex systems (Narayanan and Chen, 2012) that enable individual modules (i.e., firms) to interact by "using stable, well-documented, and predefined standards (e.g., by use of application programming interfaces)" (Tiwana *et al.*, 2010; p. 679). Additionally, in contexts with the absence of a platform leader governing the ecosystem of different parties (i.e., platforms at supranational level), standards can act as a means to ensure compatibility and interoperability among different players (Botzem and Dobusch, 2012; Jacobides *et al.*, 2018; Miller and Toh, 2020).

Having such tools as APIs with established rules and protocols ensures standardization, compatibility and interoperability (Benzell *et al.*, 2019). Leiponen (2008; p. 1904) defines compatibility standards as "formal or informal agreements regarding how components within a technical system interact with one another". Consequently, "brands based on the same technical standards are compatible" (Shy and Shy, 2013; p. 303). Digital businesses such as platforms rely on these capabilities

/ infrastructures to create value and use digital technologies as well as infrastructural connectivity to establish connections, simplify transactions and benefit from (internal or external) digital resources (Gawer, 2020). This connectivity facilitates ‘permissionless innovation’, enabled by APIs published by firms aiming to encourage independent and permissionless experimentation of different actors. Via APIs, these firms increase the speed of innovation by allowing access to their core technology and infrastructure and benefit from external ideas (Chesbrough and Van Alstyne, 2015). Here, 3rd parties can then utilize the central firm’s or “the platform’s capabilities in developing and deploying applications that serve end-users’ needs” (Ghazawneh and Henfridsson, 2013; p. 177).

Since standards play a key part in facilitating communication and transactions in complex systems, the choices around standards (i.e., open vs proprietary) are among critical decisions that an ecosystem leader makes (Narayanan and Chen, 2012). Additionally, standards “lock markets into specific, often partially proprietary, technical solutions for extended periods of time” (Leiponen, 2008; p. 1904). Therefore, the owner of the winning technology or product can gain higher profits and long-term advantages by establishing the industry standard (Funk, 2003).

To avoid from this monopolistic control over technology, boost innovation, and increase the diffusion of standards, open standards can be leveraged, as they would enable more firms to adopt and leverage standard interfaces such as APIs at national and also potentially global level (Funk and Methe, 2001; p. 590). Thus, more 3rd parties can join the innovation ecosystem and develop complementary products using shared infrastructure and resources (Boudreau and Jeppesen, 2015; Chesbrough and Van Alstyne, 2015). Therefore, besides reducing transaction costs and increasing efficiency, APIs enable markets, and effectively transform the API-publishing firm to a market itself (Benzell *et al.*, 2019). This can translate into socio-economic benefits (i.e., lower prices) by increasing transparency and choice (Baldwin *et al.*, 2006; Chesbrough and Van Alstyne, 2015).

Determining the level of openness requires making key decisions regarding the control over strategic technical resources such as APIs (Ghazawneh and Henfridsson 2010), as firms can “offer network access to distributed data and services” via publishing APIs (Benzell *et al.*, 2019; p. 5). APIs can also be considered as boundary resources that determine the level of openness in “specific parts of the codebase or specific interfaces within the platform" (Karhu, Gustafsson, and Lyytinen, 2018; p. 488). Therefore, API design constitutes a strategic move that ensures 3rd parties can develop applications, enriching the platform ecosystem as well as balancing platform control and ecosystem diversity (Ghazawneh and Henfridsson, 2013). Ideally, these decisions should lead to design rules that are stable but also flexible, adaptable and not overly constraining to reap the benefits of API-driven interoperability (Baldwin and Woodard, 2009).

Therefore, how interfaces such as APIs are designed can be considered as a standardization process in itself (Tiwana *et al.*, 2010). Such interface standards can catalyze transformation of a complex system/industry constituted of several interacting parts, where "requirements are heterogeneous, future technological developments are uncertain, and/or the system must adapt to unanticipated environmental changes" (Baldwin and Woodard, 2009; p. 24). By this way, standard APIs can facilitate an established industry's transition to a modular, platform-based ecosystem by enabling easier communication and simplified coordination among different parties, making information "universally understandable and easily specified" (Jacobides, 2005). Thus, standards can be a key facilitator of industry disintegration, affecting the industry structure.

The Role of Regulation in Standardization

While industry architecture is affected by standards, standardization process is also affected by industry context and characteristics. Industry architectures define *"who can do what"* and *"who gets what"* in an industry (Tee and Gawer, 2009) and have a significant impact on standardization. Correspondingly, who initiates and manages the standardization process can change depending on industry context, i.e., whether it is a nascent or an established industry. For example, in mature and stagnant industries, governments can take a more active role and use standards as a means to create open rules that encourage competition and innovation (Blind, Petersen, and Riillo, 2017).

Although standards are mostly set by private actors (Blind and Mangelsdorf, 2016), three modes of standardization has been identified in literature based on the actor leading the standardization effort (Wiegmann *et al.*, 2017). First one is *committee-based standardization,* where standards are developed and diffused through *collaboration* of involved stakeholders. Here, the emergence of standards is facilitated by “voluntary open and transparent, consensus based standardization processes of interested parties organized by SDOs” (Blind and Mangelsdorf, 2016; p. 14). The second mode is *market-based standardization*, where standards can be developed by anyone and coordination of actors during the diffusion of standards is ensured via *competition* of different standards, emerging naturally following market processes (Blind and Mangelsdorf, 2016). Finally, another mode is *government-based standardization,* where standards can be developed by anyone and diffusion/coordination is ensured by government *hierarchy,* imposing / mandating use of standards (Wiegmann *et al.*, 2017).

There are also examples of *multi-mode standardization*, where different actors get involved at different stages of the standardization process (Wiegmann *et al.*, 2017), as having a hybrid approach would likely yield the best results (Farrell and Saloner, 1988). An example of this can be a combination of market-based and committee-based standardization, especially seen in complex and dynamic industries (Vercoulen and van Wegberg, 1998). In such cases, government can also get involved by either using their hierarchical power (i.e., to shape a committee-based standardization via obligatory mandates) or non-hierarchical power (i.e., by intervening in committees with an ‘entrepreneurial approach’, which requires early involvement and a proactive vision by governments) (Meyer, 2012). In other cases, governments can set goals and leave the development / diffusion of standards to committees (i.e., Standards Developing Organizations); this strategy is conceptualized as the European ‘New Approach’ to standardization (Borraz, 2007).

In industries characterized by network externalities, standards are an important source of power, as discussed before. In such contexts, firms that own the dominant standard gain an asymmetric level of control over the ecosystem, creating implications for competition. When a system’s innovative performance is contingent upon inter-firm interactions and associated institutions, policy action might be needed to address the difficulties in coordination across firms (Bleda and Del Río, 2013). Furthermore, standards have long-lasting impacts on the industry and industry players, which can motivate a policy intervention. By introducing common standards, policy-makers can reignite competition by allowing more players to access networks and reduce switching costs (Evans and Wurster, 1997). They also can prevent any specific firm to obtain and retain an “architectural advantage” through a proprietary dominant standard (Jacobides, Knudsen, and Augier, 2006), since a government-driven approach can "balance interests and ensure that competing perspectives are heard" (Blumenthal & Clark 1995, p. 435). Thus, if a dominant design by a single firm creates a monopoly and/or no industry standard emerges to simplify coordination, policy interventions might be required to facilitate a level playing field and faster economic growth (Tassey, 2000).

However, the topic of who initiates standardization and how standards get implemented and diffused received less attention in literature, especially in terms of which actors take what kinds of roles in different stages of standardization, and whether and how this process is dependent on industry context. More specifically, standardization process in established industries and its (intended and unintended) consequences are less studied. Extant studies analyze standardization in nascent markets (Bergek *et al.*, 2008; Tassey, 2000), but more research is needed to understand this process in established industries. Thus, we would benefit from further studies exploring the interaction of different actors during standardization and in different technological and institutional contexts (Wiegmann *et al.*, 2017).

In order to address this gap identified in literature at the intersection of different modes of standardization, API standards as well as industry context, this chapter asks*: what are the intended and unintended consequences of a regulatory-led standardization process to boost innovation in an established industry?* Considering two broad phases of standardization that are standards development (i.e., creation of technical solutions aimed to become standards) and standard diffusion (i.e., encouraging standards acceptance, adoption and implementation) (Wiegmann *et al.*, 2017), I study the standardization process initiated by introduction of Open Banking regulations (for standard APIs to share data and initiate payments) in UK banking, with a special focus on standards implementation process.

2.3. Methodology

Given the limited empirical work on this chapter's research question, I followed an inductive, grounded theory approach (Eisenhardt and Graebner, 2007) with a multi-level design, where I analysed the challenges arising from the Regulatory Technical Standards around Open Banking and their implementation at the firm-level as well as the associated implications at the inter-firm and industry-level. Following the set-up followed by Ozcan and Santos (2015) in their study of the emergence of the mobile payments market, I used the multi-level design to investigate the interaction between firm-level and industry-level (e.g., regulator) decisions and their consequences at multiple levels.

Data sources: The main data source was in-depth semi-structured interviews with incumbent and challenger banks, fintechs, regulators, and industry experts. I supported the interview data with archival resources (news articles, blog posts by key industry actors, business publications, press releases, industry reports, archival interviews with founders, executive, regulators, experts and so on) and observations at annual industry events (e.g., Innovate Finance Conference, SIBOS global banking event, SWIFT Business Forum, Westminster Business Forum, API Days, Fintech Connect). These events presented great opportunities to collect data at keynote and break-out sessions as well as reaching out to key informants to conduct interviews. Triangulation of data collected from multiple sources strengthen the robustness of the findings (Eisenhardt, 1989).

The data collection covered the period between 2016-2021, which was the regulation's implementation period[6]. This allowed me to follow the standards implementation period, trace the evolution of standards and observe the regulations' impact on industry architecture in real-time. This study started with a pilot stage in 2016, a process considered a crucial part of a good research design (Van Teijlingen & Hundley, 2001). In this period, I conducted interviews with three informants from incumbent banks, two informants from challenger banks, three informants from non-bank fintech start-ups and four industry experts/regulators. The pilot study enabled me to identify different key players in the UK retail banking industry were as well as how they approached the regulatory change simplifying inter-firm communication and coordination by introducing standard APIs.

After the pilot study, I refined the research question and adjusted the investigation methods to better address this phenomenon-driven real-life problem (Creswell & Poth, 2017; Kim, 2011). For instance, based on the findings from the pilot stage, I focused on the CMA9 (as these were the only group of banks required to comply with Open Banking regulation by January 2018) as well as AISPs (as some of them were already present in the market, leveraging the old technologies such as screen scraping for data access). The mandatory requirement for publishing APIs by January 2018 (the implementation deadline for open APIs) meant that CMA9 was under competitive threat, as they would have to share key resources (such as data) with more innovative firms that could provide better user experiences and competitive, more affordable services, which could 'steal' the banks' customers. The pilot period was also utilized for building connections with future interviewees.

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[6] PSD2, and thus UK's Open Banking, entered into force in January 2016, with an implementation deadline initially set for 13 January 2018.

Building on the learnings from the pilot study, I used a total of 114 interviews conducted with UK informants in 9 incumbent banks (covering all banks required to comply with open banking regulation by 2018), 5 challenger banks, 21 fintech firms (including technical service providers to banks and other fintechs), and finally, numerous industry experts / regulators. The interviews lasted 40-90 minutes and followed a semi-structured format. The interview questions were structured around the background of the interviewees and their role at the focal firm, what challenges they had regarding the details as well as the implementation of standard APIs, whether they were working with any banks/fintechs and if so, what their experiences and challenges were regarding these partnerships and finally, what their current / future plans as well as key decisions / challenges were regarding Open Banking. Given the focus on the regulatory change and its impacts on industry players, I spoke with several individuals in selected firms who were knowledgeable about the firm's approach to Open Banking and its impact on their value proposition/business model. I also spoke with regulators to understand their approach to Open Banking regulations and standards, what challenges they as well as the participating firms experienced during standards implementation, how they addressed these issues and how the industry evolved as a consequence of these processes. Finally, I spoke with industry experts to obtain a broader understanding of different perspectives coming from different actors as well as to get a clearer industry-level picture.

To address the possibility of informant bias, the interview data was collected in several waves over 5 years. This allowed both collecting real-time as well as retrospective data, creating an ideal combination by allowing better grounding via retrospective data as well as mitigating retrospective data bias by utilizing real-time data collection (Leonard-Barton, 1990). I also used several interview techniques to minimize potential bias. First, I used *courtroom questioning,* putting informants back in time, asking them to talk us through the events and create a chronological event flow (Eisenhardt, 1989). I employed an open-ended narrative, avoiding from questions that lead to inaccurate, vague, speculative or narrow answers. I also used *event tracking* and *nondirective questioning* techniques to support more accurate data collection and not to lead informants to specific constructs until the end of the interview (Huber, 1985; Huber & Power, 1985). Selected informants had a particular knowledge of Open Banking regulations and open APIs (i.e., from firms that have implemented or would implement Open Banking APIs), and I utilized industry experts as an independent source of data. I promised anonymity to all informants to encourage candor. Finally, I triangulated the interview data by utilizing multiple data sources, where all of these techniques helped me reduce bias and lead to more generalizable findings (Eisenhardt and Graebner, 2007).

Data analysis: The majority of the interviews were recorded and transcribed verbatim, most within 24 hours. In the few cases where recording was not permitted, interviewer(s) transcribed their notes within two hours after the interview in order to obtain a complete record. Here, I started by analyzing the qualitative data collected based on the terms and themes used by the informants in the interviews (Eisenhardt, 1989; Yin, 1994). In the first stage of data analysis, I constructed a detailed description of the standardization process, especially the standards implementation period. After identifying different challenges experienced by different players regarding the data access standards, I grouped the firms in two categories based on whether they were mandated to implement the regulation (CMA9) or not (smaller incumbent banks, challenger banks, 3rd parties such as fintechs).

I then analyzed the data collected from various informants in order to spot the common issues that these two groups experienced when implementing or adopting open APIs. For instance, regarding incumbent banks, I encountered recurring statements from informants about the firm's technical capabilities, unwillingness to publish open APIs and the low quality of the APIs they published, which, in iteration with extant literature on standards and standardization (Wiegmann *et al.*, 2017) helped the formation of constructs regarding the diffusion of standards under a regulatory framework. Additionally, the implications of the adoption and implementation of standard APIs at the industry level allowed me to examine how interface standards can have a significant impact on industry architecture (Jacobides, 2005). I used tables and other cell designs to compare several possible constructs at once during the theory development process (Miles & Huberman, 1994). Following this process of comparison and iteration with extant theory first for standards, then for government-led standardization, and finally for industry architecture, I arrived at a mid-range theory on policy-driven standards' role in facilitating industry disintegration in a regulated, data sensitive industry.

Research Setting: The UK's approach in designing and implementing the Open Banking regulations were different compared to the EU's approach to PSD2. The UK's CMA created an "Open Banking Implementation Entity (OBIE)" to deliver Open Banking, by designing the specification for APIs, supporting firms (i.e., 3rd parties, incumbent banks and building societies) to adopt and use the standards, create standards for security and messaging, manage the Open Banking Directory (which allowed regulated firms to enroll in Open Banking), create guidelines for firms participating in UK's Open Banking ecosystem, and detailing how disputes and complaints would be managed [7]. OBIE was funded by the 9 largest banks and building societies (also known as CMA9)[8] in the UK and governed by the CMA, which was also the first collaborative initiative set up for Open APIs' implementation across Europe. In line with this, I refer to the technology standards specified and enforced by OBIE as "Regulatory Technical Standards (RTS)" in this study. According to the regulations, initially, CMA9 was mandated to adopt and implement Open Banking standards and publish open APIs, through which licensed 3rd parties could connect up.

2.4. Findings

The open banking regulations, as described above, aimed to improve interoperability across different financial services firms via standard APIs and data formats, leading to industry's modularization and consequently, disintegration. After the announcement of new regulations, the changes were expected to revolutionize the retail banking industry and shift its architecture significantly, as explained below.

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[7] Source: https://www.openbanking.org.uk/about-us/

[8] CMA9 consisted of: AIB Group (trading as First Trust Bank in Northern Ireland), Bank of Ireland, Barclays Bank, HSBC Group, Lloyds Banking Group, Nationwide Building Society, Northern Bank Limited (trading as Danske Bank), The Royal Bank of Scotland Group, Santander UK.

> *"Banking, which has traditionally been a closed off and exclusively vertical industry, is undergoing a massive transformation and part of that involves opening up and granting external parties access to data, functionality and customers." (Industry Expert)*
>
> *"Thousands of fintechs are coming with the wildest ideas and new customer propositions, so when this really takes off, […] this is going to be a total revolution." (Industry Expert)*

However, the regulatory change did not lead to the expected and intended results immediately; because even with the presence of regulatory technical standards (RTS)[9] that would govern operations in an Open Banking environment, ensuring interoperability across different industry players was very challenging due to several reasons. This analysis of UK Open Banking showed that the success of Open Banking standards in ensuring compatibility and interoperability was not only dependent on having detailed standard specifications as part of the regulation, but also on the scope of data it could access as well as how industry players implemented those standards. During standards implementation, the characteristics of the industry players in this regulated, established industry created a set of challenges, causing delays on the industry-wide adoption and implementation of the standards. Below, I describe the specifications in RTS, the scope of data that could be accessed, how customer authentication processes evolved, the variances in the implementation of RTS, and how the regulation was recalibrated according to emerging problems. Then, I discuss the implications of these decisions for the industry architecture and emerging roles.

A. Regulatory Technical Standards

In introducing Open Banking standards, the regulator was very specific in terms of the technology to be used for data exchanges and the specification of standards. They specified which data could be accessed (current account and payments data), how it should be accessed (via standard open APIs), and how secure these processes should be (two-factor authentication). The steps of an Open Banking process can be seen in Figure 1.

In defining these steps, the regulator has been proactive and very much focused on data and data access technology. They kept the data scope limited at the beginning, specified the API standards so that it could become the dominant standard quickly but left customer authentication processes to the market so that they could find the best solution. So, the regulation initially had only technical specifications of APIs and a requirement for two-factor authentication to ensure enhanced security. However, the part they did not specify created an unexpected problem during the implementation period. Below, I discuss the key decisions regulators made when creating RTS and how the standards evolved in accordance with the emerging challenges.

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[9] Here, I use RTS to refer to the standards developed by OBIE in the UK for Open Banking regulations.

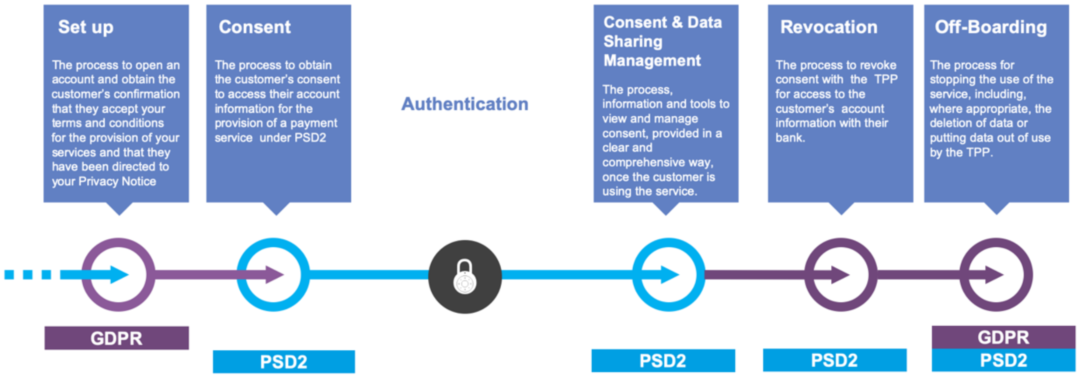
Set up
The process to open an account and obtain the customer's confirmation that they accept your terms and conditions for the provision of your services and that they have been directed to your Privacy Notice
Consent
The process to obtain the customer's consent to access their account information for the provision of a payment service under PSD2
Authentication
Consent & Data Sharing Management
The process, information and tools to view and manage consent, provided in a clear and comprehensive way, once the customer is using the service.
Revocation
The process to revoke consent with the TPP for access to the customer's account information with their bank.
Off-Boarding
The process for stopping the use of the service, including, where appropriate, the deletion of data or putting data out of use by the TPP.
GDPR
PSD2
PSD2
PSD2
GDPR
PSD2

Figure 1. Sample Open Banking journey in the UK[10]

a. Setting technology standards for data sharing. While UK was a leading player in the Open Banking space, other jurisdictions in the world including the EU also had Open Banking initiatives, called PSD2[11]. Different countries adopted different approaches in terms of how specific they would be in regulations in terms of the exact technology to be used and standards.

UK's Open Banking regulations also involved compliance requirements of PSD2 but went a step ahead – UK was more specific in Open Banking regulations, they required the use of APIs whose standards were specified in the regulations. On the one hand, UK's approach was advantageous in terms of pace of adoption, as it saved time that would be spent on a 'standards battle'. Even though it would eventually lead to the emergence of a dominant standard, the standardization process would take significantly longer. Additionally, it could give the owner of the dominant standard an asymmetric power and control over other industry participant, which would go against regulators' aim to level the playing field. An informant discussed:

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[10] Source: https://standards.openbanking.org.uk/wp-content/uploads/2019/12/customer-journey2-e1576153555226.png

[11] The Revised Payments Services Directive (PSD2) was the EU directive for accessing to payment account data, which was nationalized as and complemented by Open Banking framework in the UK.

> *"There is already quite a lot of divergence in what the standards can look like, what requirements are going to be there, what isn't within the scope, what is within the scope, what certain terms mean [...]. There is almost a bit of a too many cooks situation and my preference would be for someone that is not commercially incentivized to completely takeover that." (Fintech Founder & CEO)*

> *"The reason it looks different [in different countries] is because the 'why' is different. [...] There's a few things going on for the why. There's the consumer right, [...] the old data issue of being able to access it. [...] The additional competition [...], the innovation piece, [...] then you get to a different 'why' which is that we're trying to actually help a sector of the economy grow and become a great big British export. [...] Yet another argument is financial inclusion. [...] Sometimes it's about oligopolies." (UK Regulator)*

Thus, the UK regulators believed specifying the technology and technical details in RTS would increase both the pace of adoption and successful implementation across the industry, helping them address multiple social and economic issues at the same time, as explained below.

> *"The definition of a standard, addressed either by the regulator or the market, will have to be introduced, in order to not disperse unnecessary energy of the industry that attempt to reconcile the different interfaces implemented in autonomy by the different Institutes." (Industry Report)*

> *"[The British Government] realised that GDPR, which is weak because it is technology-agnostic; it is very theoretical over practical. PSD2 is very practical but it is actually technology-agnostic and also standards-agnostic. So we wanted to go beyond that." (UK Regulator)*

Contrarily, other approaches that left technical details to competitive actors and did not lock in a specific technology into law would ensure flexibility when there was a superior technology in the market. The informants discussed:

> *"I think [European Commission] very rightly made the choice to regulate it in a technology neutral fashion. So they didn't actually say APIs, they just said 'here's a dedicated interface.'" (Industry Expert)*

Thus, having specific technology standards as the UK did as part of the regulation bore the risk of becoming out of date quickly. Some actors discussed that once there was a new technology better than APIs, this technology-specific language in RTS regarding open APIs would limit new technology's adoption in the market, as detailed below.

> *“[Regulators] have a habit of going down into some technical detail and that always goes wrong, because a) they’re not the experts, they will listen to some lobbyist who has a technology and enshrine that in law. And even if they choose the right technology which often doesn’t happen, […] a year or two later a new technology will emerge which then nobody can use because it’s been built into the law.” (Industry Expert)*

However, the EU’s technology-neutral approach caused a variety of competing standards to emerge across the EU. Even though PSD2 aimed to establish interoperability as well, this variance in technologies and standards slowed down standards adoption as well as the evolution of a pan-European market, as explained below:

> *“This lack of a clearly defined single API standard threatens to obstruct the very core objective of Open Banking to create a unified, innovative, pan-European digital ecosystem for financial products. The PSD2 […] stop short of defining a single communal API, resulting in the creation of region- or country-specific API standard initiatives – like UK's OBWG, Berlin Group's ‘NextGenPSD2’ with participants across Europe such as France's STET, and other national versions being launched across the continent.” (Industry Expert)*
>
> *“When it comes to standardizing how banks share data, the UK’s framework leads the way.” (Industry Expert)*
>
> *“Europe is still all over the place.” (UK Regulator)*

Thus, I observed a variance between UK’s Open Banking framework and EU’s PSD2 in terms of technology standards, creating a technical inconsistency and incompatibility between the UK and broader EU jurisdictions. This was a key concern for fintechs that wanted to internationalize with an Open Banking-enabled business model, as explained below:

> *“So many of the fintechs want to internationalise - having some consistency approach, interoperable or technical standards, consistent liability models and regulatory frameworks are all things that they think are important to them.” (Fintech Association)*

Consequently, the UK emerged as the leading player in terms of Open Banking in the period after January 2018 (which was the original implementation deadline) until March 2021, despite the delays it experienced.

Overall, I found that regulators faced a trade-off in whether to specify the technical details of technology standards as a mandated requirement in the regulation or not. Although having specific technical standards for a new technology would level the playing field in favour of entrepreneurship, innovation and competition more quickly; the lack of regulators’ technical expertise could be a cause of dispute. In the absence of clear standards specifications by the regulators, on the other hand, emerging variances can lead to a lack of compatibility and interoperability, disincentivizing mass adoption of the standards. However, having specific technical standards as part of the regulation did not completely eliminate the variability in UK's open APIs, since implementation of the standards also affected their compatibility (discussed in more detail below, in subsection d).

b. Determining scope of data to be shared. The scope of data access facilitated by standard APIs also had a significant impact on how widely the standards were adopted, how they were implemented and how they reshaped the industry. The data coverage of UK Open Banking APIs was initially limited to current accounts and payment data. The reason for this decision of the regulator was to roll out the new standards in a smaller segment of the industry and manage the technological change more easily. In fact, they adopted a novel, experimental approach here so that they would be able to quickly launch the initiative and learn as they go, as explained below:

> *"We called the first version of the standard 'a minimum viable product', we said we're going to launch this and then build on it. And that really is something that regulators don't do very often, [...] because normally you go through the most tedious detail. [...] We got it out in eighteen months or something like that, which is unheard of. But it wasn't right and it was terrible, in fact, the first version; but six to eight months later it was good." (UK Regulator)*
>
> *"They wanted to go gradually with it and see what standards evolved, how people react, is it secure." (Industry Expert)*

However, many existing fintechs acting as AISPs relied on other types of data coming from other types of accounts (such as savings, mortgage, and investment accounts), as explained below:

> *"There is a big difference in scope [...] - people using our service also have their mortgages, loans, investments and those are all currently outside of the scope of PSD2, [..] if a consumer still wants to use services like ours, some of the data will be under the regulatory framework of the CMA open banking, some will be under the PSD2 and some will just be outside." (Fintech Executive)*
>
> *"Are they going to expand the scope? I suppose it's tricky, I suppose they are sticking the carrot; and our hope is that banks, even though they don't legally have to provide some of this other data for our API, that they would start doing that." (Fintech Executive)*

During the transition period, some fintechs tried to solve the limited data issues by using both the old and new technologies simultaneously – i.e., by using open APIs to access open banking data and the old technologies for the remaining accounts. By this way, they would use APIs and be ready for when the old technologies were outlawed for current and payments accounts but keep accessing other types of data as well. However, this led to friction in customer experience, as customers using such services had to access their current accounts via open APIs and other accounts via screen scraping/reverse engineering. Having two different data access interfaces with different characteristics and requirements created a duality in consumer journeys, leading to confusion, as explained below.

> *"[We waited for banks to implement the latest version of open APIs], as we didn't want the user to sign up and say 'Ok, I am using open banking for my credit card and I am using screen scraping for my current account'. It is just a complicated journey for them, so it is largely a function of trying to make user experience as seamless as we can." (Fintech CEO)*

Thus, to remain appealing to their customers, such fintechs opted for using the old technology as long as possible, so that they could ensure the broadest data coverage with a single user interface. The informants explained:

> *"In the current Open Banking environment, the lack of scalability and certainty of direction of travel means that there is no advantage in being an early adopter of PSD2." (Fintech Executive)*

Therefore, the more limited scope that standard APIs could access encouraged some fintechs to stick with the old technology, depending on their business models (specifically, their value proposition) and whether the standards enabled them to access all the data they needed. This delayed the adoption of open API standards by fintechs, despite the fact that the regulator announced that the old technologies (such as screen scraping and reverse engineering) would be outlawed after the successful implementation of RTS[12]. However, in the end, the implementation deadline was postponed multiple times as there were issues with industry-wide, efficient implementation of standards (explained in more detail in subsection d). Subsequently, choosing the appropriate technology at the right time under these uncertainties became a key consideration for fintechs during this technological transition period, as shown below.

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[12] In 2016, the regulator announced that the implementation deadline for open APIs would be January 2018, and then the old technology would be outlawed for current account and payments data. The implementation deadline for strong customer authentication, which was a key part of RTS, was extended until 14 March 2020. After this date, it would be illegal to use screen scraping for current account and payments data.

> *"Right now [in 2019], of course, account aggregation is mainly screen scraping and reverse engineering of mobile APIs because PSD2 is not really prevailing." (Fintech Executive)*

> *"The idea was that, when PSD2 fully kicked in, in the middle of September last year [in 2019], screen scraping would go. Unfortunately, the banks weren't prepared or the fintechs weren't prepared and so […], in terms of screen scraping for the banks, they got a 6 month extension to get things right. That should be over at the end of March [2020]." (UK Regulator)*

> *"These businesses [using screen scraping] will have to make an urgent transition to Open banking APIs if they are to avoid major service disruptions. Starting with December 2020, under PSD2 and the RTS, screen scraping […] will no longer be allowed." (Fintech Report)*

Consequently, the initial discrepancy between the standards' coverage and TPPs' requirements motivated fintechs to keep their existing data access technology, which was not compatible with open APIs. Even though fintech start-ups were the ones expected to benefit most from Open Banking and standardized interfaces, they were discouraged from adopting the standards because it damaged -not facilitated- their business model in terms of available data. Therefore, the types of data covered by the regulatory intervention was an important factor affecting the pace of standards adoption by non-mandated entrepreneurial ventures. I observed that while fintechs providing payments services would be willing to use standard APIs as they needed to mainly access payments data (covered under the RTS's scope), some firms needed other types of data as well. Since they were dependent on other types of data, they were inclined to keep the old data access technology to keep providing their services and simplify the user experience in customer facing channels.

c. Determining customer authentication standards before data exchange. Despite having specific technical standards for open banking APIs, the UK regulation did not initially standardize end-to-end open banking journeys, but they left some details for the market to figure out. An informant explained:

> *"Some of the ways [regulation was] worded and some of the regulatory technology standards just are.. they are too prescriptive in some of the areas, and not prescriptive enough in other areas. […] This is actually going to slow down innovation. And, yeah.. We still need to see." (Fintech Executive)*

Strong customer authentication (SCA) was one such processes, which was required by Open Banking regulations but did not have any technical specifications. Determining how SCA should work was initially left to market; but this led to a thornier and lengthier process for the creation and adoption of standards. The market-driven approach to SCA ended up unnecessarily complicating and delaying the process of standardization, as it had negative implications for user experience, as explained below:

> *"The bank would require you to go through a number of steps to authenticate yourself and authorise the sharing of data. This sometimes would entail clicking through 15 screens. [...] In other cases, you'd have to use a card reader to do it, [or] a call centre would have to get in touch with you and ask security questions, and in some cases you'd get to the end of the process and it'd say, 'Oh! This is a joint account! [...] we need consent from both parties.' There was good friction and bad friction, we thought this was bad friction." (UK Regulator)*
>
> *"If you want to do a payment, you do about 12 frames to do one payment. How is that a competitive user experience? So there are some significant challenges from a business perspective, operational perspective, technical perspective and from a customer experience perspective that need to be addressed." (Fintech Executive)*

Some incumbent banks even tried to block fintechs from accessing customer data by creating intentional frictions in customer journeys, benefitting from the initial lack of standards specifying how these end-to-end journeys would work. In the resulting implementation of SCA processes, the user experience was cumbersome, as explained below.

> *"Banks could have done it on day one, but they chose not to. So they were saying to me, 'Don't worry about this particular step, [...] just stick with the technical standards, we do customer experience, we're going to compete with each other to do it well'. It was disgusting what they produced. What should have been produced on two screens, [Incumbent Bank] required 16 and would require 12 minutes for customers to try and navigate their way through." (UK Regulator)*

Overall, the issues experienced in getting SCA process right delayed Open Banking implementation by at least 6 months, which also negatively affected the adoption and use of open APIs, because this was a key step to authorize and enable API-driven interactions. Below, I discuss how variances in implementation affected the standardization processes and how regulator addressed these issues.

d. Variances in implementation and recalibration of standards. According to one of the informants who was a representative of a fintech association, there were two requirements for the successful implementation of RTS. The first requirement was the alignment of the liability framework, and the second was the alignment of the technology. He argued that "*having some common design principles, patterns, trust frameworks enabling data sharing between an ecosystem of innovators*" would reduce risk and improve security. Despite the industry stagnancy and inertia, regulators acted fast, matching the pace of the fastest incumbents in implementation, rather than waiting for the slowest, as explained below:

> *"In this case, because the competence of the banks was so different, if we'd gone at the pace of the slowest [...] nothing would have happened. We actually set the deadlines to the pace of nearly the fastest [...] - when we had that first deadline, it was 13th of January 2018, only two banks managed it." (UK Regulator)*

Although Open Banking regulations mandated the 9 biggest banks in the UK to implement RTS, they were culturally and technically not ready to publish and manage high quality open APIs. Most of them were also not willing to do so, especially due to the misalignment of liabilities as well as lack of incentives for incumbents. From the incumbents' point of view, the regulatory change caused a shift in the industry, which was threatening to their dominant position, as it made room for competitive entrants with disruptive services and business models. Due to the requirement of 'opening up' via APIs, they were vocalizing concerns around possible security risks and liability issues as discussed below.

> *"The banks try and play but they keep getting stumped, which is that 'This is dangerous for customers and they're going to get defrauded, they're going to lose their identity.' [...] The other one that they try and push is that 'This is going to allow big tech in.'" (UK Regulator)*

> *"I am not sure if [regulators] have done enough on the education and actually, what's the regulation and how do you enforce that around data leakages and security. The risk is that when something goes wrong, [it] is the banks who share that data... they won't end up bearing the brunt of it. Even if it's not the financial brunt, the reputational damage." (Incumbent Bank Executive)*

Thus, during the early stages of Open Banking, some incumbents acted as slowly as possible instead of taking what they perceived as a significant risk, as explained below.

> *"Some banks are approaching this as a positive thing, some are trying to move as slowly as possible because they recognize the threat to their business model." (Fintech CEO)*

> *"I think [Incumbent Bank is] trying to make it hard for their consumers to connect up, I mean if I'm being honest, I think they are genuinely trying to make it difficult." (Fintech Executive)*

Furthermore, during this technological transition period, incumbents' interpretation and implementation of the RTS led to variances in API standards as well as resilience issues for the resulting technology. So, even though API standards were specified by regulation, getting implementation of standards right took some time, as discussed below.

> *"In the UK, one of the comments we hear regularly is that the participants wished the API standards were a little more specific in the UK. [Then] every bank would have been building the APIs the same." (Industry Expert)*
>
> *"[Open Banking opportunities] is being undermined by the current fragmentation of API standards." (Industry Expert)*

This variance in implementation led to the emergence of various, and in a sense competing, API standards within the UK. The informants explained:

> *"I think there's an assumption [...] that says, 'well there's standards [...] defined by the OBIE, all the banks meet the standards; therefore, connecting up should be really simple'. The reality is the standards aren't standard and everyone's interpretation [...] is slightly different - so connecting up to one bank does not give you connectivity to 7 or 8 or 9, [it] gives you connectivity to one bank, you then have to go and do it again." (Fintech Executive)*
>
> *"It would be nice to just say that all these APIs are standardized and it only takes a few days to connect them, and then you will know for sure that it will work - but we're not there yet." (Fintech Executive)*

Thus, I observed that mandated standards were not sufficient by themselves in ensuring compatibility and for successful implementation of standards. As some incumbent banks were mainly motivated to protect their existing model rather than adapting to the new environment, they opted for 'doing the bare minimum for compliance's sake' during this period, as explained below.

> *"Banks are required to make huge investments in exposing public APIs that are created according to standards. The APIs offer virtually zero return or opportunity for revenue, which breeds the perception that only compliance is required." (Industry Expert)*
>
> *"If the banks were allowed to do what they wanted to do, they would've done the absolute minimum. [...] First thing is that the banks hope for status quo. [...] If they have to move, then their version of open banking [is] what I call closed open banking, [...] where the bank determines who, as in which fintechs come in, what they can charge, what they can do, how they react, how they price for them, what they can do for their customers..." (UK Regulator)*

Furthermore, even when incumbents published open APIs, their performance was not sufficient for reliable provision of TPP services. In fact, even after the majority of incumbents implemented the standards and published open APIs, resilience and efficiency problems damaged the use of open APIs by fintechs as it created obstacles to their value proposition, as explained below.

> *"It's been an ongoing learning curve to help them make their APIs work. Ongoing, not just day 1. Even now, I won't embarrass the bank, but they're changing their API regularly [and] don't tell the community [...] Then you get the data in different fields, and you've got to remap what you're doing, and you've been given no notice. So your*

> *API fails because they forgot to tell you. That's the world we live in today. We have to react to this all the time." (Fintech Executive)*
>
> *"When we are integrating to multiple APIs, hopefully they will all go well, but if [Incumbent Bank] have a problem with their APIs it is going to make us look bad." (Fintech Executive)*

Thus, the issues caused by incumbents' clunky implementation, leading to non-standard and low-performing APIs, delayed the industry-wide transformation, as it was a prerequisite for moving to an Open Banking environment. The informants explained:

> *"The bank APIs has been the biggest problem. [...] Their APIs aren't very good, and just not reliable enough; they're down, data gets transposed, performance is not there. We get error rates of about 10 to 15% even today [in September 2019]. So we have to keep re-hitting calls. [...] We had one consumer try 17 times before it worked, which is a record admittedly. [...] Now we are re-iterating to make it work for them. It might seem a simple thing, but we built a lot of stitching into the technology stack [...] to make it work for different use cases we've got. And we shouldn't have to do that, the API should work, but they don't. There's no point in pretending they're going to." (Fintech Executive)*
>
> *"The quality of API varies a lot in UK. Imagine how it is for the Europe, in general where you have so many standards." (Industry Expert)*

These issues created questions around how successful Open Banking regulations would be, affecting motivations of other parties without compliance obligations to adopt the same standards. An informant explained:

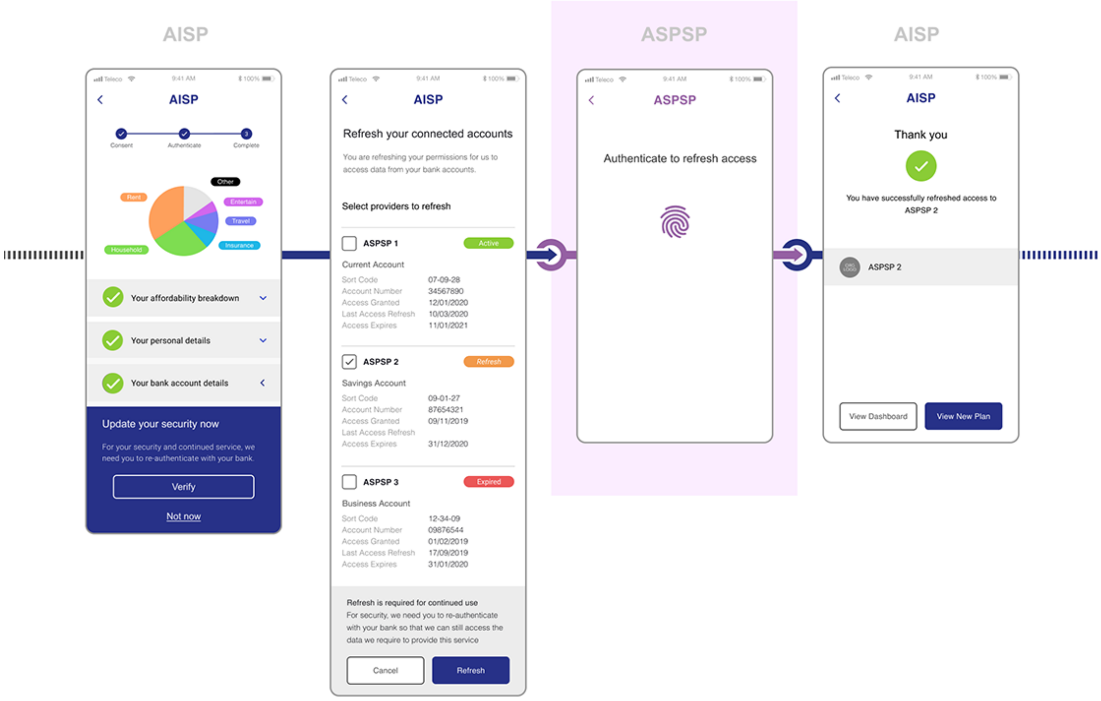
> *"We had to have adoption by banks - well, you've got the Big 9, they all know that they need to do it, so we reasoned that, 'Well, the other, smaller banks would adopt the same standards, why wouldn't they?' [...] They're free, unlicensed, and it would just make their lives a bit simpler. Up until about August 2019, they hadn't." (UK Regulator)*

Similarly, non-resilient APIs also derailed fintechs' adoption and utilization of these standards. The informants explained:

> *"There is a big if on how good the APIs are and how well they work." (Fintech Executive)*
>
> *"I think the education and the adoption is a huge question. [...] I think there is a bit of an assumption at the moment that as soon as this stuff becomes available, everyone will just get it and use it and it will be fine. And I think that is not the case." (Fintech CEO)*
>
> *"Fintech start-ups are still building their solutions in ways that rarely even use the APIs because it is still too hard." (Industry Expert)*

Additionally, the issues experienced regarding the SCA processes also complicated this process even further. Consequently, the regulator had to step in and update RTS by including technical specifications for SCA processes, now covering end-to-end open banking journeys in RTS (please see Figure 2 for an example). They did so by incorporating some other available technologies enabled by the use of mobile devices (i.e., biometrics for authentication) to minimize friction, which was not something the market did on its own, as explained below.

> *"Getting the authentication journey right […] took 6 months longer, probably, than we thought it was going to. And it took that time because we left it in the competitive space rather than specifying it ourselves. […] We've been converting people across from screen scraping to open banking, and they've found it hard to do that when the customer journey is somehow worse with open banking than it was with screen scraping. But with app-to-app, it's gotten a lot easier…"* (UK Regulator)


AISP
AISP
Consent
Authenticate
Complete
Rent
Other
Entertain
Travel
Household
Insurance
Your affordability breakdown
Your personal details
Your bank account details
Verify
Not now
AISP
Active
Refresh
Expired
Cancel
Refresh
ASPSP
ASPSP
AISP
AISP
ASPSP 2
View Dashboard
View New Plan

Update your security now

For your security and continued service, we need you to re-authenticate with your bank.

Refresh your connected accounts

You are refreshing your permissions for us to access data from your bank accounts.

Select providers to refresh

☐ ASPSP 1

Current Account

Sort Code	07-09-28
Account Number	34567890
Access Granted	12/01/2020
Last Access Refresh	10/03/2020
Access Expires	11/01/2021

☑ ASPSP 2

Savings Account

Sort Code	09-01-27
Account Number	87654321
Access Granted	09/11/2019
Last Access Refresh	
Access Expires	31/12/2020

☐ ASPSP 3

Business Account

Sort Code	12-34-09
Account Number	09876544
Access Granted	01/02/2019
Last Access Refresh	17/09/2019
Access Expires	31/01/2020

Refresh is required for continued use

For security, we need you to re-authenticate with your bank so that we can still access the data we require to provide this service

Authenticate to refresh access

Thank you

You have successfully refreshed access to ASPSP 2

Figure 2. An example of the updated Open Banking journey[13]

However, how these specifications for SCA standards were interpreted and implemented also created similar challenges experienced in API implementation. In this case, implementation by incumbents restricted TPPs' ability to access out of scope data via the old technology, even when regulation still permitted its usage, since this technology was not compatible with the SCA standards, as explained below.

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[13] Source: https://www.openbanking.org.uk/wp-content/uploads/04-Happy-path-to-re-authentication_resized.png

> *"Most ASPSPs are implementing SCA at the front gate of their PSU [Payments Service User] interfaces, therefore applying it to both payment and non-payment financial data. [...] All the myriad non-payments data held by ASPSPs is being restricted by technology, whereas it is not restricted by regulation." (Fintech Association)*

To address this issue, UK's FCA proposed a change in the implementation guideline in 2021, so that implementation of SCA standards would not restrict TPPs' access to the data outside the scope of RTS. However, in the meantime, these variances and uncertainties in SCA implementation caused significant problems for fintechs and affected the customer take-up of their services, as explained below.

> *"Because of the problems we had with the authentication journey, take-up by customers has been pretty slow. The [deadline for read-write APIs] was 13 Jan 2018 - only 2 of the banks delivered on that date. [...] Second, there was a lack of resilience and robustness in the actual performance of the APIs with the open banking platforms. So issues to do with outages, response times [and so on]." (UK Regulator)*

Consequently, incumbents' standards implementation created significant questions and uncertainties around whether the regulatory change would be successful and the standards would achieve interoperability as intended. Therefore, due to such frictions introduced (knowingly or unknowingly) by incumbents and the subsequent bottlenecks, the regulator had to have a hands-on approach, stepping in as needed and broaden the scope of RTS to remedy emerging variance in standards and remove unnecessary frictions. An informant explained:

> *"When I saw what they had created, it was embarrassing, I couldn't endure it. They had done it to frustrate the whole thing. [...] We then realised we needed UX standards [and also] performance standards. And all those things together become the standards. [...] The banks should have finished completing all the implementation to be fully PSD2 ready by September 2019." (UK Regulator)*

Due to the challenges arising from suboptimal implementation of API standards as well as cumbersome user experiences in SCA by mandated incumbents, regulators later had to step in and expand the coverage of regulations. They published new standards and guidelines as part of the regulation, supporting better implementation by incumbents and maintaining high-performing technology standards. They did do by including exact specifications for technologies and mechanisms to be used for security/authentication, specifying end-to-end open banking customer journeys, and adding operational guidelines to support efficient and frictionless processes. The latest version of Open Banking regulations (as of early 2021) covered four main areas of standardization: API specifications, security profiles, customer experience and operational guidelines[14].

Overall, I observed that the adoption and implementation of Open Banking standards was not only affected by technical specifications and performance of APIs, but it had to be evaluated and specified as an end-to-end journey. Although emerging issues were addressed gradually by the regulator along the way, the issues led to delays and the implementation period got longer and longer. Consequently, wide adoption of the RTS could not be ensured as quickly as intended. These issues caused new bottlenecks to emerge, creating an obstacle to the overall industry transformation and causing industry roles to be redistributed in an unintended and unexpected way.

B. Consequences of Open Banking Regulations for Industry Architecture

> *"You don't get many times in your work career to be in something so transforming as this could be, if it takes off." (Fintech Executive)*

After Open Banking regulations were announced in 2015, the implementation deadline was set to January 2018, but it was postponed multiple times due to technological unreadiness of incumbents and issues with standards implementation (see Figure 3). Although industry-wide adoption, implementation and high performance of standards could not be ensured in this period, there was still a large number of entrepreneurial firms that entered the market to benefit from the shifting industry landscape. Despite multiple extensions delaying full implementation of RTS and obfuscating how the new architecture would exactly be established; in the meantime, some players managed to benefit from the opportunities and bottlenecks that emerged during industry's evolution into an API-driven industry. Below, I analyze in more detail some of the new roles emerged during this period and how the promise of standard interfaces accelerated the platformification and disintegration of banking industry.

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[14] Source: https://standards.openbanking.org.uk

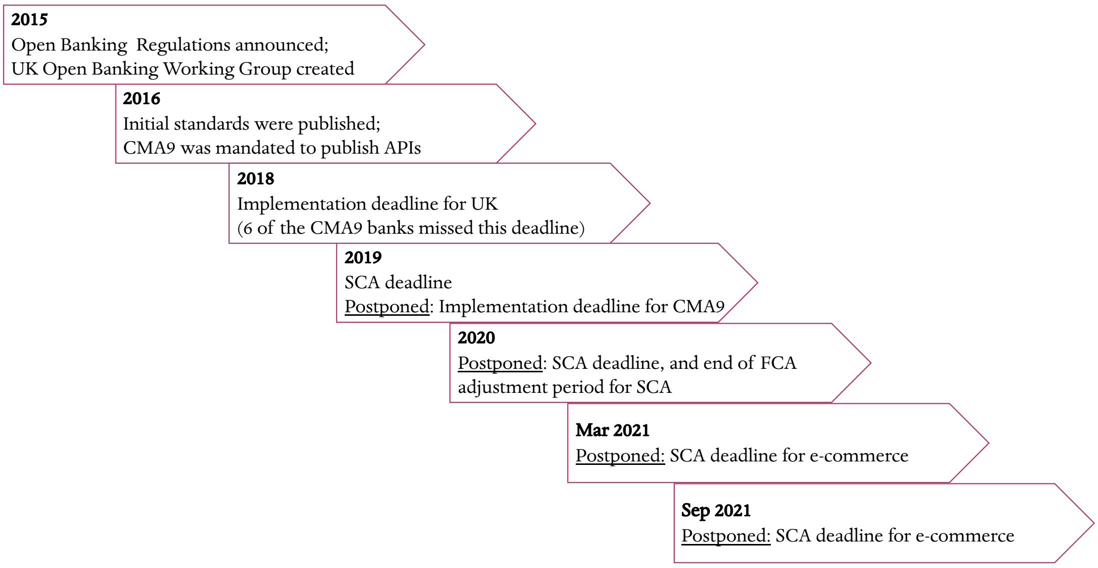

2015
Open Banking Regulations announced;
UK Open Banking Working Group created
2016
Initial standards were published;
CMA9 was mandated to publish APIs
2018
Implementation deadline for UK
(6 of the CMA9 banks missed this deadline)
2019
SCA deadline
Postponed: Implementation deadline for CMA9
2020
Postponed: SCA deadline, and end of FCA adjustment period for SCA
Mar 2021
Postponed: SCA deadline for e-commerce
Sep 2021
Postponed: SCA deadline for e-commerce

Figure 3. A brief timeline of UK Open Banking

a. New players unbundling incumbents. Given the siloed nature of incumbent banks' infrastructures and compartmentalization of their different departments (i.e., based on different products), they were already ripe for vertical disintermediation but still lagging behind, as explained below.

> *"[In 2012] in the Financial Times, they headlined an article talking about how banking is heading for its Spotify moment – and [...] the Spotify moment is inherently different because it refers to the platformication of an industry. We've seen this across different industries already happen, some traditional B2B industries are lagging behind and retail banking, despite being a consumer-facing industry, had not been embracing that opportunity." (Fintech Executive)*

Combined with banks' already unbundled internal operations and products, open APIs were expected to be a trigger for industry modularization and the emergence of bank platforms. Thus, an increasing number of fintechs with innovative services and business models that aimed to leverage open banking entered the market (see Figure 4). For example, there were 219 TPPs and 105 live Open Banking propositions in January 2021, up from 36 licensed TPPs in July 2018, 6 months after Open Banking regulations went live in the UK. An informant discussed:

> *"There is a move towards, hopefully, banks viewing API as another channel. And if you get people building cool apps and services using your API, actually that's good for you. That's a platform model, Facebook made a hell of a lot of money of Zynga, so hopefully banks start realizing that." (Fintech Executive)*

> *"This led to greater investments within the fintech ecosystem, as many entrepreneurs and investors grabbed the opportunity to revolutionise banking with the support of*

> *the current incumbent infrastructure, which could finally be accessed and leveraged by start-ups." (Industry Expert)*

Despite the challenges and delays in standards implementation, I observed these new players started to change the distribution of industry roles, as explained below:

> *"When we think about the spirit of open banking, we need platform building, development of platforms and services, where shared infrastructure makes sense, where scale is required to really deliver the value that consumers are asking for. […] This is a cultural transition." (Fintech Executive)*

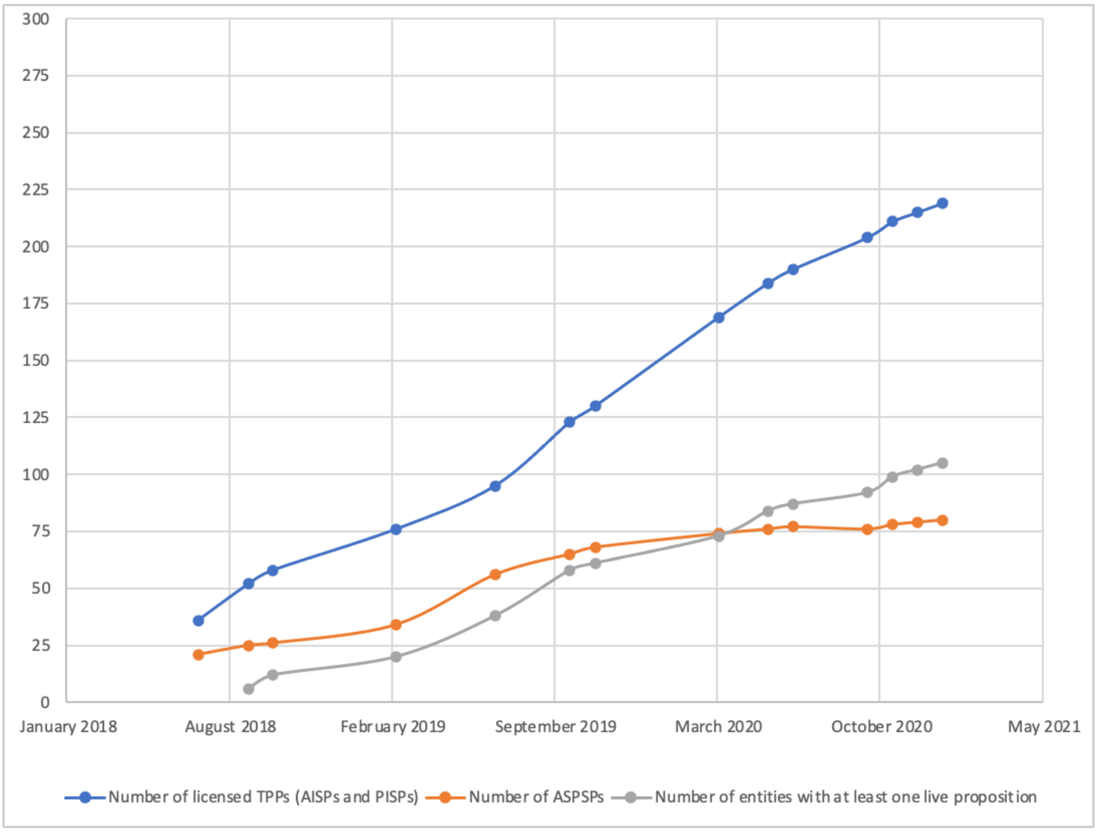


Figure 4. Total number of TPPs, ASPSPs, and number of entities with at least one live proposition after Open Banking regulations

These new entrants included fintechs focusing on providing different financial services as well as challenger banks (or neobanks) that acted as a central hub of 3rd party services (see Table 1). This caused a shift in industry logics and architecture, where the manufacturing and distribution of financial services were increasingly considered as decoupled activities, as discussed below.

> *"You look at [challenger banks] and they are also building around an ecosystem, they are not going to provide every single financial product. They are going to partner with other best of breed providers." (Fintech Executive)*

Table 1. Different 3rd party propositions developed using Open Banking

Business Model	**Types of Fintechs**	**Licensed Parties**
B2C (Total number of live apps in March 2021: 49)	Bank account aggregators	21
	Charitable giving	6
	Credit file enhancement	7
	Debt advice	5
	Financial safeguarding	7
	Foreign exchange	3
	Investment tools	5
	Loans/Automatic overdraft borrowing	4
	Micro savings/Account sweeping	7
	Mortgages	2
	Personal finance tools	33
	Product comparison	8
B2B (Total number of live apps in March 2021: 54)	Accountancy and Tax	18
	Cash flow	19
	Consent management	4
	Debt management	6
	E-commerce payments	20
	Identity verification	10
	Loans and Alternative lending	14
	SME financial management	26
Challenger Banks (in Dec 2020)	Digital neobanks with full banking license	42

I also observed a number of fintechs taking out pieces of services from vertically integrated incumbents. Thus, Open Banking both created new value (via new applications, such as Personal Finance Management) as well as disintegrated some of the existing value chains (via digital-first providers of credit scoring, mortgages, investment etc.), as discussed below.

> *"We do notice quite a lot of engagement from customers in the area of marketplace propositions as well as overdraft unbundling, a way in which fintechs can provide overdrafts directly so that customers don't have to take them from their bank. We're also noticing credit enhancement for customers [by] third-parties." (UK Regulator)*

Therefore, the level of entrepreneurship, competition and innovation in the industry increased, as intended by Open Banking regulations.

b. Emergence of new industry role. In the transition period characterized by issues in standardization and performance of APIs, some new players stepped in to resolve the compatibility and interoperability challenges. Due to variances in API standards, TPPs required a middleware managing data access and standardization process for them. Therefore, the variance in open APIs that facilitated data exchanges between incumbents and fintechs led to the emergence of new roles that aggregated different APIs and provided a connectivity platform, as discussed below.

> *"Where standardization was not sufficient, that created opportunities for ecosystem players offering services integrating APIs and linking up the loose ends." (Industry Report)*

> *"[Our platform] does all the hard work, eliminates needless complexity and removes the bloat of working with multiple banks and account providers through a single API. We shield developers from the noise, variance, availability and movement of Open Banking, PSD2 and individual bank API endpoints. [Our platform] will remove the burden of building against multiple different bank APIs, all with varying levels of implementations to the standard, all through one clean, simple API." (Fintech Founder & CTO)*

These players could enter the industry at the infrastructural level to ensure connectivity and play a key role in deploying Open Banking practices, as explained below:

> *"It looks like essentially a piece of middleware within [bank's] technology stack, which allows them to interact and integrate third-party providers. [...] It will just be a piece of infrastructure which people buy and plug in, because what it is [is] interconnectivity with the market." (Fintech Executive)*

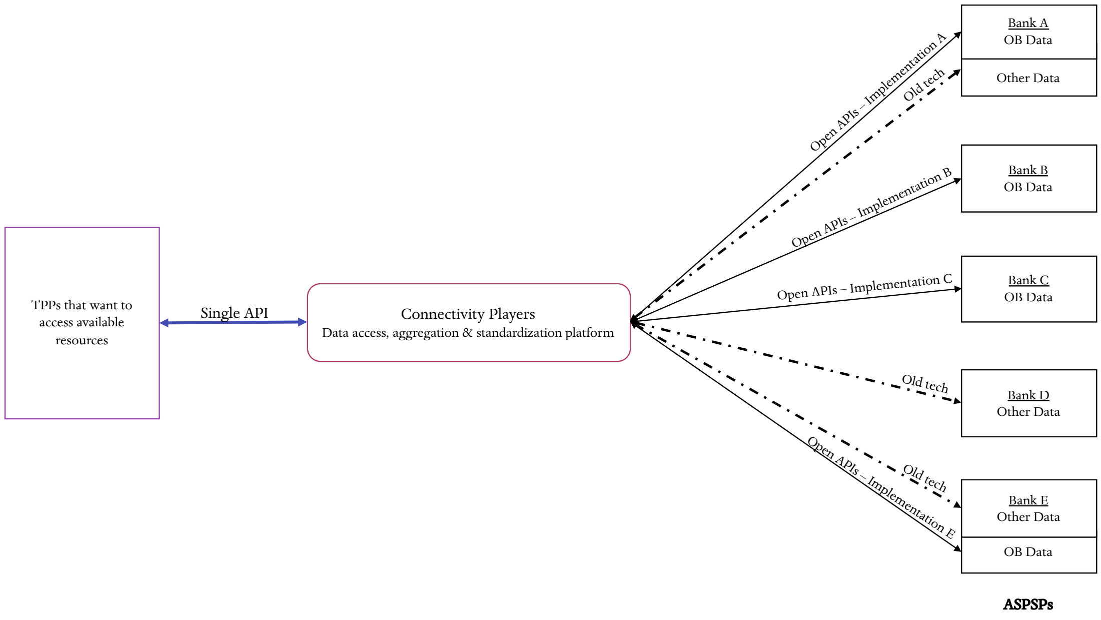
> *"Do organisations simply need to adopt all of the emerging common standards across Europe, or should they gamble on selecting a single 'aggregator' API and hope for the best? [...] While 'aggregator' solutions certainly provide tactical benefits in the near term, a platform providing true API interoperability is a future-proofed approach to delivering on the strategic promise and goals of Open Banking." (Industry Expert)*

API aggregators emerged to remove frictions experienced due to lack of standardization in both data formats and data sharing technology, acting as a standards converter and a '*single point of implementation*' (see Figure 5). However, they went a step further than acting as a mere standards converter.

First, since they could access different types of data from different data holders (ASPSPs) via these platforms, this was also a solution to the limited data scope of open banking regulations. The informants discussed:

> *"To fill this gap [of fragmented APIs], a number of 'API Aggregator' solutions, or embryonic API 'Hubs' have been developed or suggested. [...] [It] removes the need for an organisation to integrate several APIs with their own environment." (Industry Expert)*

> *"What makes us really unique is our reverse engineering and that the ability to access information outside the scope of PSD2." (Fintech Executive)*



TPPs that want to access available resources
Single API
Connectivity Players
Data access, aggregation & standardization platform
Open APIs – Implementation A
Old tech
Open APIs – Implementation B
Open APIs – Implementation C
Old tech
Old tech
Open APIs – Implementation E
Bank A
OB Data
Other Data
Bank B
OB Data
Bank C
OB Data
Bank D
Other Data
Bank E
Other Data
OB Data
ASPSPs

Figure 5. API aggregators providing a connectivity platform

These firms could also onboard incumbent banks onto their platform to access the data they held. This could both enable banks to comply with Open Banking regulations in an easier and more adaptive way and help TPPs access this data via a single, typically proprietary API, as discussed below.

> *“The best use cases that you can build today in open banking, you need more than PSD2, and that's where we're working with banks.” (Fintech Executive)*

Second, these players benefitted from the advantage they gained in terms of data and quickly expanded their value proposition. By leveraging this data advantage, such firms were able to expand and grow with data-induced products in a more focused and efficient way. The informants discussed:

> *“[Our platform] was a first version. We just pulled data, gave it somebody else. [..] But nobody really knew what to do with the data in the early days.” (Fintech Executive)*
>
> *“[…] Then it was dashboard to make it a little bit better. Then we categorized the data. […] Then we built a sandbox in lab with personas so people can do their own testing to innovate. Then we ended up building apps. So it's been a journey, it's evolved over time and will continue to. We'll [also] move into payments…” (Fintech Executive)*

Thus, even though some of the informants in this study argued that this proposition would quickly become a commodity, it in fact created an advantage for early movers in terms of processing high volume of data and developing valuable data capabilities.

One such capability these fintechs developed was ‘data enrichment’. It meant leveraging AI/ML algorithms to clean up the data, standardize data formats and organize it in a customer-centric fashion, so that it was actionable and had a full view of the customer. This process prepared the data for future data analytics processes to extract value and insights, which was a prerequisite for sophisticated data analytics. The informants explained:

> *“We take massive amounts of raw, unfiltered financial data and clean it up. In our world, that means removing unnecessary information, making transactions easy to recognise, identifying patterns, and sorting things into categories.” (Fintech Report)*
>
> *“In the actual enrichment of the data, it is quite hard challenge to solve. [...] We’d done that already. We thought we’d just build an API and let other innovators and fintechs use that service as a B2B proposition.” (Fintech CEO)*

Third, some of these fintechs included regulation as part of their Open Banking-as-a-Service (OBaaS) platform. By using these services, non-regulated players could incorporate and embed financial services into their products and services[15]. Here, fintechs absorbed regulatory risks of other players that wanted to access and use banking data or services but did not want to deal with regulation themselves or did not have the financial resources to afford the regulatory overhead[16]. For this reason, some fintechs licensed out their AISP/PISP licenses as part of their proposition, as explained below.

> *“[Firms] who don't want to go through the process of being regulated - we can make them an appointed representative of our regulations. [...] The only way that you can give open banking as a service is if you add risk to your business by essentially appointing other businesses to borrow your license.” (Fintech Executive)*

Overall, this new role that emerged to ensure connectivity in the industry has both enabled and utilized a variety of disruptive business models. Most of these firms typically started with an AISP license, taking an API aggregator role for data access and establishing themselves as key connectivity players to ensure interoperability among incumbents, fintechs and other TPPs. After accessing these data, they moved to acquire a PISP license so that they could add payments-related services building on their data advantages and growing network. By this way, they started to move to a more significant infrastructural role, similar to a payments network and services provider.

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[15] In March 2021, there were a total of 21 live apps providing OBaaS technical services to TPPs and ASPSPs.

[16] According to the regulations, 3rd parties needed to get licenses for data access (as an AISP) and to initiate payments (as a PISP).

Additionally, the majority of these fintechs pursued geographical expansion strategies to increase their global coverage in terms of regulation and data integrations so that they could resolve issues arising from both different implementations within the UK and different standards across different jurisdictions at the global level. By doing this, they started to become an emerging competition to the likes of incumbent payment networks, such as Visa and Mastercard, rather than other fintechs or incumbent banks. This fact was also highlighted when Visa's acquisition of API aggregator Plaid was cancelled due to antitrust concerns in 2021, as seen below:

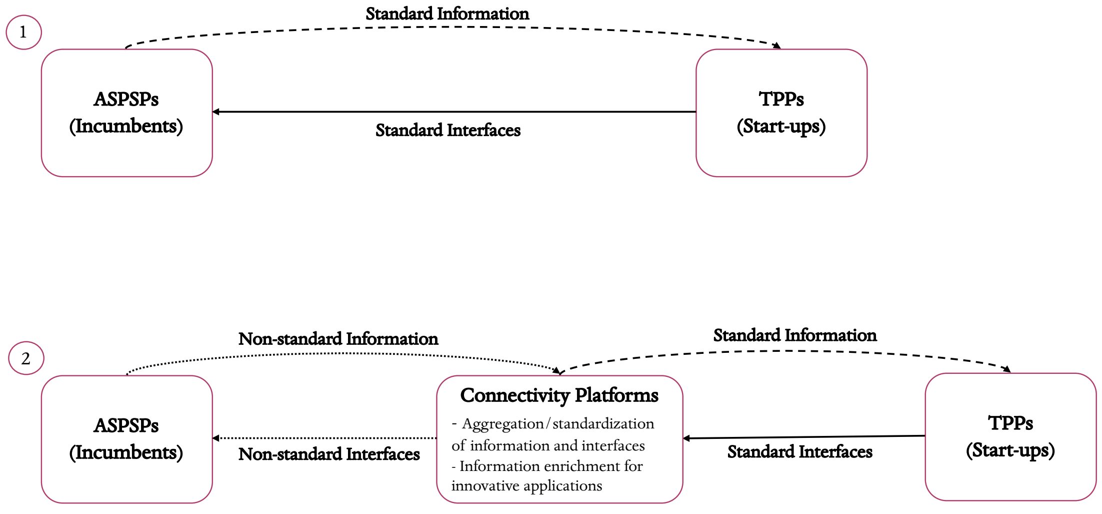
> *"By acquiring Plaid, Visa would eliminate a nascent competitive threat that would likely result in substantial savings and more innovative online debit services for merchants and consumers. [...] While Plaid's existing technology does not compete directly with Visa today, Plaid is planning to leverage that technology, combined with its existing relationships with banks and consumers, to facilitate transactions between consumers and merchants in competition with Visa." (US Department of Justice)*

These firms' efforts for maximizing data access points and integrations with 3rd parties were aimed at acquiring a central position in a network of different providers of financial and non-financial services. In other words, in addition to providing AISP/PISP services as well as infrastructural tools for 3rd parties or banks, these players also started to build an ecosystem around their APIs to create and leverage emerging opportunities, explained as follows:

> *"By definition, ecosystem orchestrators seek to offer as much integration as possible, so an embedded integrated financial offering fits the model perfectly." (Industry Expert)*
>
> *"Consumer demand for frictionless experiences has led a number of companies to provide 'an app to rule them all' driving the evolution and integration of fintech beyond the traditional banking space, into other verticals including retail, travel and gaming. [...] Fintech is becoming part of the native user interface of non-financial products, no longer functioning as a standalone feature but instead becoming embedded." (Industry Expert)*

Overall, due to variances in the implementation of RTS and performance of technology, the industry-wide connectivity and interoperability could still not be ensured 3 years into open banking regulations. Despite issues with open APIs, the emergence of a new intermediary role facilitating data exchanges and transactions across different parties reshaped the industry architecture in an unintended way (see

Figure 6). New industry roles emerged to both facilitate and benefit from interconnectivity and transition to an API economy. The findings illustrated a rise of ‘enablers’ while digitalization and Open Banking took hold in the face of impending Open Finance world, via a new concept called ‘embedded finance’.


1
Standard Information
ASPSPs
(Incumbents)
Standard Interfaces
TPPs
(Start-ups)
2
Non-standard Information
Standard Information
ASPSPs
(Incumbents)
Non-standard Interfaces
Connectivity Platforms
- Aggregation/standardization of information and interfaces
- Information enrichment for innovative applications
Standard Interfaces
TPPs
(Start-ups)

1. Successful implementation and wide adoption of Regulatory Technical Standards
2. Suboptimal implementation, low performance of technology and slow adoption of standards, as observed in UK Open Banking.

Figure 6. Implementation of standards - intended (1) vs. realized (2)

c. Embedded finance. The business model evolution of new players such as API aggregators (as discussed above) and challenger banks selling their platforms in B2B was followed by the emergence of ‘*a fresh form of finance that is embedded through APIs that allow your bank services and your data to end up on third-party applications*’. This new concept was called ‘embedded finance[17]’, as explained below.

> *“Embedded finance allows enterprises to open up new revenue streams and reinvent [their offerings]. This is great [for both] those enterprises and user convenience – it's often easier to buy products related to a main purchase from the same source instead of having to interact with three distinct businesses. […] It opens up the*

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[17] Embedded finance is the provision of financial services ‘embedded’ into other technology, software or digital applications by non-bank providers. Examples of embedded finance applications include payment and lending functions integrated in e-commerce (i.e., in-app payments for Uber, Amazon lending), digital wallets by big tech firms (i.e., Google Pay or Apple Pay), insurance provided together with physical products (i.e., Tesla selling car insurance), telcos and retailers offering cards and digital payment products etc.

> *opportunity for many companies to evolve beyond their niche offerings and become multi-market sellers […], much like Amazon [or] Microsoft." (Industry Expert)*

The provision of financial services as a service to other firms was related to the emergence of BaaS, which can be defined as an "end-to-end process where 3rd parties – fintech, non-fintech, developers, etc. – can access and execute financial services capabilities without having to develop them organically."[18] The functionalities it offered were much beyond Open Banking, as discussed below:

> *"BaaS platforms are enabling sophisticated forms of embedded finance. They connect into core financial systems via APIs and give digital brands and merchants tools to rapidly configure financial service elements into their user experiences." (Industry Expert)*
>
> *"BaaS has all the components you need to build any financial product - issuing a bank account, sending/receiving money, issuing accounts, controlling cards, issuing credit, issuing insurance - which you can use to build a neobank, or a lender. […] Open Banking only gives 5 or 6% of the functionality of BaaS." (Fintech Co-founder & CEO)*
>
> *"Thanks to these interfaces, banks and insurers can export their services to other customer journeys and find themselves not only on their own mobile application, but in a trove of outside platforms. Applications for things like vehicle purchasing or real estate agencies that assist in making rental or purchase offers, e-commerce websites that allow consumers to pay on credit at the time of purchase and a multitude of other customer experiences exist outside of the banking world, yet benefit immensely from banking services." (Industry Expert)*

Even though this model was first brought and leveraged by smaller, innovative firms; it constituted a viable model for incumbents as well - but at the infrastructural level. However, the majority of incumbent banks wanted to remain as 'the central hub' and keep owning the customer relationship. The informants explained how this would not be possible due to shifting logics and customer expectations as more innovative, big and small platforms were coming in:

> *"Only a few can be the hub, not everyone can be a hub." (Fintech Executive)*
>
> *"[Incumbent bank] are very interested in being the primary relationship holder for people's financial decisions. Now, it'd be incredibly arrogant even for a bank to assume that that would limit [people], […] because that's not how the world works now. Those days are probably gone." (Fintech Executive)*

The changing landscape and customer expectations meant that incumbent banks started losing key engagement points and valuable data, as discussed below:

> *"What the banks are seeing [now] on the current account [statements] is that, salary comes in, mortgage goes out, utility bill one, utility bill two, transfer to [Challenger*

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[18] Taken from https://innovation.gomedici.com/report-on-banking-as-a-service/

> *Bank], and then nothing for three weeks. So you're losing valuable data, valuable touch points. And then when you're sitting around worrying about this, all of a sudden Apple makes the announcement that they made in spring…" (Fintech Executive)*
>
> *"Many banks are concerned that distributing their products through partners threatens their client relationships, but if end users begin adopting embedded finance in significant numbers, banks may have little choice but to launch BaaS business lines." (Industry Expert)*

Thus, some forward-thinking incumbents started collaborating with fintechs that would support them in terms of technology, innovation and platform mindset so that they could go beyond compliance and start benefitting from Open Banking. By this way, they aimed to become more agile, technology-driven and innovative more quickly. The informants discussed:

> *"We want to help banks and their customers in a way that makes sense for the 21st century. […] Stop trying to force people to just use all of your services. […] The ultimate end goal for us is, we want to be an infrastructure around financial services. […] You can either be the central point of that node […] or you're a spoke and you get distributed for other purposes. It shouldn't matter where I want to manage my money; Facebook, HSBC, SIBOS app." (Fintech Executive)*

Here, such incumbent banks also took the role of a Banking-as-a-Service platform owner or facilitator. Even though fintechs could provide some portions of BaaS without becoming a full bank (i.e., Payments-as-a-Service can be offered with an e-money license), bank licenses would be necessary to offer and benefit from a full-fledged BaaS ecosystem, as discussed below.

> *"In Europe or the UK we use e-money licences to hold deposits, make payments, and issue cards, among others, except lending which we can't do under an e-money licence." (Fintech Co-founder & CEO)*

Thus, the need to own banking licenses to provide all banking services was an opportunity for incumbents as they would had the broadest coverage of services. By opening up their data, core banking infrastructure and licenses via a BaaS platform, incumbent banks could provide significant value for non-bank players and facilitate new business models. Additionally, they were able to provide commercial or premium APIs for out-of-scope data, both addressing data scope challenges of fintechs and creating an additional monetization channel for incumbent banks. Implementing open banking standards would give the incumbents necessary infrastructure to introduce commercial APIs more easily and quickly, and then they could leverage the shared infrastructure and interconnectivity to introduce premium APIs for monetization, as discussed below.

> *"The API data model is really, really simple, it's the tip of the iceberg. It's the security protocol, it's the trust framework, it's the response times, it's the customer experience guidelines that do the app-to-app redirection - which is the stuff that was hard; with commercial API, all you do is you just go through another data field, and then you agree a bilateral contract." (UK Regulator)*

This model would allow them to keep their central position, although with a different role in the value chain in the industry, as explained below.

> *"Techy-savvy legacy firms can fend off the encroaching threat of fintechs by moving into the BaaS space to share their data and infrastructure." (Industry Report)*

This trend was expected to grow and blur the industry boundaries, possibly changing the landscape in a significant way, as explained below:

> *"Embedded finance will see software companies—many of them big tech firms—embed financial services within their offerings to attract and retain customers. [...] As fintech continues to be embedded into financial and increasingly non-financial products, we will no longer categorise fintech as its own distinct sector, just as no one today talks about the Internet as a discrete market." (Industry Report)*

However, the changes also increased the probability that big tech firms would be interested in entering the industry to benefit from the emerging opportunities as well. This could open up the industry to even larger and more powerful firms than incumbent banks, as discussed below.

> *"By creating a customer-centric, unified value proposition that extends beyond what users could previously obtain, digital pioneers are bridging the value chains of various industries to create 'ecosystems' that reduce customers' costs, increase convenience, provide them with new experiences, and whet their appetites for more." (Industry Report)*

Overall, I observed another role emerged that provided BaaS as an enabler of embedded finance, together with API aggregators, going beyond Open Banking and paving the way for Open Finance. I observed that Open Banking standards accelerated the industry's disintegration by introducing an interoperability framework, which triggered an architectural change, creating new markets for innovative services. The reorganization and transition of traditional retail banking industry to a disintegrated and modularized industry started causing a shift in the established players' logics and culture as well. Here, incumbent players started adopting more of a 'platform mindset' while the industry transformed to an 'embedded finance' environment. This shift in industry architecture was intensified after the emergence of new connectivity roles, which aimed to establish the infrastructure and interoperability required to enable Open Banking (Please see Figure 7 for a representation of this evolution).

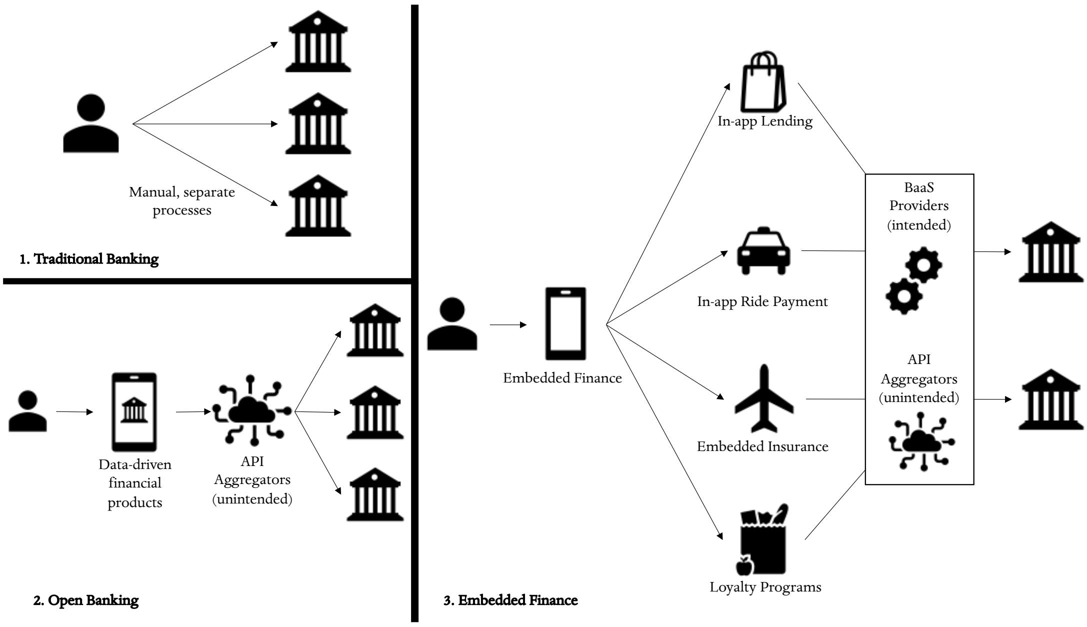
Manual, separate processes
1. Traditional Banking
Data-driven financial products
API Aggregators (unintended)
2. Open Banking
Embedded Finance
In-app Lending
In-app Ride Payment
Embedded Insurance
Loyalty Programs
BaaS Providers (intended)
API Aggregators (unintended)
3. Embedded Finance

Figure 7. Evolution of the industry architecture following Open Banking regulations

2.5. Discussion and Conclusion

This chapter uncovers the multi-stakeholder process that leads to the development and diffusion of new standards in an established market. In doing this, I highlight how the process of regulator-led standardization can lead to the emergence of new layers in the industry architecture and new roles within it, contributing to extant work in these areas (Jacobides, 2005; Tiwana, Konsynski, and Bush, 2010; Wiegmann et al., 2017). I discuss these contributions below.

Elements of a Regulator-Led Standardization Processes

First, this study documents a case of standardization that is initiated by regulators across countries in order to boost innovation and competition in an established and stifled industry by ensuring compatibility and interoperability among existing and new players. Within this picture, this study shows that the regulatory standardization efforts failed to lead to the intended results immediately due to several factors that had to do with the key decisions taken during the formulation and implementation process.

The analysis reveals that the success of Open Banking standards in facilitating data-sharing in the sector and ensuring compatibility and interoperability across industry players was dependent on several factors. First, by observing the choices made by UK regulators (versus for example their counterparts in other EU countries), the findings reveal a trade-off between mandating technical interface standards or leaving the market to decide. As the data shows, setting highly specific technical standards can have drawbacks. I find, for example, that mandating existing industry players to adopt a specific technological standard is problematic if the regulator does not have the technical capability and means to check the resulting adoption practices. In addition, a specified technology can be outdated over time, preventing the ability of industry players to adopt new technologies. The findings reveal, however, that despite these disadvantages, a tightly specified set of technical standards may be preferred in an established industry where the standardization may work against the incentives of existing players in order to facilitate new entry. In these cases, the regulator's ability to micro-manage the adoption process is critical, as leaving room for interpretation can cause disincentivized existing players to slow down and even sabotage the interoperability scheme.

In addition, the findings show that when ensuring interoperability involves access to and sharing of data across industry players, the decisions made regarding the scope of data access have a significant impact on how widely the standards can be adopted. In this case, the regulator initially limited the data coverage of UK Open Banking APIs to current accounts and payment data with the reasoning that this would allow a 'controlled' roll out of the new standards in a smaller segment of the industry, making the management of technological change easier. However, this 'controlled' approach had a direct effect on the activity in the industry, causing players to access different sets of data (in scope versus out of scope) by using both old and new technologies (screen scraping versus APIs). This, in turn, led to confusion and friction in customer experience, and slowed down the customer adoption of services by new industry players. Overall, this chapter documents that while a stage-wise standardization with an 'MVP' approach by regulators can allow experimentation in a limited service / data segment and better management of the process (i.e., by seeing what issues emerge during standards implementation and developing processes to address them), it makes for a ‘less clean switch’ from old technology to new technology for interoperability, delaying industry-wide standardization.

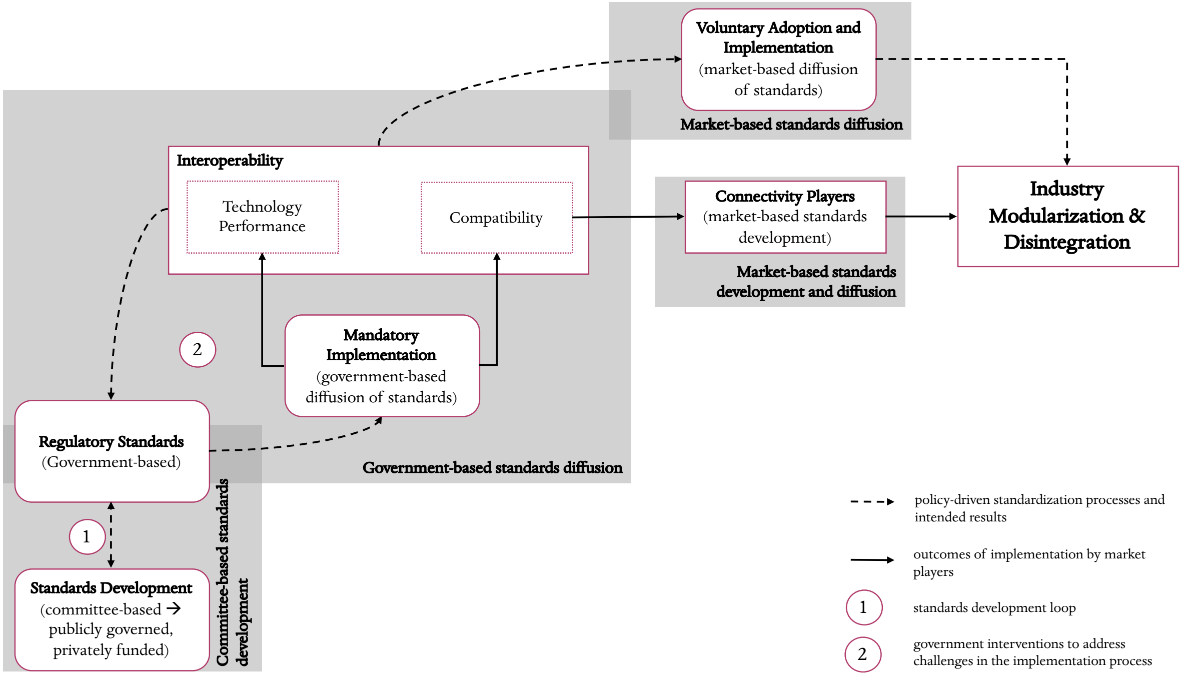
Voluntary Adoption and Implementation
(market-based diffusion of standards)
Market-based standards diffusion
Interoperability
Technology Performance
Compatibility
Connectivity Players
(market-based standards development)
Market-based standards development and diffusion
Industry Modularization & Disintegration
2
Mandatory Implementation
(government-based diffusion of standards)
Regulatory Standards
(Government-based)
Government-based standards diffusion
1
Standards Development
(committee-based → publicly governed, privately funded)
Committee-based standards development
policy-driven standardization processes and intended results
outcomes of implementation by market players
1
standards development loop
2
government interventions to address challenges in the implementation process

Figure 8. Multi-mode standardization efforts and disintegration in UK banking

These findings contribute to the literature on the mechanisms of standardization, which so far have highlighted the role of switching costs (Fichman and Kemerer, 1993), network externalities (Katz and Shapiro, 1986), standards battles (Shapiro and Varian, 1999), sponsored and unsponsored standards (David and Greenstein, 1990), and modes of standardization (Wiegmann et al., 2017). The chapter’s findings provide a contrast to Porter and van der Linde (1995), who studied the connection between environmental regulation and innovation and suggested that regulation should leave room for different approaches towards innovation and leave standard-setting to the industry to allow continuous improvement. I suggest that while in nascent industries where industry players have more aligned incentives of jumpstarting the industry, standardization can be left to industry players; this strategy may backfire in established industries. In their paper on the role of implementation in the context of certifiable standards, Christmann and Taylor (2006) highlighted that implementation can vary on a scale from *symbolic* vs. *substantive*, based on firms' perceived costs and benefits. This study complements this stream showing that several decisions taken at the formulation and implementation phases play an important role in the 'substantive' implementation of new standards. The findings show that regulators must pay particular attention to 'micro-managing' existing industry players with potentially misaligned interests, while taking large enough steps in the scope of new technology to ensure that players are able to abandon old technologies.

Standardization and Its Consequences for Industry Architecture

This chapter's findings also provide a link between standardization efforts and their consequences for industry architecture. Extant literature studied the emergence and evolution of industry architectures arising from firms' efforts to gain architectural advantage (Jacobides et al., 2006) and from the co-evolution of transaction cost dynamics and firm capabilities (Jacobides and Winter, 2005). Studies also showed how different industry roles can be affected by different knowledge bases, regulatory frameworks and standardization dynamics within different industry architectures (Tee and Gawer, 2009), and that market non-emergence at the intersection of different industries can be due to disagreements on architecture (Ozcan and Santos, 2015). This chapter contributes to this line of literature by showing how implementation of standards can shape industry architecture in intended and unintended ways.

First, the findings reveal that as expected, establishing standards for interoperability can lead to new players in a data-intensive industry to compete with established industry players, effectively causing the unbundling of products and services. This positive result constitutes an example for boosting innovation and competition in other industries, particularly when access to data is an important source of competitive advantage in the industry. I posit that with the advancement of AI and machine learning technologies, standardization initiatives that are focused on data access will be necessary across industries to enable these technologies to truly boost competition and innovation.

This study is unique in that it also highlights the rather unintended consequences of the standardization process for changes in industry architecture. Specifically, I show that the variance arising in the implementation of Open Banking led to the rise of a new industry role, API aggregator. While players occupying this new role were born out of the necessity to fix the imperfections in the standardization process, their birth led to further changes within and across industries. I observed that once these players emerged to provide a middle layer to standardize APIs, they started to strategize to grow beyond this role. I find that their efforts to further leverage their product led to a faster cross-industry change, with players from other industries, e.g., airlines and supermarkets, starting to use these API platforms to enrich their customer data and embed financial services into their products and services. Scholars have long been studying the emergence of new industry roles (Hannan and Freeman, 1986; Reynolds, 1988; McKendrick et al., 2003; Stuart and Sorenson, 2003), explaining the phenomenon through various processes. This chapter's findings contribute to this long line of research by unravelling the birth and subsequent evolution of a new industry role as a response to obstacles in a standardization process arising from lack of capabilities and misaligned interests of different stakeholders.

Overall, this study finds that standardization is a continuous, multi-stakeholder process where not only formulation decisions, but also the adjustment of industry players to roadblocks in implementation cause recalibration of standards and shifts in industry architecture.

Chapter 3 – “Platformification” of Banking: Strategy and challenges of challenger versus incumbent banks in response to regulatory change in the UK

> *“There is a change that’s happening and there’s nothing you can do about it, digital transformation, fourth industrial revolution, whatever you might want to call it. Traditionally financial services have escaped that; because still in many circles, financial services has an element of smoke and mirrors and people don’t really understand how it works. However, as the world gets more savvy, you’ve got start-ups and fintechs that are trying to take market share and as established institutions, you need to do something about all of this. Staying still isn’t an option, you could get left behind or worse, you could go out of business.”*
>
> (UK Regulator)

3.1. Introduction

Platforms “use technology to connect people, organizations and resources in an interactive ecosystem in which amazing amounts of value can be created and exchanged” (Parker, Van Alstyne, and Choudary, 2016; p. 3). They can facilitate value-creating interactions amongst consumers (demand-side) and external producers (supply-side), and produce a multisided market to provide complementary services and co-create value (Rochet and Tirole, 2006; Zhu and Iansiti, 2012). Through matchmaking, platforms can reduce transaction costs (Benzell, LaGarda, and Van Alstyne, 2017; Munger, 2015). In addition, they can foster innovation as they combine the knowledge and perspectives of various internal and external parties to create more innovative and personalized products (Baldwin and Clark, 2000; Baldwin and Woodard, 2009; Gawer, 2009, 2014). Due to these advantages, platforms have become central to many industries and markets such as e-commerce (e.g., Amazon and eBay), social media (such as Facebook and Twitter), video games (e.g., Xbox and PlayStation), PC and mobile operating systems (e.g., Google Android and Apple iOS), and peer-to-peer sharing (such as Uber and AirBnB). However, many of these successful platforms that have been studied are provided by digital-born companies; and thus, questions remain regarding how traditional firms in established, and perhaps more challengingly, highly regulated industries can switch to a platform business.

One of the most central questions when considering platforms as a form of organizing economic activity at the firm level is what boundary choices and governance decisions make a platform successful (Boudreau, 2017). How open a platform is to external developers and contributors, and who makes these decisions, can significantly influence its evolutionary trajectory (Gawer, 2014). These issues become even more problematic when considering that platform ecosystems are inherently dynamic and context dependent. For example, in an unregulated, nascent market, platform competition might occur differently compared to a highly regulated, mature industry where existing players need to transition from pipeline to platform business models to compete with new entrants. Many of these context-dependent aspects of platform competition have received little attention from management research scholars (Altman and Tushman, 2017; Gawer, 2014; Schilling, 2000; Tiwana *et al.*, 2010).

To fill this gap, this study explores *what advantages and challenges new players versus incumbents face in creating / transitioning to a platform business model in a regulated, data sensitive industry* in the context of the UK retail banking sector. Open banking regulation, which came into effect in January 2018, allows innovative third parties to build applications offering financial services (e.g., loans, mortgages, money management, etc.) by accessing customer data from other financial institutions, upon customer's consent. Since the announcement of the regulation in 2015, the rise of innovative start-ups that use better data analytics to offer cheaper, more customized financial services also gave rise to business-to-consumer platforms that allowed customers to access many of these innovative services as part of a financial marketplace. Through semi-structured field interviews, observations and archival research in the 16 months before, and 12 months after the new regulation came into effect, this study tracks the emergence of financial platforms and the challenges established as well as new players faced around platform ownership and openness.

This study contrast incumbents and new entrants in terms of their advantages and challenges in platform ownership and openness. The findings show that new entrants, a.k.a. challenger banks in this research setting, faced no challenges in building their own platform due to their technical capabilities and digital-born culture. They also chose to maintain their platforms open towards complementors, i.e., fintechs, due to not having many financial products to start with. On the other hand, these players faced severe challenges in growing their platforms on the user side in a data-sensitive[19] industry, where customers were particularly weary of fully switching to new and unknown players.

In contrast, incumbents already had a large user base for a platform, which gave them a significant advantage in jumpstarting network effects. However, these players faced an issue in that they had developed a fragmented IT infrastructure as a response to a highly regulated and data-sensitive industry, and consequently also had an organizational culture that was siloed, product and compliance focused, and averse to data-analysis. These technical and cultural challenges stood in the way of incumbents building their own platform, which is evidenced by the lack of incumbent platforms in the industry after one year despite the numerous challenger bank ones already in use. Incumbent banks also faced challenges in platform openness due to regulatory issues as well as competitive considerations originating from the large set of products that they brought into the platform. In addition, a lack of platform mindset motivated them to reduce visibility even for fintechs that did not compete with their products directly. Finally, the findings show that a new organizational role emerged in the market to allow the incumbents to bypass the challenges in building their own platform by licensing them a ready-made external platform. However, this option created conflicts of interest regarding platform openness and resulted in either a lack of adoption, or tendency towards building closed platforms, which were suboptimal from the bank users' perspective.

The proposed theoretical model that emerges from the findings provides a mental map for the two critical choices and trade-offs faced by organizations in the process of platform formation: whether or not to build the platform themselves, and how open to keep it. Through this mental map, this study contributes to the ongoing discussion around "openness-versus-control" in the platform literature (Boudreau, 2017; Shapiro and Varian, 1998; West, 2003), but also taking into account the dynamic and ever evolving nature of platforms and their immediate context (Gawer, 2014; Tiwana *et al.*, 2010). The findings are generalizable to other regulated industries where the platform business model threatens to disrupt existing pipeline models. In particular, this study emphasizes that incumbents and new players in regulated industries with data sensitivity (e.g., healthcare, insurance) are particularly prone to the challenges and trade-offs highlighted in this chapter. In the rest of the document, I first provide an overview of the theoretical underpinnings of platform research, then describe the research methodology and findings, and conclude with the study's contributions to extant literature on platforms and industry disruption.

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[19] Sensitive data, according to EU law, are special categories of data that require special measures for protection; such as personal data about racial origin, political opinions, religious or other beliefs, as well as personal data on health, sex life or criminal convictions, which also can be extended to include data relating to consumers' debts, financial standing or welfare benefits (King and Raja, 2012). I use data sensitivity in this paper in reference to both the customer data held in the banks' systems (i.e., personal data, financial standing, transaction history, etc.) as well as the data about the service itself (e.g., card/payment details, login details, etc.).

3.2. Literature Review

In the last few decades, we have seen the emergence of platform business models that have moved away from the traditional "vertical integration" of the firm, or "sequential value-chain" mode of organizing (Porter, 1985) – also known as the pipeline business models – and have introduced a flatter, more inclusive, and innovation-centric approach to value creation (Gawer, 2009, 2011; Rochet and Tirole, 2006). Platform-based strategies change the way organizations conduct their business by moving to greater openness and engaging external entities outside their boundaries, enabling them to interact (Altman and Tushman, 2017; Gawer and Cusumano, 2002). Some of the world's largest firms such as Apple, Google, Uber and Amazon, have developed digital platforms in order to orchestrate value-creating interactions between different types of independent suppliers and users. For example, Uber revolutionized transportation services by connecting consumers with available drivers, while, Amazon and eBay connect buyers and sellers of goods through an online marketplace. In a similar fashion, Apple's iOS mobile operating system sits in-between software developers and users who benefit from the complementary applications offered on the iPhone.

Platforms also change the way organizations compete (Cennamo and Santalo, 2013). Platforms can be described as "multi-sided networks" or "multi-sided markets" that enable interactions and mediate transactions between different types of users (demand-side) and external producers (supply-side) (Rochet and Tirole, 2006, 2003).

Following this definition, the key value proposition of the platform business model is not that of selling products, but of "selling reductions in transactions costs" (Munger, 2015). By moderating costs, and reducing opportunistic behavior on the platform, firms can increase users' net utility who would then prefer this mode of organizing over alternative ways of production and exchange (Benzell *et al.*, 2017; Coase, 1937; Williamson, 1975, 1979).

In this context, the competitive dynamics of a platform-based business look very different from a product-based organization. Platforms can take advantage of direct and indirect "network externalities", i.e., the increase of the user's marginal benefit as the size of the network grows and others adopt the product or service on the platform (Katz and Shapiro, 1985), to fuel rapid growth and enhance value creation and capture (Economides, 1996; Farrell and Saloner, 1985; Scott, Van Reenen, and Zachariadis, 2017; Shapiro and Varian, 1999; Zachariadis, 2011). In single sided platforms, such as users of fax machines, WhatsApp texting, or SWIFT financial messaging for interbank transfers, the more actors (individuals, banks, etc.) join the platform, the higher the "direct" benefit for all users that interact on the platform as they get more connectivity (Scott *et al.*, 2017). On multi-sided networks, the different sides of a platform can jointly benefit from the size of the other side –a phenomenon also referred to as "indirect network effects" (Armstrong, 2006; Evans, 2003). For instance, the more drivers join the Uber platform, the more this becomes attractive to consumers as there is less waiting time and faster pick-ups and vice versa (Parker *et al.*, 2016).

This underlying interdependency and complementarity between the different sides of a multi-sided platform can lead to a "virtuous cycle" (Gawer, 2014) or a "winner-take-all" situation, where the platform with the largest number of users can "tip the market" in its favor and discourage late entrants by forcing them to lose network battles (Eisenmann, Parker, and Van Alstyne, 2006; McIntyre and Srinivasan, 2017). This logic may particularly apply to incumbent firms that enjoy a well-established *installed-base* and can leverage that to create a monopoly of complementors, often putting consumers in a disadvantaged position through high switching costs. This *lock-in effect* is especially present when such switching costs are directly related to technological or other investments to access the platform in context (David, 1985).

Due to the significance of network effects that can quickly turn platforms into monopolies in a market, prior work has given particular attention to successful platform strategies, i.e., how platforms build critical mass quickly ("get-big-fast") and initiate a virtuous cycle of growth (Eisenmann *et al.*, 2006; Eisenmann, 2007). In order to discuss these further, it is useful to first differentiate between the various roles that actors can have on a platform. Eisenmann et al. (2009) proposed a framework that identifies four different platform roles: (i) demand-side platform users, are the "end users" who consume the products or services on the platform; (ii) supply-side platform users, or complementors, are the "external developers" of the complementary modules on the core platform consumed by the end users; (iii) platform (or interface) providers act as the users' principal point of contact with the platform; and (iv) platform owners (or sponsors), are those entities who develop the technology, maintain its intellectual property rights and are responsible for "determining who may participate in a platform-mediated network". Each of these roles can exist to a larger or smaller degree on a given platform. Single-sided platforms such as WhatsApp messaging network, for instance, collapse the roles of the demand and supply-side users as all members supply and demand information on the platform. In multi-sided platforms, the roles of platform provider and owner are often collapsed such as in the case of iTunes, where Apple both provides the technology and makes decisions as to who may participate as suppliers and users of entertainment on the platform. Out of these four distinct platform roles identified by Eisenmann et al (2009), it is arguably the platform owner that has the highest degree of impact on a platform's overall success, as these actors both build the interface (or mediating technology) and make key decisions regarding *openness*, which are two of the key factors affecting platform performance (Tiwana *et al.*, 2010). Below, I describe the platform decisions and trade-offs that platform owners face based on extant literature and identify areas of gaps.

Platform Strategies

Scholars suggest that there are two fundamental notions, *ownership* and *openness* (Altman and Tushman, 2017; Boudreau, 2010), which concern the decisions one can exercise on the platform for success (Tiwana et al, 2010). A key type of openness in multi-sided platforms is regarding which users and complementors to invite on the platform to fuel fast growth at the beginning. Parker and Van Alstyne (2005) and Rochet and Tirole (2003, 2006) suggest ways platform owners can get over the typical initial "chicken-and-egg" problem, i.e. users and complementors waiting for critical mass on the other side before joining, by initiating mutually reinforcing benefits for participants such as subsidizing or seeding complementors through adequate pricing or other financial incentives. In addition, Parker et al. (2016), discuss various “pull” and “push” strategies to kickstart the platform, i.e. to create a particular value proposition to a particular subset of potential users and subsequently, transform the business by attracting a wider audience on both sides (see also Gawer and Cusumano, 2008). Another strategy is to “piggyback” onto another firm’s existing user-base (or platform) and recruit third-party developers to populate the complementor side (Parker et al., 2016; p.91). While these strategies begin to address the “chicken-and-egg” problem in the initial phases of a platform, there is still much ambiguity as to which side of a platform to subsidize and cultivate first to create indirect network effects, and how valuable these network effects are perceived by users in different contextual (e.g., industry) settings.

One important aspect of platform openness in relation to complementors is the easing of restrictions on the use, development, and commercialization of technology (Boudreau, 2010; Eisenmann, Parker, and Van Alstyne, 2008; Katz and Shapiro, 1986, 1994). Closed systems are typically vertically integrated and fully restricted to external complementors, whereas, open platforms are by definition more likely to lift any restrictions that prevent third party developers to access and contribute to the codebase of the platform. Openness at the technology level can relate to the means with which platform providers open their software and empower external developers to interact with their products and/or data. A good example is the offering (or not) of APIs and software developer toolkits (SDKs) to outsiders which will provide flexibility and ease of access to important resources relevant to the software code and designing apps (Altman and Tripsas, 2015). APIs and SDKs are thus important boundary resources that allow platforms to systematically moderate the level of access to their systems and control the level of external complementors and value as well as competition between complementors. In addition, open interfaces such as APIs and/or other kinds of design rules, allow external developers to ensure that their technical solutions will be interoperable and fully integrated to the core system of the platform (Boudreau, 2010; Parker and Van Alstyne, 2008).

Opening a platform’s technology and making it more available to external complementors is generally known to foster innovation and platform growth by increasing the production and variety of goods that add value to platform users

(Baldwin and Clark, 2000; Chesbrough, 2003; Farrell, Monroe, and Saloner, 1998; von Hippel, 2005). Platform owners will also be able to exploit network effects (more complementary applications will attract further users and 'vice versa') to increase the user *adoption* of the platform as open systems generally reduce end-users' fears of being locked-in to a single vendor (Eisenmann *et al.*, 2008; Katz and Shapiro, 1994). On the other hand, greater openness typically also reduces platform owners' and complementors' ability to capture and appropriate rents due to the lowering of entry barriers and the introduction of further competition as the platform becomes more open (Boudreau, 2010). This trade-off, commonly known as "*adoption versus appropriability*" (West, 2003), captures the tension that platform owners face between the demand for openness in order to grow the platform versus the need to be closed enough in order to obtain greater returns.

In parallel to the degree of openness through granting access to external contributors or engaging in "vertical strategies" (e.g., seeking exclusivity amongst complementors), platform owners will also need to decide on the *level of ownership* they will exercise on their platforms. For example, while Apple's iOS system is fully owned and controlled by Apple, Android, an open source mobile operating system pioneered by Google, is controlled by a collective of organizations in the technology industry under the umbrella of the Open Handset Alliance (OHA), and is available across different handset manufacturers (e.g., Samsung, LG, etc.). Scholars suggest that platform control can also be seen as an issue of openness, but at the ownership level (Boudreau, 2010; Ondrus, Gannamaneni, and Lyytinen, 2015).

Shared ownership structures in platforms imply that other (competing) parties can co-develop a platform's core technology, share R&D costs and/or participate in decisions regarding openness, technology, standards, etc., which can speed up its development significantly (Eisenmann et al., 2008). For example, through studying OS platform owners who allowed outsiders to contribute to isolated parts of their core system (such as its GUI), Boudreau (2010) found that lower platform control increased development rates about 20% ceteris paribus. Scholars have found that sharing control over a platform will create trust and provide incentives for external contributors to spend time and develop value-adding innovation (Chesbrough, 2003; Gawer and Henderson, 2007; Perrons, 2009; West, 2003). However, while the amount of diversity in shared ownership platforms brings various benefits, the complexity of coordination and relevant costs involved can often cause counter effects and stall innovation leading to under-performing technologies (Commons, Chester, and Garud, 2002; Scott and Zachariadis, 2013), such as when platform owners in the Symbian smartphone operating system had different visions regarding the key features of the platform (e.g. touchscreen versus keyboard or stylus pen operated), which led to conflicts of interest, delays and loss of market share (West and Wood, 2014).

On the opposite end, there is evidence to suggest that monopolistic incumbent platforms with extensive control over the infrastructure will tend to take advantage of their position and extract higher rents from complementors and users, thus making them more reluctant to invest on the particular platform (Boudreau, 2010; Farrell and Katz, 2000). This can jeopardise their competitive position when a challenger enters the market and offers a more favourable proposition to complementors and users. For example, Nintendo gradually lost market leadership to Sony PlayStation in the late 90’s as it had been quite strict in its terms with developers who saw Sony’s platform as an opportunity to get a more profitable deal (Eisenmann et al., 2008). These findings suggest that platform ownership may have an inverted U type of effect on performance, which Boudreau (2008) confirmed in the setting of handheld computing platforms looking at the rate of innovation.

As evident in the discussion above, there is considerable research on the various ownership and openness choices of platforms and their effect on platform size/growth, varieties of developers, competitive dynamics, network effects, etc. (Boudreau, 2010; Ondrus *et al.*, 2015; West, 2003, etc.). While these studies start to unpack the nuances in platform strategy and competition, further, and in particular, empirical research is needed to understand how platform competition plays out in different contexts and over time.

Transition of Established Industries to a Platform-Based Business Model

One of the contexts in which platform competition may evolve in unpredicted ways is when players in an established product-based industry transition to a platform-based business model (Altman and Tripsas, 2015). This is of particular interest when considering the variety of industries in modern economies but also the presence of mature and complex sectors such as telecommunications or mobile payments which have failed to transition to a platform economy for a long time (Ondrus, Lyytinen, and

Pigneur, 2009; Ozcan and Santos, 2015). Many of the organizations studied in the platform literature (e.g., eBay, Amazon, Microsoft) were either born with a platform-based business model or consciously adopted platform-based strategies at an early stage in their lifecycle. On the other hand, many firms start off by operating on the basis of a pipeline, integrated, and product-based business model and later transition into a platform business model, e.g., due to a technological disruption. Recent examples of such transitions can be found in the automotive industry where the concept of connected vehicles has brought a new set of technology players onto a platform around auto manufacturers or mobile telephony where advanced technology has allowed consumers to add after-market applications to smartphones, thus inviting application developers onto a platform around smartphone manufacturers.

The shift from a product to a platform-based business model poses a set of challenges. In a series of theoretical pieces, Altman and Tripsas (2015) and Altman and Tushman (2017) suggest that firms that traditionally pursued all innovation activities in-house may struggle to delegate such activities to outsiders. The authors outline three transitions that impact the organizational identity of firms in the mid/long term as their business focus changes: (i) from providing the best products to developing the best complementor ecosystem; (ii) from maximizing product profitability to focusing on platform growth; and (iii) from increasing the number of units sold to maximizing the number of transactions facilitated. However, empirical studies that document how incumbents in different industry settings go through such a transition process are non-existent.

Platform scholars are highly aware of how variations in contextual factors, such as how the industry or the regulatory context in which a platform operates can affect the technological and strategic choices made by platform providers and complementors as well as the strength of network externalities. For instance, Sheremata (2004) emphasized that "characteristics of the environment [will] affect expected returns from different strategies" (p.360), where these characteristics can include the existence of switching costs for consumers, irreducible technological uncertainty, heterogeneous customer preferences and the thresholds for network effects. Similarly, Gawer (2014) called scholars to appreciate the uniqueness of the organizational context and the broader industry environment within which platforms manifest themselves. Most recently, McIntyre and Srinivasan (2017) argued that strategy studies “have largely adopted a static or cross-sectional view and have not focused on how platform-complementor interactions evolve dynamically over time” (p. 150).

Thus, in order to document the context-specific advantages and challenges that incumbents face in transitioning to a platform business model, this study compares and contrasts the platform formation efforts of these players to those of new entrants in the highly regulated, data-sensitive industry of UK retail banking. Examining these processes in a traditional and regulated industry is important for understanding the limits of whether / how fast new entrants with platform business models can disrupt an industry. Consequently, the findings also have implications on how regulation can infuse innovation into a traditional industry through platform business models in order to break monopolies/oligopolies. Before detailing the findings from this study of platform emergence in the banking industry, I describe the methodology of this empirical work below.

3.3. Methodology

Given the limited empirical work on the research question, I followed an inductive approach with a multi-level design, analyzing firm-level strategies and challenges along with their consequences at the inter-firm and market-levels. I used multiple cases as a basis to build the theory inductively (Eisenhardt and Graebner, 2007), and these cases were used to understand the commonalities and differences between different types of industry players (i.e. incumbent banks and challenger banks), following the set-up followed by Ozcan and Santos (2015) in the study of the emergence of the mobile payments market.

Data sources: This study benefits from various sources for data collection. The main source was in-depth semi-structured interviews with incumbent and challenger banks, fintechs, regulators, and industry experts. I also reached out to interviewees at industry events such as SIBOS (global banking event), SWIFT Business Forum and fintech summits in the UK and in Europe. These events also constituted great occasions to collect data through observations where various industry players and regulators discussed the changes they were planning / experiencing in anticipation and following the regulatory change. Finally, I used archival data to triangulate and support the findings, which included business publications, industry reports and Internet sources to strengthen the robustness of the findings (Eisenhardt, 1989).

The data collection period for this chapter covers the 16 months before and 12 months after the regulatory change came into full effect in January 2018. This allowed me to observe in real-time the platform strategies of various industry players before and after the regulatory change were in effect. This study has also benefitted from a pilot stage in 2016, as pilot studies are considered a significant part of a good research design (Van Teijlingen and Hundley, 2001). In this stage, I conducted interviews with three informants from incumbent banks, two informants from challenger banks, three informants from fintech companies (non-banks) and four industry experts / regulators. The pilot study helped me identify different key players in the UK retail banking industry and how they approached this change that encouraged them to create / transition to platforms.

I consequently refined the research question tackled in this chapter and made necessary adjustments regarding the investigation methods to better address this phenomenon-driven, real-life problem (Creswell and Poth, 2017; Kim, 2011). For instance, based on the findings from the pilot stage, the data collection focus regarding incumbents shifted towards the 9 largest incumbent banks in the UK (called CMA9), since these were the only group required to comply with open banking regulation by January 2018[20]. Having to publish open APIs by this date meant that third parties could connect to these large players to access the financial data of customers (upon consent) in order to offer competitive services and entice customers to switch away, which put these large incumbents under direct competitive threat. Pilot interviews also revealed that the largest threat to the competitive position of these incumbents came from challenger banks, who were new industry entrants that had created a financial platform with high quality user interface and money management tools based on advanced data analytics and used complementors to offer financial services in a variety of areas such as loans, mortgages, pensions, as further detailed in the findings section. Given this finding, the data collection efforts became more concentrated on the platform formation decisions of challenger banks and incumbents for these business-to-consumer financial platforms, which were the only type of platforms visible and potentially attractive for retail banking customers. During the pilot period, I also started building connections with future interviewees that facilitated a wider network for data collection. Table 1 summarizes the data collection process.

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[20] By the end of data collection at the end of 2018, there was still no date announced for the compliance of smaller financial institutions with open banking regulation.

Table 2. Data collection.

Period of data collection	September 2016 – December 2018
Data Sources	Semi-structured interviews, observations at industry events and conferences in the UK and Europe, internet sources such as newspaper articles, business publications and reports.
Total # of interviews	79 Incumbent Banks: 21 interviews in 9 firms Challenger Banks: 13 interviews in 4 firms Fintechs: 19 interviews in 8 firms External Platform Providers: 7 interviews in 4 firms Industry Experts and Regulators: 19 interviews
Type of informants	Executives from incumbent banks with roles such as Head of Innovation, Director, Digital Innovation Manager, Strategic Payments Director; executives from fintechs and challenger banks with roles such as founder/co-founder, CEO, CTO, CPO, CFO, Head of Payments, Head of Finance, Engagement Manager; industry analysts, consultants, and regulators.
Conferences attended for data collection	API Days (Berlin and Paris), Fintech Connect Live (UK), Innovate Finance (UK), SIBOS Geneva, SWIFT Business Forum London, Westminster Business Forum, Paytech Conference, SIBOS Sydney.

Based on the information gathered during pilots, this study leverages a total of 79 interviews conducted with UK informants in 9 incumbent banks, which constitutes all banks required to comply with open banking regulation in 2018; 4 challenger banks, 8 fintech firms, as these were the complementors on the emerging B2C financial platforms; 4 external platform providers, and finally, numerous industry experts / regulators. The interviews lasted 40-90 minutes and followed a semi-structured format. The questions were structured around the background of the interviewees and their role at the focal firm, how they approached competition in retail banking, i.e., whether they were partnering with any banks/fintechs and if so, what their experiences and challenges were regarding these partnerships and finally, what their current / future plans as well as key decisions / challenges were regarding platform formation or participation. Given this chapter's focus on platform formation, the informants included several individuals in the sample of firms who were knowledgeable about the firm's approach to forming a platform or participating in one. Additionally, industry experts and regulators were among the interviewees so as to get a broader understanding of the different perspectives of the actors from different sides of the market. The structure of these interviews was similar, but here the focus was more on the key platform formation and organizational transformation trends they most commonly saw in the banking industry as well as the perspectives and challenges of the different players that they came across so far.

To mitigate the potential informant bias, I used several techniques. First, the data collection via interviews was in several waves distributed over 28 months, which allowed for the collection of both real-time and retrospective data. In this combination, the retrospective data enables efficient collection of more observations (thus enabling better grounding) and real-time data mitigates retrospective bias (Leonard-Barton, 1990). Second, I used interview techniques such "courtroom questioning," "event tracking," and "nondirective questioning" that yield accurate information from informants (Huber, 1985; Huber and Power, 1985). For event tracking, I put the informants back in the time frame of the events and then guided them forward through time to produce a step-by-step chronology of events (Eisenhardt, 1989). For courtroom questioning, I emphasized facts (e.g., dates, participants, meetings) as well as open-ended narrative (e.g., intended strategy) and avoided questions that typically yield inaccurate answers, such as broad speculations (e.g., how do you think the market will change with open banking?). I also pressed informants to be specific when they were vague (e.g., asked for details when an informant termed a platform "open"). For the nondirective questioning, I avoided questions about specific constructs until the end of the interview. Third, I made sure that the selected informants were particularly knowledgeable about the platform decisions of the focal firm, and industry experts (e.g., analysts, investors, trade journalists) contributed as an independent source. Fourth, all companies and informants were promised anonymity to encourage candor. Finally, the interview data was complemented with publications such as analyst reports and business journals; Internet publications and sources; internal sources; and observational data from various industry conferences. All of these strategies help reduce informant bias and lead to more accurate and generalizable data (Eisenhardt and Graebner, 2007).

Data analysis: Most interviews were recorded and transcribed verbatim, within 24 hours. In the few cases where recording was not permitted, I transcribed the interview notes within two hours after the interview so as to obtain a complete record. I started by analyzing the qualitative data based on the terms and themes used by the informants in the interviews (Eisenhardt, 1989; Yin, 1994). As a first stage of data analysis, I constructed a detailed description of challenger banks' and incumbents' efforts to offer a B2C financial platform. Then, I analyzed the findings from various informants in order to spot the common issues that the owners of these platforms experienced in platform ownership and openness. For instance, for challenger banks, there were recurring statements from informants regarding the firm's technical capabilities, focus on user interface and fintech relationships, which, in iteration with extant platform literature (e.g., Gawer and Cusumano, 2014; Parker *et al.*, 2016) helped forming the constructs for challenger banks' advantages in platform ownership. Further analysis of data from informants within this group also showed that all challenger bank platforms suffered from slow customer acquisition and low engagement, i.e., customers trying out the platform but not bringing over their salary and savings, which, through comparison with extant literature, emerged as negative effects of data-sensitivity and high customer inertia on user growth in new entrant platforms, thus expanding theory on platform growth into these underexplored settings.

I repeated the same process to identify the advantages and challenges experienced by incumbents in platform governance. I used tables and other cell designs to compare several possible constructs at once during this process (Miles and Huberman, 1994). Following this process of comparison and iteration with extant theory first for challenger banks, then for incumbent banks, and finally between the two groups, a mid-range theory emerged on the drivers and challenges of platform competition for new entrants versus incumbents in a regulated, data sensitive industry, as detailed below.

3.4. Findings

A. The Regulatory Trigger for Platform Emergence in Banking

Generally, the key aims of open banking regulation (and of PSD2) were to integrate further and support a more efficient payments market, as well as promote competition in an environment where new players were emerging. To fulfill the above target, one innovation that both regulations brought was to enable third party payment institutions to access consumer bank accounts mostly held by incumbent banks. For this, the law required all banks to create *interfaces* (such as open Application Programming Interfaces, or APIs in short) through which trusted third party providers (TPPs) could automatically connect to customers' bank accounts and access their transaction data as well as initiate payments, upon completion of a three-step process for customer consent. An illustration of access to customer data before and after open banking regulation is provided in Figure 9.

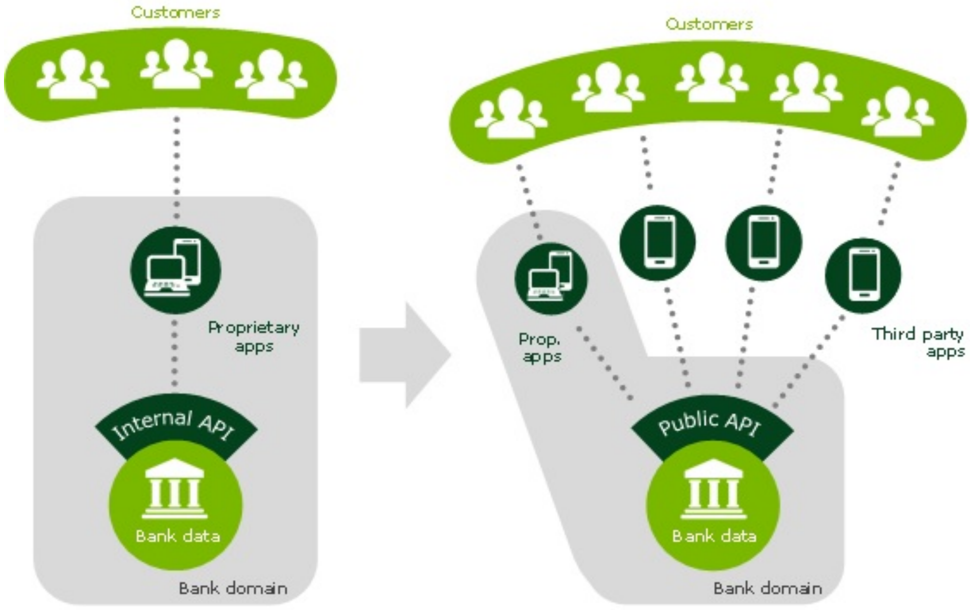

Figure 9. Customer data flow before and after open banking / PSD2 regulation.

Following the 2015 announcement that PSD2 and open banking regulations would come into full effect simultaneously in the EU and UK in January 2018, new digital banks started to enter the UK market, as being able to connect to customer data at incumbent banks meant that these new entrants now had a chance to switch customers over by showing how much better they could analyze customer data to offer more customized services such as money management tools (Table 2). Given that these new players only had one or a limited number of products, typically just a current or savings account, they focused on letting customers obtain financial services from multiple fintech providers by connecting them on a digital platform, typically in the form of a mobile application. Thus, the first business-to-customer financial platforms, also known as "financial marketplaces", were born as direct competition to the offerings of traditional banks[21]. Below, I describe the characteristics of these platforms and the challenges and trade-offs that different types of firms faced in building them in a regulated, data-sensitive industry. Table 2 illustrates the types of consumer facing platforms that I observed either in formation stage or readily available in the industry.

Table 3. Comparison of three types of platforms: challenger bank, incumbent bank inhouse (where bank is both the platform provider and platform owner) and external (when platform provider is the bank but platform owner is an external fintech or technology firm).

	Challenger Bank as Platform Provider	**Incumbent Bank as Platform Provider**	
		Built In-House	**Licensed from Third Party**
Ownership/full control of Platform Provider	Yes	Yes	No
Provider's own products included	No / Low	Yes	Yes
Openness	Open (High)	Low-Medium due to Competitive / Cultural Issues	Variable (Low-High) depending on Platform Owner's Policy
Initial customer base to populate the platform	None	Large	Large
IT challenges in complementor integration to platform	None / Low	High	None / Low

B. New Entrant Platforms

The digital-born new entrants, often referred to as "challenger banks", offered financial platforms to customers, very much in the spirit of Amazon or the Apple application store, aimed to compete for attracting customers along three dimensions. First, their leaner structure allowed them to provide services at a lower cost, which they could translate into lower prices for various services on their platforms. A fintech executive explained:

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[21] It is important to note that the open banking regulation does not mandate that banks turn into platforms. It requires them to allow connectivity with other players, which these players can use to entice customers to switch over. The emergence of platforms was a strategic choice by the new entrants, which then became imitated by the incumbents, causing the "platformification of the industry", as laid out in this paper.

> *"I think it is a scary time for [big banks], and when you look at these neo banks where their operating costs for a current account is something like 60p a year versus 70-80 quid or whatever it is for a high-street bank, then you know, there is a serious potential for cost-saving for the consumer there, and therefore, possibility for people to switch."*

Second, they competed on populating their platform with the "best choices for their costumers" in as many areas as possible. Given that they did not come into the industry with many products or services of their own, mostly with just a current account, they kept their platforms "open", i.e., available and easy to join for fintechs that pass the regulatory qualifications, to be able to accommodate the different needs of customers. The VP of Platforms of a challenger bank described:

> *"We offer one simple very clear product that is a nice app with a bank account and a debit card, a very good simple customer experience and then you can bring on board different partners like a marketplace that will offer a client the best services in the market, so right now we are working with other fintechs offering credit, offering investment, offering savings and obviously offering FX."*

An industry analyst described these new banks as follows:

> "*They understand the digital game where you fill your customer journeys from various APIs with other players."*

In addition to having an *open platform*, i.e., populating it with the "best choices for their costumers" in as many areas as possible, these digital-born players also invested heavily into providing the most user-friendly platform possible. An industry expert described how these players differentiated themselves on user experience as follows:

> *"<Start-up banks> need to differentiate their service to make it more interactive and easier to use and more of a delightful, you know the often overused term, delightful customer experience that you might get with Amazon or Airbnb or Uber, that if they can apply that to financial services then they can entice more customers in."*

As part of better user experience, challenger banks heavily used data analytics to help customers manage their money, limit their spending, be protected against fraud etc. An example of challenger banks' superior capabilities around technology and data analytics is how one challenger bank recognized a data breach at a retail website even before the website identified it and blocked its customers' cards to prevent fraud. One executive explained:

> *"At that point we were confident that there'd been a breach, so we told [Payment Processor] directly and decided to proactively replace every [Challenger Bank] card that had been used at [Website]."*

Using their technical skills to compete on variety and quality of user-experience motivated challenger banks to adopt the roles of platform owner and provider simultaneously, building the platform interface inhouse and controlling its curation. An industry analyst explained:

> *"You won't find any of these guys not managing their own platform cause great user experience requires control. And the only reason to give that up would be if you can't do it yourself somehow."*

As described above, the choices regarding platform governance were rather obvious for these new players - 'build the technology, own the platform, keep it open'- as they had the capabilities to build and manage a digital platform, but no products to populate it. For these players, the challenge was growing the user side of the platform in this industry, where data security and consequently trust in the bank, where data (and assets) resided, made customers inertial and sticky to well-known players[22]. One expert explained:

> *"You might have someone providing you with products that looks really cool and you might trust them if you are going to use it for the occasional expense; but if you are going to put your life savings there and you are going to depend on that to pay your rent, you might actually prefer to go with something less full-featured but you are pretty sure it's going to be there next year and the year after."*

A challenger bank executive similarly described:

> *"We're sort of an iTunes, for financial products, but what's maybe a little bit different than iTunes is that, iTunes is telling you which songs I should listen to...But when you advise a customer to buy a game and they don't like it for two Euros well then fine, but if I'm sending a customer insurance and it turns out that's not what she should have bought, then that's probably something we will really have a problem with the customer."*

One aspect of customer inertia affecting the challenger banks was that even when new customers signed onto their platform, the majority of them only transferred small amounts of money over to experiment, rather than deposit their salaries or savings into the challenger bank, in order to minimize their risk of going with a new player. An industry expert explained:

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[22] A 2017 UK study by Accenture found that customers are unlikely to change their banks due to lack of competition in the past, meaning they consider all banks in the UK to be the same in terms of offerings and customer service, and do not see the value to switch. The same study found that customer inertia is strong against challenger banks, as "even though customers did not trust the [incumbent] banks for giving them the best deal, they trusted them to keep their money safe." (see newsroom.accenture.com/news/accenture-research-finds-lack-of-trust-in-third-party-providers-creates-major-opportunity-for-banks-as-open-banking-set-to-roll-out-across-europe.htm)

> *"People are intrigued, for sure. Especially millennials. But to survive as a bank, you need people's money, and you need them to do things with that money. That's why most of these new guys aren't breaking even yet. People don't trust them."*

While dealing with slow customer acquisition, one problem that aggravated the matters was that given their resource constraints as young and venture backed companies, challenger banks spent most of their resources on perfecting and populating the customer-facing platform they were building, and typically had no resources to build the back-end, which was quite expensive in banking as it dealt with processing a large amount of payments. Many challenger banks relied on third parties for back-end transactions, i.e., payment, processing23, as described below:

> *"[Challenger Bank] is building it all which makes them unique, we're the ones leasing it for a long period of time while we get to scale... If we raise £40m like [Challenger Bank] we probably wouldn't stick with [payments processor], we'd probably do what they're doing because it's easier and there's less migration later; but because we're a start-up and we're like a proper start-up that doesn't get much cash, we have to do it that way."*

Evidently, this reliance on third parties for processing transactions on the platform created additional challenges in building trust among customers because it affected system resilience. For instance, during the data collection period, two of the challenger banks had their systems down twice for over 24 hours due to an issue with their payment partner. Two industry experts described the effects as follows:

> *"This is the tough period for these guys. They are already struggling to get the customers to trust them, and then this happens."*
> *"One negative experience can be very hard to overcome, typically for these smaller challengers. They have to be really on their best game in order to get and retain customers."*

Given the detrimental effect of a negative reputation on the already slow customer acquisition, most challenger banks switched to their own back-end IT infrastructure as soon as they had the resources so that they could gain more control over the customer experience. However, the switch itself proved to be problematic. For instance, when of the challenger bank made this switch, their systems went down for three days, creating widespread negative press. A competing challenger bank executive described:

---

[23] A payment processor is a company that handles transactions from various channels such as credit cards and debit cards. In an operation that will usually take a few seconds, the payment processor will both check the details received by forwarding them to the respective card's issuing bank or card association for verification, and also carry out a series of anti-fraud measures against the transaction.

> *"This is bad news for them. […] People are already worried. […] I think any neo bank that doesn't admit their customers are worried is lying."*

One way for challenger banks to alleviate the customer acquisition problem was to go international quickly, which informants described as "not that costly" for an online business. However, growing internationally as a platform required their complementors, i.e., fintech partners, to come along, which was especially difficult in segments with country-specific regulations, such as pensions or taxes, as described by one executive below:

> *"So we are definitely considering that we need different partners that are more local and also have a bit more local credibility. […] It's because they're doing a very country-specific product that has also a big impact or a big relationship with taxes. So when you're looking at investment funds, ETFs or when you're looking at index funds, when you're looking at pension funds as well, that is very very local, that is made in this country for the customers in this context, you cannot go abroad because of the whole, I would say, tax benefits that you get with pensions and with investments."*

Overall, the findings suggest that for challenger banks entering the UK banking industry, building an open platform was a relatively straight forward process from a technical and competitive perspective. However, the customer inertia in a regulated, data-sensitive industry made growing the user side of the platform difficult, which was worsened by not having the resources to have full control over the back-end of the platform. Attempts to alleviate the customer acquisition problem by going international quickly also proved difficult due to the high-level of local regulation that certain categories of complementors were subject to. By the end of data collection, several challenger banks were on top of the UK bank list in terms of product and overall customer satisfaction ratings, however all were still fueled by investor money and only one was at break-even point (Table 3). The theoretical model that emerges from this first section of findings on new entrant platforms is described in Figure 10 below. In addition, please see Appendix 1 for key supporting quotes for this and subsequent sections.

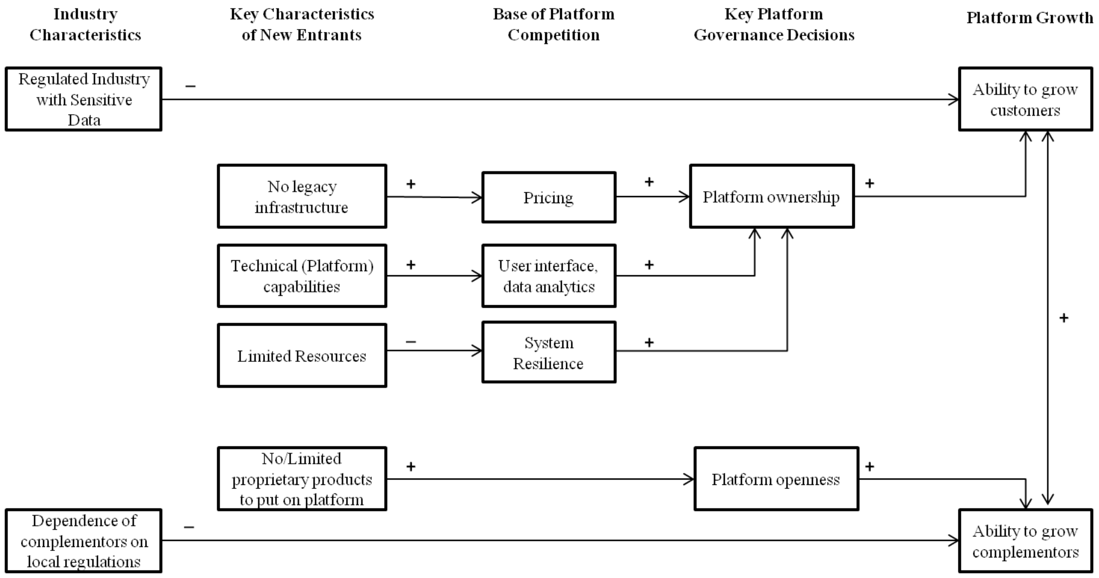
Industry Characteristics
Key Characteristics of New Entrants
Base of Platform Competition
Key Platform Governance Decisions
Platform Growth
Regulated Industry with Sensitive Data
–
Ability to grow customers
No legacy infrastructure
+
Pricing
+
Platform ownership
+
Technical (Platform) capabilities
+
User interface, data analytics
+
Limited Resources
–
System Resilience
+
+
No/Limited proprietary products to put on platform
+
Platform openness
+
Dependence of complementors on local regulations
–
Ability to grow complementors

Figure 10. Theoretical Model for Drivers / Challenges of Platform Governance for New Entrants in Regulated, Data-Sensitive Industries

C. Incumbent Platforms

The announcement of the open banking regulation in 2015 and the consequent market entrance of numerous challenger banks with platforms that were rich with fintechs and easy to use, motivated incumbent banks to work on offering similar banking platforms to their customers in order not to lose market share. Two bank executives described:

> *"It is a new world. It is happening. […] We can't afford to stay still. We need to collaborate otherwise we giving customers a good reason to switch."*
>
> *"The banks recognize that there is the potential to lose some of their income and the window to the customer, so all banks are looking at how to prevent that; and that's where the collaboration with these third parties becomes key, because we want to be competitive but we recognize that we don't have the best brains in the industry within our four walls. The best way to be competitive is to try and work with and take some of these ideas from these startups that may not have the funding and backup to offer the scale that they need."*

In offering a platform, incumbent banks had an important advantage compared to challenger banks – they already had an established customer base, which meant they could leverage network effects to attract the best fintechs. Two industry analysts explained this as follows:

> *"[Banks] have the customer base at the moment and the statistics say that I am more likely to remarry than I am to switch bank accounts, so there is a lot of inertia. And there is a lot of loyalty through inertia."*
>
> *"What we say to the incumbent banks is look, you have to move quickly otherwise you're going to get taken over by these start-ups; but at the same time you have a huge advantage - you have this very well-established brand that many people feel very safe and comfortable with. So all you need to do is to get the technology and apply that to your business model and then you can overlay that with your fabulous safe and established brand and actually not think about defending your market share but potentially increasing your market share."*

Given this critical advantage they possessed for platform success, as well as ample financial resources to build a platform, the majority of large incumbent banks in the UK attempted to build a platform in-house, which, if executed well, would give them a new type of competitive advantage and further enforce customer retention, as explained in the previous section on challenger banks. However, waves of interviews over two years also revealed that incumbent banks experienced severe challenges in the process that arose from having operated in this highly regulated industry for decades, and that affected platform ownership and openness. Below, I first describe the technical and cultural challenges that affected incumbent banks' ability to build their own platform, as well as other factors that affected their approach to platform openness as platform owners. These factors are illustrated in Figure 11 below.

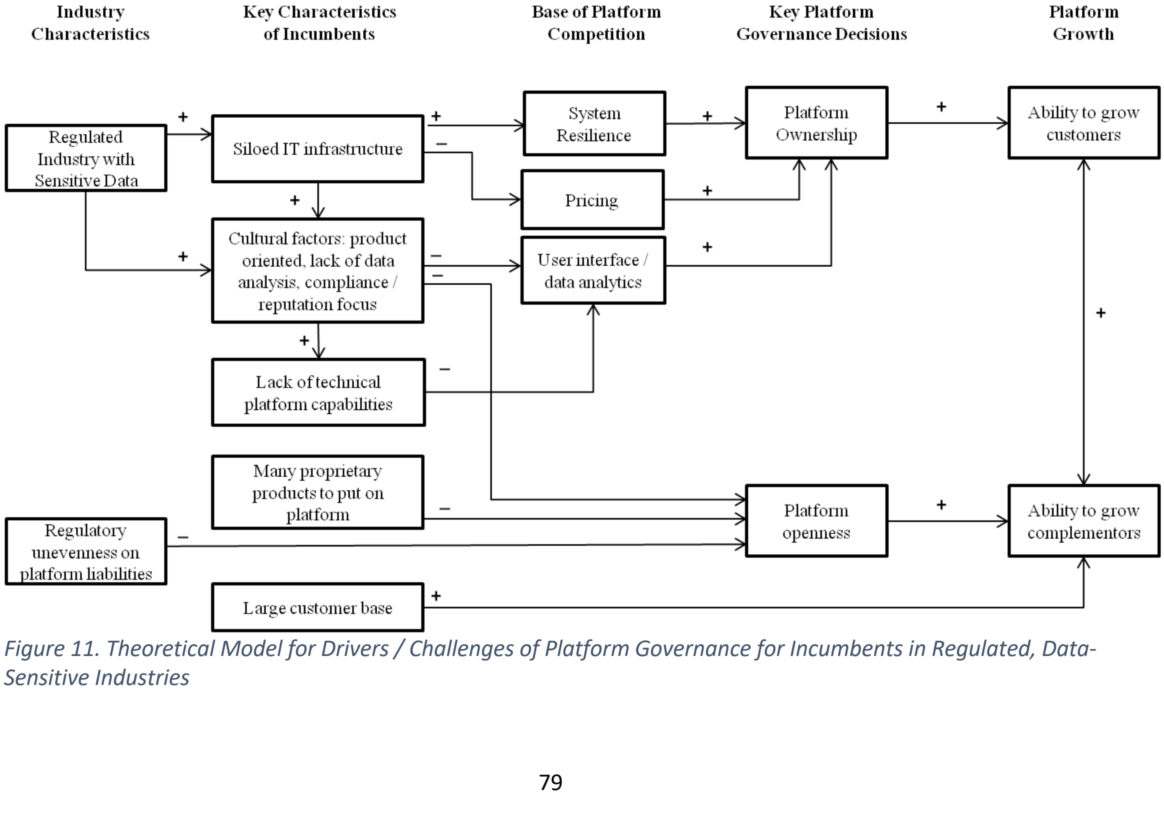
Industry Characteristics
Key Characteristics of Incumbents
Base of Platform Competition
Key Platform Governance Decisions
Platform Growth
Regulated Industry with Sensitive Data
Siloed IT infrastructure
System Resilience
Pricing
Platform Ownership
Ability to grow customers
Cultural factors: product oriented, lack of data analysis, compliance / reputation focus
User interface / data analytics
Lack of technical platform capabilities
Many proprietary products to put on platform
Regulatory unevenness on platform liabilities
Platform openness
Ability to grow complementors
Large customer base
+
−

Figure 11. Theoretical Model for Drivers / Challenges of Platform Governance for Incumbents in Regulated, Data-Sensitive Industries

C1. Incumbent Banks' Challenges in Platform Ownership

Technical challenges. First and perhaps most expectedly, incumbent banks did not have the technical expertise to form and manage a digital platform, as they had never done so before. Having operated in an industry where a traditional pipeline business model was dominant meant that the capabilities needed to build a digital platform, where third parties coexisted and the user experience was streamlined, were never developed. Two fintech executives explained:

> *"I think this is where the major banks are going to fall down. If they can transform their IT into a more Google-like, Facebook-like way of continuous delivery, continual testing, with modern software development, modern platform development; then yeah. I think they have got a huge opportunity. But there is a big difference between making a nice little app interface and actually transitioning to a fully modern digital offering."*
>
> *"It is clearly obvious to those who know technology that digital is a massive cultural, business and organizational transformation based upon a wholly new business model."*

In addition to the expected challenge of not having the expertise to build a digital platform[24], banks experienced a further technical complication due to the way they had structured their IT over the decades. Interviews revealed that as incumbents in a regulated and data sensitive industry, banks had resorted to creating separate IT systems for adding new products to their portfolio in order to ensure system resilience. As products (e.g., credit cards, loans, mortgages) were added over different decades and with minimal connection to the rest of the systems, the "isolated IT siloes" operated on different technologies that did not communicate well with one another. An industry expert explained:

> "*They've got all these vertically integrated pillars, which are all for different products and they don't really talk to one another. That's why, when you call your bank for something, they tell you, we've got great rates for a mortgage, and you go, but I actually have a mortgage with you!"*

A bank executive confirmed the existence of this multi-system structure as follows:

---

[24] Incumbent banks' experience with a traditional pipeline model also had consequences for their approach to platform openness, explained in detail in the next section (C2).

> *"When a customer initiates a payment we obviously have to check that it is a valid customer, they have access to those accounts, those accounts have balance in them, we have to talk to an enterprise fraud solution to ensure that payment is not fraudulent, potentially financial crime, AML, sanctions check out, balance check out, do a memo posting to say that the balance is aligned it to be reduced so don't use that balance elsewhere; and that's all before we then send it to the various market infrastructures. And each one of those touch points is an integration; and sometimes it's straight-forward and sometimes these are other legacy systems, which is not easy."*

For incumbent banks to build a platform, having isolated IT pillars with different formats and standards became a significant obstacle as making sense of customer data and sharing it with fintechs required connecting them, and connecting them without disruption was virtually impossible. Recognizing this problem, some banks decided to overhaul their IT infrastructure. However, this process turned out to be painful and risky. For instance, one incumbent's customers were unable to access online banking for several weeks, while others had access to other customers' accounts for several days during the bank's IT restructuring effort. The bank's handling of the project was still under investigation by UK regulators by the end of data collection. When asked, an executive from another incumbent bank described this story as "the nightmare of every bank right now". Interviews revealed that the technical challenges described above also led to cultural challenges, as described below.

Cultural Challenges. Interviews revealed that incumbent banks' siloed IT structure also created a culture of working within siloes focused on different products and "not touching anything that still works". The organizational roles in the banks were created around products and their interaction with one another was limited, which was quite different from a model, e.g., in a challenger bank, where the customer experience was the sole focus across different areas. A fintech founder described this as follows:

> *"Banks maintain their product-oriented view in their organizational structure as well, have departments created around the core products they offer. And, there is a lack of communication between those departments in general."*

An industry expert further explained:

> *"Look at how bank executive boards are constructed, right? Head of lending to SMEs, head of lending to consumers, head of this product, head of that product, they've got product mentality baked in to the organizational design. They don't have service at the top table. They don't have customer insight at the top table…"*

This siloed culture created significant challenges in achieving interdepartmental collaboration for creating a holistic platform, as one former bank executive described:

> *"So it wasn't only that people had different priorities, but we couldn't even get them around the same table for months. While all these competitors that you mentioned were popping up everywhere, we couldn't get one meeting scheduled, which was frustrating."*

In addition to the cultural consequences of their IT and subsequent organisational structure, incumbent banks also experienced cultural challenges in building their own platform that arose from having operated in a regulated industry for a long time. All informants agreed that operating in a regulated industry, where security and privacy of customers' assets and data were crucial, required banks to be primarily focused on complying with the regulation in order to protect their brand name and avoid heavy fines. One of the ways in which regulation affected incumbent banks' behavior was that they had developed very strict procedures and guidelines in order to protect the data, which came at the cost of using it. One executive explained:

> *"Data has been a hazardous exhaust product for banks, and we woke up one day and realized, wow, that's actually valuable."*

Thus, in contrast to challenger banks that differentiated themselves through data analysis, incumbent banks had a "fear of touching the data", as explained by one executive below:

> *"In theory, it is very easy for [bank] to know actually when a customer moves without updating their address with us because they change certain type of shopping and you see that they shop in a certain area; and the hours, you know, leaving from home, coming home and so on. So, we know when people move. Can we tell them that we know that they moved and offer services around that? No, we cannot tell them. […] This is a policy of the bank. You don't touch this type of data!"*

In addition to the avoidance of data analysis, another important consequence of a compliance-focused and siloed organization was that each product silo had its own interpretation of compliance, which stalled the discussions on compliance for a new initiative that spanned across departments, as explained by an industry expert below:

> *"Nobody can really comprehend or handle all the regulations. Each department inherits interpretations of various regulations as they apply to their particular situation. And that's what they care about…"*

The resulting slowness of incumbent banks when it came to forming a platform severely affected their negotiations with fintechs, as explained by various informants below:

> *"It's going to take you at least six months to negotiate the contract so that you can actually deploy this. And then it's going to take you at least three months to integrate it. The fastest thing that we have signed deals with them, six months, from first contact to the deal, that's the fastest." (Fintech Executive)*
>
> *"Where fintechs get frustrated is things like banks do security reviews and say here's our 150 page security assessment document. Can you fill this out? Then we're going to bring in a team to audit your infrastructure and make sure you got all these layers of security. Or you're on X, but we prefer you to be on Y. That's usually where they get caught up." (Industry Analyst)*

Many fintechs we interviewed stated that they could not rely on banks as they would run out of money while negotiating and getting a contract with them, as described below:

> *"The disadvantages [the fintechs] got is running out of money, having their time wasted by people who want to collaborate and don't know how." (Industry Expert)*

Overall, data show that incumbent banks that attempted to build their own platform experienced technical challenges that stemmed from lack of experience as well as having operated in an industry where data was sensitive and the price of getting it wrong was high in terms of customer trust and regulation. Their existing IT system, which was created in separate pillars in order not to disrupt the customer experience while adding new products, did not allow them to merge, analyse and share the data in a seamless way. These technical challenges also had significant consequences for banks' organizational culture that limited their ability to build their own platform, which required a holistic view and convergence of the services that customers valued. In addition, having operated in a regulated, data-sensitive environment created further cultural hurdles in the form of shying away from data analysis and having compliance-focused, slow processes. This created a situation where the positive network effects that would arise from large incumbent banks having millions of customers could not be leveraged as there were no platforms to start with, despite the numerous committee meetings and fintech negotiations that informants described during interviews (see Appendix A for the status of top 9 UK banks' platform-related efforts)[25]. A fintech executive described the delay in the emergence of incumbent bank platforms as follows:

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[25] The findings suggest that another factor further delaying banks' response to challenger bank platforms was that making contingency planning for Brexit (e.g., whether to move headquarters to EU) required resources and left less bandwidth for competing in the changing banking landscape within the UK. While this did not affect incumbents' intentions to provide a financial platform to their customers, it further delayed the process.

> *"Clearly the banks' ability to move fast is just not existing, and not just because they're big but I would say more because of the regulatory framework that they operate within ...So everyone's behind the curve. Yeah, a lot of banks I talked to is like -- they don't know what they're going to do."*

C2. Incumbent Banks' Approach to Platform Openness

In addition to incumbent banks' efforts in building their own platform, the study also examines these players' approach to platform openness, i.e., the extent to which they were carrying out negotiations to populate their platform with third party fintechs and what types of fintechs these were. Below, I describe the competitive and cultural factors that affected incumbent banks' approach to openness.

Competitive Factors. As stated in the opening description of the regulators' motivation for introducing the open banking regulation, incumbent banks had been operating under oligopolistic conditions where, largely due to the customer inertia in the industry described before, they did not have strong reasons to make radical changes to their products or the way they offered them to customers. With the entry of new and innovative players and the regulation that allowed these players to offer more customized services to customers by accessing and analyzing their data at incumbent banks, incumbent banks found themselves in a world where their products were put into direct comparison with products from multiple innovative players and typically ranked unfavorably. An industry analyst explained:

> *"If you open up that ecosystem and I can get my current account from <incumbent bank>, but then I can go and get a loan at a cheaper rate from somewhere else with the click of a button and I can get my mortgage from somewhere else, you know, all of that value for them is suddenly escaping. I think it is a little bit like, you look at Amazon vs. Barnes and Noble. They can recognize that selling books in a shop at the moment may work, but they have to cannibalize their own business in order to be relevant in 5 years' time."*

In the absence of a radical organizational transformation initiative that would reconsider the competitiveness of each product against the marketplace, incumbent banks were not willing to let fintechs compete with them directly on a platform where, given the competitiveness of its current product suite, the bank would mostly generate revenues as a platform provider rather than through selling products. Consequently, when asked how they were selecting which fintechs to work with, executives from different incumbent banks explained that they mainly used fintech complementors in areas that they did not yet compete in or underserved:

> *"Yes, we want to collaborate with fintechs where they provide additional services that we don't do ourselves today and that we could sell for our clients, tick, easy. But what if we could collaborate with a fintech that basically offers banking services but does that better than we do, with a better customer experience or cheaper or whatever? That's just happening at the moment and none of us has experienced it before. Collaborating for something that we don't do is a lot easier to explain than popping up and saying 'Guys, now we work together with XYZ because we think their risk model is better than ours and let's just give the lead to them, generate revenue by the lead generation and not selling credits or loans on our own anymore'. I'm pretty sure many of our supervisors will not go for that now."*

> *"First, we look for what is missing inside. That's the natural flow. If I can consume fintechs' APIs as well, I can enrich them with our services and together we can bring even better service in the market."*

Cultural factors. I observed that in addition to the competitive worries of exposing inferior products to direct competition on a platform, not having a platform mindset created a lack of openness even when there was no conflict of interest, i.e., when the fintechs were not in direct competition with the banks. Several fintech executives who negotiated with banks explained how banks' not wanting to "share the customer", i.e., give them visibility on the platform, was big source of conflict. A fintech executive described:

> *"So we clearly need banks, as I said before, but for us to survive, to get other banks as customers, we have to hold on to our brand and become visible to the consumers, but banks don't like that, naturally. So it's a zero-sum game and we're at the losing end..."*

An incumbent bank executive confirmed this tendency as follows:

> *"Branding is a big challenge. If a customer is interacting with those 2 APIs on the platform 90% of the time and interacting with the bank 10 times less than before, getting frequent reinforcement of the relationship that they have with the bank is a lot harder, unless the bank logo stays in front of those APIs. Volume things, and emotionally significant things, like getting money to buy my dream house or an insurance claim, which reinforce the brand are the key. If they're gone, your customer relationship hurts."*

Regulatory factors. An additional issue that affected banks' attitude towards openness came from the regulatory consequences of something going wrong with a fintech on the platform. Until late 2017, the issue of legal liability in a bank-fintech collaboration was in flux. Several bank executives mentioned that fintechs were largely uncategorized at that point in time and since regulators knew how to regulate banks, they would continue to "come after them". In November 2017, the regulator announced that until further notice, banks would in fact carry the responsibility of logging and investigating all abnormalities in the handling of data by third parties, practically giving all liability to banks. A bank informant explained:

> *"Actually, it is in the RTS [Regulatory Technical Standards]. In November last year [2017], the banks were made responsible for any possible problems that could appear in the chain between the customer and the bank. So, if the customer says that they have fraudulent transaction in their account, even if it was originated through a third party, the bank needs to immediately reimburse the customer. Afterwards, the bank [...] needs to prove what happened. [...] They carry the whole responsibility and the burden of retaining information on each transaction, which is difficult and honestly not fair."*

A few months after the regulation came into effect, more clarity was reached. However, the new regulatory guidelines did not improve the banks' situation by much, as explained below:

> *"If the TPP is liable for the unauthorized payment transaction, the TPP must indemnify the bank immediately. It all sounds simple. But then you start scratching the surface. What if the TPP claims it is not liable and the bank also thinks it is not at fault? One thing is certain: the customer does not get caught up in the middle – it is refunded by the bank, no matter who's ultimately at fault behind the scenes." (Industry Analyst)*

The unevenness of regulation regarding liability of platform owner versus complementors made banks particularly risk averse in their selection of fintechs. Different bank executives stated that going beyond the regulatory consequences, the reputational consequences of a fintech collaboration gone wrong on their platform would be detrimental, as below:

> *"I get why, it is why the regulators say that banks sit on too much of this stuff, you need to share it, you need to promote competition; but I am not sure if they have done enough on how you enforce the regulation around data leakages and security. The risk is that when something goes wrong, it is the banks who share that data, [fintechs] won't end up bearing the brunt of it. Even if it's not the financial brunt, the reputational damage..."*
>
> *"I guess the closest this comes to is – there is no record publisher that now has a successful platform business. It took a third party to turn that industry around. And I would argue banking is special in that the reputational consequences of getting it wrong are much higher. Even if you make it clear to the customer that this is now a third party they are dealing with, it doesn't matter. You used to keep their information safe and you made the lead, so it will be your fault."*

Overall, this study finds that incumbent banks were not open to building an open platform where complements, in direct competition or not, were visible to users due to the fear of cannibalizing their own products and not having shifted to a platform mindset. Another important factor was the unevenness regarding the legal liabilities of a platform owner in this regulated and data sensitive industry. These issues became major motivations for banks to work towards closed platforms, mostly offering their own products and services, and only complementing them in areas where their offering was weak or non-existent. In the next and final section of the findings, I summarize how resorting to a platform provider role became an alternative for incumbent banks who struggled to build their own platform, and point out how their approach to platform openness stood in the way of making this a competitive move.

C3. Incumbents Resorting to Platform Provider Role

Between the announcement of the open banking regulation in 2015 and the end of data collection in 2018, a new role emerged in the banking industry, which was technology companies, both start-ups and large established ones, coming into the market to offer "want-to-be platform providers" an alternative to building their own platform. The services provided by these external parties ranged from only technical support in building a customized platform, with no interference in platform curation, to a ready-made platform populated with fintechs for banks to plug into. All of these platforms were owned and managed by the technology firm. However, given incumbent banks' concerns with maintaining the customer relationship, the technology firms allowed their platforms to be white-labeled, such that the consumer always perceived the platform to be part of the bank's offering.

For incumbent banks, this type of licensed platform had several advantages over building their own. First, the external platform did not touch the banks' infrastructure but instead obtained data through APIs only for those customers who entered the platform and processed it within their own layer. Consequently, the banks' siloed IT system did not need to be changed, and thus service disruption was less likely. In addition, this option gave them a platform created and managed by experts, thus taking away the technical challenges that arose from lack of capability. Finally, the external party also handled the data, thus cultural issues regarding data analysis could be avoided[26]. Overall, external platforms available in the market were thus attractive as they allowed players to bypass the technical challenges of building a platform, as explained by an incumbent bank executive below:

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[26] On the flipside, as the platform was created and managed outside, only interacting with the bank electronically when needed, external platforms did not change the banks' culture in terms of reducing

> *"The thing with that is you can build it yourself but it will take time, so the other consideration is time, like how long do you have to invest in this stuff?"*

Interviews revealed, however, that these external platforms attracted different kinds of clients (platform providers) depending on how much the technology firm was willing to give up control over platform openness. Below, we discuss three representative cases, which are illustrated as different points on a spectrum of platform openness in Figure 12 below.

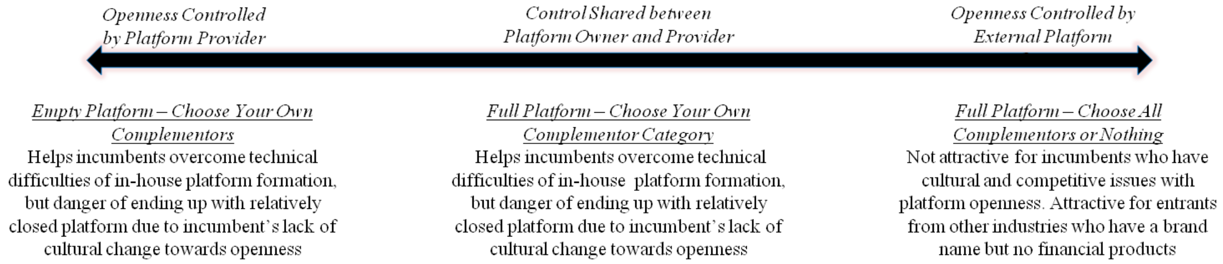
Openness Controlled by Platform Provider
Control Shared between Platform Owner and Provider
Openness Controlled by External Platform
Empty Platform – Choose Your Own Complementors
Helps incumbents overcome technical difficulties of in-house platform formation, but danger of ending up with relatively closed platform due to incumbent's lack of cultural change towards openness
Full Platform – Choose Your Own Complementor Category
Helps incumbents overcome technical difficulties of in-house platform formation, but danger of ending up with relatively closed platform due to incumbent's lack of cultural change towards openness
Full Platform – Choose All Complementors or Nothing
Not attractive for incumbents who have cultural and competitive issues with platform openness. Attractive for entrants from other industries who have a brand name but no financial products

Figure 12. Spectrum of externally owned platforms based on availability of complementors and policy for control of openness

Case 1: Ready-Made Platform – No Control over Openness

One extreme case was a technology firm that offered a platform already populated with numerous fintechs. Interviews with this firm revealed that aware of network effects, the founders were motivated to dominate the market by growing their platform as quickly as possible with fintechs. One executive explained:

> *"Everybody knows there can't be 10 different fintech marketplaces. So it's a race right now to become the only go-to place for banks and wanna-be banks"*

When it came to platform openness, however, this platform owner experienced a conflict with incumbent bank clients, as the founder explained below:

> *"We need our platform to be as inclusive as possible, obviously, it's our reputation hanging from it, in the end. But this can be challenging when you are trying to sell it to some clients. Some of those products they see on the platform are way better than theirs."*

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aversion to data analysis or increasing collaboration across departments to create a holistic customer experience.

To solve this conflict of interest, the firm went with an "all or nothing" policy, only giving banks the choice of getting all fintechs on the platform or nothing at all:

> *"I think, as I said we could be more…respond more directly to banks, how they would like to do it, but I think that's for us shortsighted. I think at the end of the day the market will benefit from an open system, and if we are a significant player in that market we will ultimately benefit. So yeah we could potentially charge a bank more by giving them the ability to limit the scope, for example right, but we don't believe that that's creating an attractive ecosystem that attracts customers and fintechs. At the end of the day if there is no traffic in the ecosystem, we lose, right; so that's how we think. It's for the greater good and the greater good serves us better in the long run."*

By the end of data collection, no incumbent bank had adopted this platform. The founder of Case 1 firm explained that this was due largely to incumbents' concerns over "the ability to customize the offering on the platform", as confirmed by one bank executive below:

> *"In a scenario where all banks adopt the winning fintech platform, we all end up with the same applications; and therefore, with the same value proposition. Like everybody who has Android ends up with the same apps."*

Interviews revealed that this platform was more attractive for entrants from other industries (e.g., technology, insurance) that did not have any financial products of their own and were intending to solely play the role of platform provider. One industry analyst explained:

> *"Look, PSD2 can be a great opportunity for anyone who has a trusted brand name in another industry to come in and offer banking services. In those cases, this kind of platform works really well as you have a blank slate to start with."*

Case 2: Ready-Made Platform – Partial Control over Openness

Compared to the first platform described above, the second one, which also had a large number of fintechs incorporated, approached platform openness in a more moderate way. This firm allowed banks to select from 15 categories of fintechs, e.g., include pension fintechs and exclude lending ones, but without any control over which fintechs to choose within each category. An executive explained this decision as a middle ground between what they and banks wanted:

> *"[Banks] pick and choose the services and the additional services. [...] They can't pick and choose individual fintechs. [...] Yeah, it'd be very anti-competitive for us to do that. I mean, if they did that, if we allow them to do that probably in*

> *two years' time, we're gonna get a fine at some point and no fintech would sign up with us anymore."*

By the end of the data collection, one large incumbent bank had signed a deal with this platform to implement it within a smaller subsidiary bank that they owned. The platform executives indicated that they had started negotiations with two other large incumbents in mid 2018[27]. Many fintech informants indicated, however, that while attractive to incumbents as it gave them control over platform openness, platforms of this type let banks keep their "old mentality" and build relatively closed platforms by mainly using their own products and only inviting third parties in areas they did not compete in. An incumbent bank executive mentioned:

> *"<Case 2 Platform> is a great option for any bank that needs to cover those areas that they don't compete or aren't strong in. It gives you a more complete set of products that you can offer to your customers."*

Case 3: Empty Platform with Full Control over Openness

The third and final type of offering was technology firms coming into the market to build and manage platforms for banks in the form of external IT departments, leaving it entirely up to the bank to populate the platform. The technology firm would also handle on-boarding any fintechs, as described by one executive below:

> *"Yeah, we do the technology for them. We don't go out and find partners. If they tell us they want to work with so and so, we can do the integration though. But they have to do the due diligence, we don't do any of that."*

While the first two types of external platforms described above were offered by one firm each, there were more firms, start-ups and large B2B technology providers, offering this third type of platform infrastructure, as it did not involve any scouting or relationship-building with fintechs, which required an understanding of the financial industry. By the end of data collection, one incumbent bank had announced one such technology partnership and technology firms indicated that they were in negotiations with other incumbents as part of their IT overhaul projects. As expected, however, this type of platform faced the same issues as Case 2 above, in that it allowed banks to build a closed platform and continue to operate without switching to a "platform mentality". One technology firm executive explained:

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[27] Case 2 executives indicated that they could not name these incumbents as the deals were not yet signed.

> *"I mean, it is a risky process, and banks don't want to take chances with something that can hurt their reputation. [...] So it's much more about having a platform where they can do account aggregation and put their products on, not so much about a marketplace."*

In this final section, I have shown how external platforms emerged in the industry as an alternative to platform ownership, which proved to be difficult for incumbent banks. While external platforms could solve many of the technical and knowledge-related barriers that incumbent banks faced in the way of doing it themselves, the competitive and cultural issues preventing openness still stood in the way. Adopting an open platform, which would have been the preferred choice for customers, was not preferred by any of the incumbent banks, due to concerns of product cannibalization and a lack of platform mindset. Two industry analysts explained the dangers of this tendency of incumbent banks towards closed platforms as follows:

> *"Look, everyone is trying to sell you something, right? So as a bank, you could easily buy something right now that makes you believe you have a right to exist in the way you do... The danger with that is that it will be too late when you realize that you don't."*
>
> *"I keep saying to banks, the media may be overestimating the short-term effects of this regulation, but you are for sure underestimating the long-term effects."*

The subsequent discussion section provides an overview of the findings and their contribution to academic knowledge on platforms and market disruption. I then finalize the chapter with limitations, implications for practitioners, and pathways for future studies.

3.5. Discussion

This chapter explored *what advantages and challenges new players versus incumbents face in creating / transitioning to a platform business model in a regulated, data sensitive industry.* The in-depth field study shows that challenger and incumbent banks experienced different challenges and trade-offs when creating or transitioning to platforms. The findings suggest that challenger banks faced no challenges in building their own platform due to their technical capabilities and digital-born culture, and again no challenges in their platform's openness towards complementors, i.e., fintechs, due to not having many financial products to start with. However, as new players with no brand name and limited resources, they faced severe challenges in growing their platforms on the user side in a regulated, data-sensitive industry.

Incumbents, on the other hand, already had a large user base for a platform, which gave them a significant advantage in jumpstarting network effects. However, the fear of having a system failure in a regulated, data-sensitive industry had caused them to develop a fragmented IT infrastructure over decades as well as an organizational culture that was siloed, product and compliance focused, and averse to data-analysis. These technical and cultural challenges stood in the way of incumbents building their own platform, which is evidenced by the lack of any incumbent platforms in the market one year after the regulatory change despite the numerous challenger bank ones already in use.

When it came to platform openness, having a large customer base was almost a disincentive for banks to build an open platform, as they saw having third party products among their offerings as a loss of customer relationship and profitability. In addition, being the established and regulated party created unfavorable regulatory conditions regarding the liabilities when collaborating with new entrants, which made incumbents particularly weary of opening up their platforms. Finally, I observed that in the midst of all these challenges, a new organizational role emerged in the industry to help incumbents bypass the challenges in platform formation: external platforms for licensing. However, this option created conflicts between platform owners (external parties) and providers (banks) regarding platform openness and resulted in either a lack of adoption, or closed platforms, which were suboptimal from the bank users' perspective and therefore not competitive in the long run.

Taking into account the above, this study provides a significant contribution in extending platform theory, particularly when new entrants enter to compete with incumbent players in an established, regulated industry. Traditional work in platforms focuses on firm-level strategies to compete in a platform-based economy (Van Alstyne *et al.*, 2016; Eisenmann *et al.*, 2006; Gawer, 2011) and puts forward the ingredients for a successful recipe in platform competition such as: how to energize network effects and attract customers and developers (Boudreau and Jeppesen, 2015; Farrell and Klemperer, 2007), decide on platform metrics and monetization, (Parker *et al.*, 2016), choose the optimal level of openness and control (Boudreau, 2010; West, 2003), design a successful platform architecture (Baldwin and Clark, 2000; Baldwin and Woodard, 2009). This chapter extends current platform theories in the form of challenges that new entrants versus incumbents face during platform formation, especially when they decide on the level of openness and ownership of their platform, in a regulated, data-sensitive industry (see Figure 13 for a visual comparison of these choices and trade-offs). Below are the details of this study's contributions.

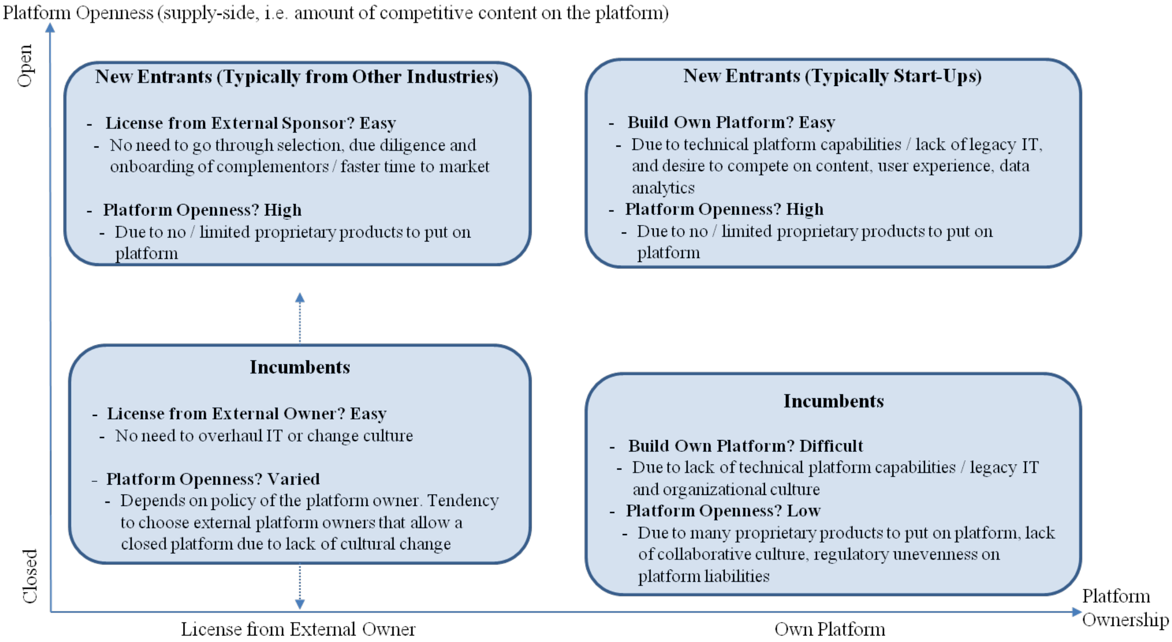
Platform Openness (supply-side, i.e. amount of competitive content on the platform)
Open
Closed
New Entrants (Typically from Other Industries)
- License from External Sponsor? Easy
- No need to go through selection, due diligence and onboarding of complementors / faster time to market
- Platform Openness? High
- Due to no / limited proprietary products to put on platform
New Entrants (Typically Start-Ups)
- Build Own Platform? Easy
- Due to technical platform capabilities / lack of legacy IT, and desire to compete on content, user experience, data analytics
- Platform Openness? High
- Due to no / limited proprietary products to put on platform
Incumbents
- License from External Owner? Easy
- No need to overhaul IT or change culture
- Platform Openness? Varied
- Depends on policy of the platform owner. Tendency to choose external platform owners that allow a closed platform due to lack of cultural change
Incumbents
- Build Own Platform? Difficult
- Due to lack of technical platform capabilities / legacy IT and organizational culture
- Platform Openness? Low
- Due to many proprietary products to put on platform, lack of collaborative culture, regulatory unevenness on platform liabilities
License from External Owner
Own Platform
Platform Ownership

Figure 13. New entrants and incumbents based on platform ownership and level of openness.

Incumbents' Platform Ownership, Openness and Response to Disruptive Change

First, I show how the heavily regulated and data-sensitive nature of an established industry can lead incumbent players to adopt vertical and product-centric IT and organizational structures, which help with compartmentalizing compliance and making the system more resilient, i.e., less prone to data leakages and failures, when products are added or revised. However, such a structure creates significant hurdles in transitioning into a platform business model, both from a technical and cultural perspective. Technically, different IT systems with varying degrees of compatibility become a major obstacle in converging and making sense of customer data for usage on a platform. These vertically integrated siloes that each focused on a different product (e.g. current accounts, lending, mortgages etc.) were highly secure and resilient, but did not allow for effective inter-product communication and data integration, both of which are important for digital platforms in information businesses (Parker *et al.*, 2016). In other words, the IT-related consequences of being in a highly regulated and data-sensitive industry made it particularly difficult for incumbents to switch to a platform business, where cross-system interfaces are crucial for third-party developers to build their solutions (Gawer, 2014; Baldwin and Woodard, 2009). On the other hand, overhauling the IT infrastructure to make it platform-ready is a complicated process in a data-sensitive industry for the very reasons that caused the decentralized structure itself: the risk of data leakages and system failure, as observed in the case of one of the largest UK incumbents during data collection.

This double-edged sword that incumbents experience in platform formation in a regulated, data-sensitive industry also has wider implications for a decentralized, product -rather than customer- focused, data-averse organizational culture, which can become another significant obstacle in getting the different departments organized and motivated to transition to a platform business model. Established theories, mainly from economics, on platform competition typically do not emphasize bounded rationality and imply that organizations and actors within are able to transition to the most optimal competitive state based on the strength of network effects, installed base, etc. (Katz and Shapiro, 1992). In a rare exception, the theoretical essays by Altman and Tripsas (2015) and Altman and Tushman (2017) point out how incumbents might struggle culturally as they transition to a platform business model. The study of incumbents in a regulated, data-sensitive industry uncovers further complications than just a traditional pipeline mindset as an obstacle in this transition. The findings show that the requirements for competing in such an industry make it difficult for incumbents to make a transition into a platform ownership role.

The findings also show how a new industry role emerged during the industry's transition to platforms, which was technology companies offering ready-made platforms to players such as incumbent banks that desired to provide their customers a platform, but did not have the capabilities and culture to build one. I observe that this type of licensing relationship can create a conflict between the platform owner (i.e., technology firm) and the provider (e.g., incumbent bank) when the latter has the customers but not the willingness keep the platform open. Those platforms that are richest in terms of complementors thus seem the most threatening to an incumbent that fears product cannibalization on an open platform. External platform owners showed different responses to this issue. Some did not compromise on platform openness and therefore targeted new entrants rather than incumbents as clients, while others gave either full or partial control over openness, knowing that this would lead to reduced attractiveness for complementors. Overall, I find that externalizing platform ownership can help incumbents overcome the hurdles of building their own platform. However, this strategy leads to platforms that are suboptimal, i.e., less attractive for customers, as they do not require the incumbent to change its product portfolio and organizational culture to embrace platform competition. Thus, the incumbent remains focused on appropriability rather than openness (West, 2003), trying to protect a large share of a shrinking pie (Jacobides *et al.*, 2006).

Extant work finds that when faced with disruption, incumbents can choose to adopt, ignore, attack or flee from the disruption (Constantinos *et al.*, 2003) and that even when they choose to adopt, the effectiveness of their response will largely depend on whether the change is competency destroying (Anderson and Tushman, 1990; Murmann and Frenken, 2006; Tushman and Anderson, 1986). Incumbent firms are known to have organizational routines which are built upon the firms' existing knowledge and experience (Benner and Tushman, 2002). For instance, Benner (2009) has found that in the photography industry, the existence of pre-set routines in the incumbent organization hindered the responsiveness to disruptive changes, but that the negative effect was stronger for incumbents whose capabilities depended on old technology (Benner, 2009).

The case of incumbents adopting a platform business model provides a perfect example of ineffective adoption as incumbent response to disruptive change. Incumbents' capabilities not only depended on old technology, they depended on a set of incompatible old technologies. In addition, there were cultural and compliance-related consequences of this fragmented structure, which created a perfect storm when it came to their ability to build a platform. On the one hand, having deep pockets allowed incumbent banks to solve this problem by outsourcing the process to external platform owners. On the other hand, this solution could not be more than a band-aid over a bullet wound, as an external platform made it even more difficult for banks to recognize the need to engage in creative destruction, i.e., overhauling their IT and organizational structure as well as their product portfolio. Thus, this chapter contributes to extant literature by bringing nuance to incumbents' ability to adapt to disruptive change. The findings emphasize that external solutions that help incumbents adopt a platform business model quickly may lead to loss of competitive advantage in the long run as these solutions are bound to lead to closed platforms in the absence of the incumbent going through radical change, which, in itself, is delayed by the availability of the external solution.

New Players' Platform Ownership, Openness and Other Challenges

When it comes to challenger banks, the story is entirely different, but again one where industry conditions matter significantly for platform competition. Challenger banks are the digital-born platforms that compete through great user interface and a rich ecosystem of complementors. Extant research suggests that in platforms where network externalities can speed the pace of competition, agile start-ups can quickly find themselves in equal terms with incumbents (Parker et al., 2016). However, in banking, these capabilities prove to have limitations in creating an advantage in platform competition as customers are inert and more likely to stick to well-known incumbents. Even when ease of use, price, and a high variety of offered services intrigue them to sign up for a new platform, engagement on the platform stays limited as most customers prefer to keep their salary and savings with incumbents. In other words, unlike platforms like Facebook, iTunes, or Twitter that created demand for something entirely new, or unlike Amazon where data sharing with sellers usually involves sharing basic customer information, e.g., name and address, new players in this industry needed users to fully switch from incumbents in order to be profitable, but lacked the trusted brand that users required to share sensitive (e.g., financial, risk-profile) data. Another industry characteristic that further complicated the matters was the cost of ensuring system resilience in a regulated industry where customers were carrying out large numbers of sensitive transactions on a daily basis.

As discussed in the findings, challenger banks attempted to alleviate the big challenge of user growth in this setting by having customers in multiple countries. However, this time they ran into another difficulty of platform growth that was industry-specific: many of their complementors (e.g., in investments, pensions) were subject to country-specific regulations and therefore not able to operate globally right away, which limited the platform owner's speed of international growth. Extant work on platform growth has largely focused on which side of a platform to incentivize first, and how, in order to jumpstart network effects (Parker and Van Alstyne, 2005; Rochet and Tirole, 2006, 2003). This study's findings regarding challenger banks thus not only point out the limitations to network effects in settings where switching from incumbents and platform onboarding are costly, but also bring nuance to international growth as a possible solution to industry entrants that suffer from the liability of newness (Freeman, Carroll, and Hannan, 1983). Scholars have found that many entrepreneurial firms are capable of going international quickly to reach scale (Autio, Sapienza, and Almeida, 2000; McDougall, Shane, and Oviatt, 1994), even more so when their business model is Internet-based (Bingham and Davis, 2012). The findings show that this strategy is less feasible when the entrepreneurial firm is dependent on a large set of complementors on its platform and when these complementors are highly dependent on national-level regulations.

Regulation, Platform Competition, and Industry Disruption

The research findings regarding platform competition in the banking industry also have implications for whether regulation can jumpstart innovation in a stagnant market, and how regulatory uncertainties and unevenness can hamper incumbents' willingness to work with innovative start-ups. Open banking regulation is a perfect example of regulators' attempt to reduce monopolistic/oligopolistic power in a regulated and stagnant industry by reducing entry barriers (Klapper, Laeven, and Rajan, 2006). Steel manufacturers, oil companies, rail transportation and wireless carriers are among examples of oligopolistic markets where market entry is difficult for new players which makes competition low, innovation slow, and prices high: a suboptimal outcome for end costumers. Therefore, regulation is required to protect the public interest and avoid market failures (Barbosa and Faria, 2011).

This study of a regulatory intervention to increase competition and innovation in the banking industry finds, however, that regulatory uncertainties and unevenness can stand in the way of a regulation's effectiveness in stimulating innovation. In the research period, legal liabilities regarding failures and data leakages on a platform were uncertain for a long while. During this time, regulators held the parties that were already under their jurisdiction, i.e., banks, liable for anything that happened in collaborations with new entrants. Then, when liabilities were revised, the situation did not get much better for banks as they had to first compensate their customer and then prove it was the third party's failure, which was not always easy. This finding about uncertainty and unevenness in regulation contribute to a more nuanced portrait of regulators as actors with certain tendencies and limitations rather than boundless, absolute authorities that can impose change (Gurses and Ozcan, 2015; Ozcan and Gurses, 2018). Regulators' tendency to put greater liabilities on parties that are already regulated while figuring out how to regulate new types of entrants can be an obstacle in the way of promoting innovation through collaborations between incumbents and new entrants, which, in an industry with high customer inertia, is a critical way for new entrants to reach customers.

More broadly, the challenges this study has identified for challenger banks to gain fully-engaged customers and for incumbents to transition to open platforms point to a picture of industry change which may be different from what the regulators intended. At first instance, one may conclude that if incumbents are changing minimally and new entrants have difficulties gaining customers, the industry may remain stagnant. However, open banking regulations, which makes it easy for customers to try out services from new entrants may be particularly advantageous for extant platforms in other industries, e.g., Amazon, Google, to enter the banking industry. Having a large customer base and a trusted brand name will help these platforms overcome the user growth hurdles faced by start-up challenger banks. The fact that most of such well-known platforms are US companies and open banking regulation is only in effect in the UK and Europe so far may have delayed the entry of such players into the industry. However, by the end of the data collection, Facebook and Google had already been granted an e-money license to enable payments throughout Europe and Amazon's lending business to SMEs on their platform around the world was estimated at several billion US dollars. Given this, platform envelopment (Eisenmann, Parker, and Van Alstyne, 2011) may be a likely future for UK and EU retail banking, which can serve as a warning that in industries with high customer inertia, regulations that open up the industry to platform business models may in reality be opening it up to competition from large platforms from other industries, which can create a new kind of monopolistic / oligopolistic situation. The conclusion section below provides implications of this finding and others for practitioners and policy makers and then discuss the limitations of this study and recommendations for future work.

3.6. Conclusion

This chapter explores the platform formation challenges and trade-offs faced by new versus incumbent players in a highly regulated and data-sensitive industry, especially focusing on the factors affecting these players' decisions around platform ownership and openness. The real-time qualitative data collection in this project allows us to distinguish between the strategies and challenges of incumbent versus new players as they emerge. They also highlight the limitations of certain platform strategies and dynamics (e.g., network effects, chicken and egg) in regulated, data-sensitive industries and provide a more nuanced view of platform emergence and industry transformation with attention to the organizational context, interorganizational conflicts, and the industry (and regulatory) environment.

The multi-level qualitative approach in this study contributes to platform emergence literature by highlighting the significance of the *industry context* within which platforms seek to develop. In contrast to relatively new and underdeveloped markets where consumers are prone to favoring the new entrant's superior proprietary platform (Katz and Shapiro, 1992; Matutes and Regibeau, 1996), I show that in established industries and particularly when customer data is highly sensitive, platform competition and industry disruption may have limitations even when interoperability between incumbents and new players is granted by regulation. This seems to be particularly effective when the information or services exchanged on the platform are highly sensitive in nature. Thus, the findings have implications for other data-sensitive industries beyond banking such as healthcare or insurance, where platform competition is also starting to emerge. In these settings, the value added for users from complementary services on a platform will need to be much higher proportionally to the inherent risks of sharing their data with newly introduced (i.e., non-trusted household names) platforms and subsequent external providers. As such, both challenger and incumbent platforms will need to lower transaction costs by not only guaranteeing access to good quality complementors (as per existing discussions in the literature, e.g., Parker et al., 2016), but also accept the liability on behalf of complementors in case something goes wrong.

The findings also have important implications for practitioners. For incumbents in highly regulated and data-sensitive industries, the findings show that it is crucial to transform their IT structure and organizational culture to be able to compete through collaborations. Even when the threat from innovative small new entrants does not seem large due to customer inertia, platform envelopment can bring highly trusted platforms from other industries and lead to significant loss of market share. Secondly, I recommend that incumbents become aware of the dangers of licensing external platforms without increasing their organization's willingness to collaborate with complementors. Without a cultural change, which these "quick fixes" take away the urgency for, closed platforms will lead to loss of market share, particularly as competitors with open platforms start to gain customers' trust over time.

New entrants, on the other hand, should first be aware that in data-sensitive and highly regulated industries, it takes time to acquire customers and convince them to switch fully; so it is crucial to ensure a resilient system to establish trust as well as a significant amount of value to incentivize the customers to get onboard. In addition, this study serves as a warning that going international to grow the customer base will take time in this industry as many of the local complementors cannot be taken abroad due to dependence on local regulations. Finally, for regulators, I first recommend that they increase the speed of adoption for such changes by addressing key sources of regulatory uncertainty, such as the distribution of liabilities in the new regulatory/institutional environment, which can hinder new entrants' ability to collaborate with industry incumbents. Finally, the study provides a warning of platform envelopment as a possible threat to regulations to level the competitive field in an oligopolistic industry. In the face of high customer inertia, new players may have much less of a chance to acquire market share compared to established platforms from other industries.

Chapter 4 - AI-driven Entrepreneurship in Data Sensitive Markets: A Study of UK Fintechs' Market Entry and Business Model Evolution

"Artificial Intelligence is about big data, data, data and again data."
Ursula von der Leyen, President of the European Commission

4.1. Introduction

In the past years, there has been an increasing activity in digital economy following disruptive market entries of new firms with digital business models (i.e. Airbnb, Netflix, Amazon) that provided services via digital channels (Christensen, Raynor, and Mcdonald, 2015). Such digital businesses facilitated transactions and data exchanges on their platforms as their core business model; and as they grow, they accumulated significant amounts of customer data, leading to the creation of 'big data'. This, in turn, enabled them to integrate artificial intelligence (AI) applications into their business model to utilize the large sets of data they collected. In other words, these firms collected data, formed rich databases, and then built relevant AI algorithms on top of the 'big data' they already owned, as opposed to entering with an AI-driven model with no data to start with.

These firms also dealt with relatively non-sensitive customer data at the early stages of 'digital economy', where privacy concerns were much lower and customers did not hesitate to share their data in exchange of the value they received. Similarly, there were no obstacles to customer acquisition due to specific industry, product/service or customer characteristics. However, we do not know how AI-driven new ventures *with no initial data* to start with strategize for market entry and growth, especially in the presence of regulations governing market activities (data-related or otherwise). Therefore, in this study I ask: *How AI-driven new ventures with no initial access to data build a business model in a regulated, data-sensitive industry?* Regulated, data-sensitive industries constitute an appropriate setting to study this process, as it acts as an extreme case where data is sensitive and data access is regulated.

To address this gap, this study investigates the business model design and evolution of AI-driven new ventures in the context of highly regulated, data-sensitive UK banking. I adopt a longitudinal qualitative approach to study business model choices of AI-driven financial technology (fintech) start-ups; and more specifically, I examine their entry business models and how these business models evolved over time due to challenges and context-specific constraints they faced (Foss, Klein, and Bjørnskov, 2019). I explore how *data access* challenges affected the business model choices of these start-ups, whose AI-based value propositions required access to mass data as key input.

This is an important and very timely subject to study. Due to digitalization of various markets, we observe 'industry convergence', where traditional industry boundaries are increasingly disappearing. This is also evident from the regulators' attempts to regulate innovative digital firms that started to emerge in every industry and the difficulty they experienced in the process. For example, GDPR (General Data Protection Regulation, a regulatory framework introduced in 2018 by the EU) affected many firms across different industries, including digital technology giants (i.e., Google, Microsoft), social media providers (i.e., Facebook, Twitter), and banks – in other words, all businesses that deal with customer data in the EU. Furthermore, the EU stated that "rebalancing big data power dynamics to tip the scales away from big tech" is among the goals of the bloc's developing data strategy[28]. As the EU is vocalizing their ambition to create 'a single market for data' and be 'open' (given certain conditions are met by 3rd parties that want to access and process European data), other countries such as Australia (Consumer Data Right) and US (California Privacy Rights Act) follow. These trends show that previously unregulated markets are becoming more regulated and regulators are adapting to the new age through 'smart regulations', which go beyond the traditional market-specific or industry-specific regulations. Instead, they adjust the regulatory frameworks so that they are appropriate for the digital, cross-industry businesses. As data economy takes hold and governments start devising new regulations to create and sustain innovative, competitive markets, it is crucial to understand the interaction between new business models, data and regulation.

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[28] "Europe's data strategy aims to tip the scales away from big tech", accessed at: https://techcrunch.com/2020/11/24/europes-data-strategy-aims-to-tip-the-scales-away-from-big-tech/

The findings in this chapter highlight the role of data as a key resource and data access as a key component of business model design for AI-driven new ventures in regulated, data-sensitive industries. This study finds that data access requirements and constraints cause significant changes in business models of AI-driven new ventures (i.e., pivoting from B2C to B2B), especially when they fail to acquire customers and access data due to data sensitivity. The findings unravel the variances in B2B business models and document associated trade-offs. I specifically explain the advantages and disadvantages of different types of clients in terms of data scope and competitive tensions depending on clients' existing product set.

4.2. Literature Review

Artificial Intelligence, Data Economy and Business Models

The age of AI is defined "by the emergence of a new kind of firm, based on a digital operating model, creating unprecedented opportunities and challenges" (Verganti, Vendraminelli, and Iansiti, 2020; p. 212). The increasing number of digital businesses led to an abundance and variety of data, which in turn caused various AI-driven businesses to emerge in different industries to utilize available data and offer personalized, targeted services. These AI-driven technologies allowed firms to make 'recommendations' based on users' transaction histories and emerging needs; so much so that AI "enable[d] the achievement of ultimate levels of people-centeredness." (Verganti *et al.*, 2020; p. 222).

The 'business model' concept has provided a useful theoretical lens to examine the activities and consequent success of such AI-driven, digital firms. As increasingly more industries started to undergo 'digitalization', this trend at the market level led to the emergence of digital business models as a stream of research under "digital entrepreneurship" (Kraus *et al.*, 2019). A business model is at the core of firms' competitive advantage (Casadesus-Masanell and Ricart, 2010a; Shafer, Smith, and Linder, 2005; Casadesus-Masanell and Ricart, 2010b), and thus, a valuable theoretical framework in understanding firm strategy in such dynamic contexts.

Extant academic work teased out different aspects of many successful digital business models so far. We know that Amazon, for example, employed a *co-opetitive business model* when entering the market, incorporating its complementors and competitors into their business model (Ritala, Golnam, and Wegmann, 2014). This, in turn, "has led to market growth, resource efficiency, and increased competitiveness not only for Amazon.com but also for its coopetitive network of third-party sellers, content providers, and large multi-national competitors." (Ritala *et al.*, 2014). Netflix entered via *business model innovation,* by introducing significant changes into existing business models – specifically by redefining value proposition, target client segment, and monetization components, differentiating itself from existing players (i.e. Blockbuster) and creating a significant competitive advantage in the long run (Ahuja and Novelli, 2016). Such entrants with innovative business models then evolved in time into data-driven, or AI-driven, digital giants leveraging their data advantages.

However, this transformation into AI-driven business models was preceded by the significant (and growing) amount of individual-level data they collected and the relevant artificial intelligence[29] (AI) capabilities they developed along the way. Netflix, for example, developed and employed a specific type of AI capability, called *supervised learning,* to leverage "a rich stream of data on each individual user. This focus on individuals can be scaled with no limitations on the number of users and the complexity of data" (Verganti *et al.*, 2020; p. 222). Uber invested in its AI capabilities significantly as "its ability to estimate accurate arrival times for customer and driver alike is essential to how it competes in the marketplace" (Kiron and Schrage, 2019; p. 32). Therefore, AI applications became the core of these firms' business models as they grew and evolved. In other words, these firms typically became AI-driven by building on the data they generated/collected. Our knowledge regarding market entry and growth of new ventures with an AI-driven business model but no initial data, on the other hand, is very limited, especially from a strategy and entrepreneurship perspective.

Our existing knowledge on AI-driven business models mainly comes either from practitioner-oriented articles, rather than in-depth academic studies, or studies from other disciplines. Garbuio and Lin (2019), for example, studied AI-driven health care start-ups and identified seven distinct AI-driven business model archetypes, which "differ in their target user, area of value creation, and value capture mechanisms". Yet, they do not explain "how data availability may affect the survival of resource-constrained start-ups." (Garbuio and Lin, 2019; p. 77). We know, for example, from information technology literature that firms in a digital industry typically devise a data strategy (either data offensive or data defensive) that is a function of the firm's overall strategy, culture, the level of competition in the market (i.e. data capabilities of rivals) and the market characteristics (i.e. regulations) (Davenport and DalleMule, 2017). Information technology literature also has studies analysing what they call 'big data business models' (Wiener, Saunders, and Marabelli, 2020); but our knowledge is limited on the evolution of AI-driven business models from a strategy and entrepreneurship perspective. Despite its significance, the role of data and its interaction with business model design/evolution has not been addressed by this literature.

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[29] Artificial intelligence can be defined as "a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation" (Kaplan and Haenlein, 2019; p. 17)

Business Models and Entrepreneurship

'Business models' are considered to be a bundle of firm's interlinked intra- and extra-organizational activities through which the firm creates, delivers and captures value (Amit and Zott, 2015; Saebi, 2014). Thus, business model design is a crucial process, especially for resource-limited new ventures, to clearly define *how* their offer will be brought to market and delivered to customers (Ghezzi *et al.*, 2015; Zott and Amit, 2007; Santos, Spector, and der Heyden, 2015). Furthermore, it is a key aspect of *strategic entrepreneurship*, as it explains how new ventures create value as well as new demand in cooperation with customers and other ecosystem players (Massa, Tucci, and Afuah, 2017; Priem, 2007; Zott and Amit, 2007). Thus, investigating the link between business models and value creation activities of entrepreneurs (by which entrepreneurs drive customer demand and willingness to pay, two prerequisites of value capture) is needed to better understand the strategic entrepreneurship practices of more customer-centric start-ups (Priem, 2007).

In order to benefit from the business model construct both theoretically (to ensure the consistency of academic research) and practically (as it affects entrepreneurial ventures' subsequent survival and growth) (Demil and Lecocq, 2010; McDonald and

Eisenhardt, 2020; Zott and Amit, 2008), there is a need to define business model appropriately. Although there is no consensus on business model definition yet, Zott *et al.* (2011) combine different definitions found in literature and underline the major components highlighted by the business model literature so far; namely the notion of value (i.e. value proposition), financial characteristics (i.e. costs and revenue streams), and the partnership network of the firm (i.e. delivery channels). In line with Zott et al. (2011) and Magretta (2002), the key business model components I focus on in this study are the value proposition, target market and client selection (i.e. businesses or individuals), and cost and revenue structures of the firms. Below, I analyse in more detail the key components of a business model that combine activities for value creation, delivery and capture (Lanzolla and Markides, 2020).

a. Value proposition. This component of the business model describes the *value creation* process, which typically involves improving the value to customers by "increasing use value or decreasing exchange value" (Priem, 2007; p. 220), in other words, by improving existing offerings or decreasing their prices, typically through innovation. Value proposition details how the value is created for customers through the products and services offered by the focal firm (Chesbrough and Rosenbloom, 2002; Teece and Linden, 2017). More specifically, this component establishes which needs are met by the firms' offerings (Schön, 2012; Teece and Linden, 2017) that are built on the resources and capabilities of the new venture (Demil and Lecocq, 2010).

b. Target market and clients. Identification of the market segment that would value the proposition offered by the firm is another important decision in business model design. This component would be based on *value delivery* decisions around who the firm would sell its products to (Chesbrough and Rosenbloom, 2002; Teece and Linden, 2017). The type of client chosen by the focal firm also informs how the products would be marketed to the clients, which can include "various kinds of 'customers' - end consumers, suppliers, complementors, competitors or sponsors - particularly in the case of multisided markets" (Demil and Lecocq, 2010; p. 231). Furthermore, firms that adopt an intermediary role in a value chain can consider their 'business clients' as well as the end consumers "as partners in producing value during consumption" (Priem, 2007; p. 222). This component is also a crucial part of business model innovation, which is a process starting with explorations of important customer needs to address (Amit and Zott, 2012), leading to a more customer-centric view.

c. Revenue and cost models. Building upon the decisions around value proposition and target market, this component describes the costs and revenue generation mechanisms of the firm (Chesbrough and Rosenbloom, 2002). Cost and revenue structure describes the cost of partner network as well as core assets and capabilities for value creation (i.e. regulatory licenses, technology) and the pricing mechanisms of the firm (Schön, 2012; Teece and Linden, 2017). Revenue models in B2C businesses, for example, can be: 1. free (also called a *third party revenue model,* where revenues obtained from 3rd parties such as advertisers), 2. paid (i.e. subscription models), or 3. freemium (a free version with a paid premium version) (Tidhar and Eisenhardt, 2020).

The initial design of a business model is often prompted by the entrepreneur's identification of an unserved or underserved customer need (Teece and Linden, 2017), which shapes the firm's goals to meet those needs (i.e. value proposition) (Amit and Zott, 2015). Other business model decisions that the firm needs to make are concerned with who will be willing to buy this proposition (market segment/client selection) and the identification of relevant costs and appropriate revenue generation mechanisms associated with the value proposition.

Having a better understanding of the interdependencies among these different business model components would inform us about how firms can design higher performing business models by building "superior interdependencies among the selected activities" (Lanzolla and Markides, 2020; p. 6). Therefore, the business model research requires further attention to identify the building blocks of a business model as well as the antecedents and consequences of business model design (Zott *et al.*, 2011), its context-specific evolution (Massa *et al.*, 2017), and the relationship of business models with digital technologies and data (Kraus *et al.*, 2019; Lanzolla and Markides, 2020; Nambisan, 2017), especially in the context of data-sensitive markets in the age of AI.

Business Model Change

While designing a business model can seem like a static process based on a one-time decision, we should acknowledge the dynamic nature of business models and understand how they change over time. The entry business model of a firm can be considered as a hypothesis regarding how the firm will deliver its value proposition to consumers, rather than a fixed plan; and it changes as new information and opportunities become available to the firm (Andries and Debackere, 2007; Chesbrough and Rosenbloom, 2002; Contigiani and Levinthal, 2019) or as environmental conditions change (Saebi, 2014). For example, firms make business model changes as a response to their economic, competitive and institutional (or regulatory) context (Saebi, 2014; Birkinshaw and Ansari, 2015) in order to sustain value creation over long periods of time (Achtenhagen, Melin, and Naldi, 2013). This dynamic nature is one reason that there are fewer studies investigating business model evolution, as analyzing this process requires a qualitative and longitudinal approach.

Saebi (2014; p. 148) defines business model change as "the process by which management actively alters the intra-organizational and/or extra-organizational systems of activities and relations of the business model in response to changing environmental conditions". Business model change can be radical and discontinuous, or incremental and continuous (Demil and Lecocq, 2010). It can also be additive or replacive, depending on whether a new business model is added to the extant incumbent model or the incumbent model is replaced by a new business model (Dos Santos, Spector, and Van der Heyden, 2015). Similarly, alterations in one of the business model components can have an impact on other elements of the business model due to interdependencies among business model components (Demil and Lecocq, 2010; Lanzolla and Markides, 2020).

Majority of extant studies analyse business model change of incumbent players, though it is also a critical process for the survival and success of new ventures (Gerasymenko, De Clercq, and Sapienza, 2015). Studies on new ventures suggest that they can pursue business model change via *business model innovation*, by introducing novelties in business model's content (i.e. by changing activities), governance (i.e. by partnering for certain activities) or structure (i.e. by altering the interdependencies among activities) (Snihur and Zott, 2020). Lean start-up literature talks about start-ups that 'pivot', where the pivot is defined as a major change "designed to test a new fundamental hypothesis about the product, business model, and engine of growth" (Ries, 2011; p. 178).

However, most studies on business model change fail to provide an in-depth and longitudinal examination of substantial, frequent and 'unavoidable' pivots[30] or business model changes of new ventures. Kirtler and O'Mahony (2020) study pivots from a 'strategic change' lens, whereas McDonald and Gao (McDonald and Gao, 2019) analyze pivots from a 'strategic reorientation' perspective and explore its outcomes depending on how it was communicated to different audiences. However, how and why such changes occur at the business model level and how the process is affected by interdependencies among business model components is understudied.

Research Gap

Literature mostly looks at business model design of new ventures (Amit and Zott, 2001; Zott and Amit, 2007) and business model changes in established firms as a response to competitive threats emerging in the market (Osiyevskyy and Dewald, 2015; Dos Santos *et al.*, 2015). What makes new entrants pivot and how they pivot is an underexplored area. Considering that new entrants' business model evolution will be partly informed by their entry model (Felin *et al.*, 2019), it is imperative to follow new ventures longitudinally with a qualitative approach to uncover the path-dependent and context-dependent nature of business model evolution.

With the rise of AI technologies, there is an emerging need for firms to account for the specific requirements/challenges associated with AI-driven business models. In markets being disrupted by AI-driven firms, data access can be key for survival and growth, but the rules and requirements of data access can differ in different market contexts – i.e., there might be some data access restrictions in regulated markets or in the presence of specific data regulations. In such contexts, this requirement can lead to vital dependencies between firms and customers (both the source of data and user of the services). Building on the growing attention from regulators into the digital space, this chapter addresses the need for studies on how resource-limited new ventures with AI-driven business models strategize upon entry into regulated markets.

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[30] Building on the concept of 'pivot' introduced by the lean start-up literature, pivots in this study to describe *significant changes in the business model* that new ventures have to make *in order to survive,* or more specifically, when they face with significant obstacles they could not overcome with their existing business model.

Overall, more studies are needed to account for the "characteristics innate to digital technologies" in digital entrepreneurship (Nambisan *et al.*, 2019), to understand the impact of technologies such as AI on entrepreneurial strategy / business models (Drnevich and Croson, 2013), to untangle how market characteristics shape entrepreneurial strategy (Nambisan, 2017) and how start-ups respond to regulatory constraints and changes (Audretsch *et al.*, 2020). This gap should be addressed to inform *strategy* and *entrepreneurship* literatures, and specifically the *business model research stream,* in the age of AI. Therefore, this study asks: *How AI-driven new ventures with no initial access to data build a business model in a regulated, data-sensitive industry?*

4.3. Methodology

In this study, I followed an inductive qualitative approach with a multi-level design, where I analyse firm-level business models and challenges experienced by new ventures emerging due to firm-level and market-level characteristics. I collected data through semi-structured field interviews, observations, and archival research in real-time (covering the period between 2010-2020). I used multiple cases to build the theory inductively (Eisenhardt and Graebner, 2007). Choosing multiple cases within each category is critical as each case serves as a distinct experiment and multiple cases serve as replications that reveal similarities and differences, contributing to the emergence of theory (Yin, 2013).

Data Collection. I conducted 53 interviews with founders/executives from 9 case firms (see Table 4) as well as regulators, incumbent banks and industry experts. The cases were selected based on the criteria that they were AI-driven fintechs in the UK that entered the market between 2010 – 2018 with an AI-based value proposition. I supported the interview data with archival data and observations at industry events. In each of the chosen cases, I spoke with 1-3 individuals (depending on the size of the fintech), who were knowledgeable about the firm's business model and its evolution over time. Additionally, I incorporated the views of regulators, incumbent bank executives and industry analysts so as to get a broader understanding of different perspectives of the actors from different sides of the market. The firm-level data was triangulated through multiple interviews in order to avoid informant bias. I also used archival interviews and data sources such as news articles, press releases, blog posts from case firms' official websites to complement our knowledge and triangulate the findings. Overall, I used more than 400 pieces of archival data that included firm-level information as well as market-level analyses.

Table 4. Overview of selected cases

	2010 – 2015 Before new data regulations were announced	**2015 – 2018** Implementation period, after new data regulations were announced	**2018 - 2020** After initial implementation deadline for new regulations
B2C	**Market entry: 5 start-ups** Melinda, Blink, Blackboard, FinCen, Bold	**Market entry: 1 start-up** Firebolt (immediately added B2B)	**3 of 9 cases had a B2C offering:** Blackboard, FinCen, Firebolt
B2B	**None** of the cases.	**Market entry: 3 start-ups** Taken, Payloans, Openers **Pivot to B2B: 6 start-ups** **- *Additive***: 3 start-ups Blackboard, FinCen, Firebolt (2 of the 5 existing start-ups, 1 new entrant) **- *Replacive***: 3 start-ups Melinda, Blink, Bold (3 of the 5 existing start-ups. They repurposed their B2C for testing/AI training)	**All 9 cases had B2B offerings:** - 4 of these start-ups created connectivity platforms after the regulatory change with in-house data access technology (Blackboard, Blink, Taken, Openers). - 7 of these start-ups had a value proposition of data aggregation & enrichment (to prepare data for AI applications)

Data Analysis. Once interviews were completed, a detailed description was constructed for each fintech case based on the triangulated data and using the case history methodology (Eisenhardt, 1989). When building the cases, I followed up with the informants to fill in the missing pieces. I then conducted a cross-case analysis to identify any common themes and spot the similarities and differences among cases (Creswell and Poth, 2017; Eisenhardt and Graebner, 2007). I used tables to facilitate comparisons of multiple possible constructs within and across cases (Miles and Huberman, 1994). I formed relationships between constructs based on emerging themes, and then enhanced these relationships by doing iterations between the cases and specific constructs / relationships. These iterations between theory and data enabled me to sharpen the identification and analysis of the constructs as well as the theoretical relationships among them (Eisenhardt, 1989). As the theoretical framework clarified, I related it to extant research on business models and entrepreneurship. Furthermore, I compared the data and findings with extant literature in order to identify similarities and differences as well as to strengthen the internal validity of the findings. Then, the cases were grouped based on the design and context-dependent evolution of their business models, which led to the emergence of three main categories: 1. B2C entrant pivoting to B2B by removing B2C from its value proposition, 2. B2C entrant pivoting to B2B by keeping B2C in their value proposition, and 3. B2B entrant. The research findings, described below, were constructed by following iterations among case data, proposed theory and existing literature.

4.4. Findings

This section explores how AI-driven new ventures with no initial access to data build a business model in a regulated, data-sensitive industry in the context of UK fintech between 2010-2020. I start by analyzing the business models of AI-driven fintechs that entered before 2015[31]. After discussing the challenges experienced by these fintechs with a B2C model during this period, I discuss how they had to pivot to B2B due to the challenges they faced and how this transition was accelerated by Open Banking regulations. Finally, I examine the variations in B2B business models and associated trade-offs, both for older firms that pivoted from B2C as well as for fintechs entering with a B2B model after 2015.

A. B2C Entry into a Data-Sensitive Market

In this section, I analyze the B2C fintech cases (five out of nine total cases, which were Melinda, Blink, Blackboard, FinCen, and Bold) that entered the market in the period between 2010 and 2015. Here, the main offering of these start-ups was an AI-based personal financial assistant, called a Personal Finance Management (PFM) app. The PFM app effectively created a *digital hub* that aggregated customer's financial data from different types of accounts from multiple banks (e.g., current accounts, credit cards, savings, investment accounts). Thus, within a single app, customers could see and access all their financial information, traditionally distributed across various products from different providers. Correspondingly, fintechs could provide a PFM app and help customers be in control of their finances, by analyzing their data and providing a complete financial picture that was easy to understand and use. AI algorithms[32] and nudges were used to provide insights based on customer data and to encourage better financial behaviour. This enabled the creation of an affordable personal AI assistant, as explained below:

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[31] I specifically selected 2015 as a cut-off point, since it marks the start of a transformative period in UK banking. In 2015, Open Banking regulations were announced in the UK and introduced standard open APIs for data access to facilitate innovative fintech business models (discussed in more detail below in subsection c of section A).

[32] These algorithms varied in their level of sophistication: some were simple algorithms that provided a number of rules and constraints for AI-based decision-making, whereas some of them employed more autonomous and agile machine learning (ML) tools. ML is a sub-category of Artificial Intelligence,

> *"Now, AI is transforming personal financial management [by doing] what most simple budgeting apps can't. An AI assistant not only tracks expenses but also learns from a user's spending behavior, which means it can predict the user's actions and make useful recommendations." (Industry Expert).*

These AI-driven[33] new ventures were able to offer personalized services, categorize transactions, provide data analytics and visualizations, make predictions about customer's future purchases and account balances, and offer insights and recommendations based on customer data to help with budgeting. The informants discussed:

> *"We use ML algorithms to predict what peoples' balance would be, using a whole range of data and comparing them to other people's data. So we can actually know if someone is going to go into their overdraft, and let them know beforehand - we can say 'oh, click this button to move this money from your savings account back into your current account so you don't encounter a fee.'" (FinCen Executive)*
>
> *"Aggregation, smart balance, goals and lists are the key tools that allow our systems to understand people and their ambitions. They are data gathering tools, which helps us paint a picture of users for persona mapping and our neural network." (Bold Founder and CEO)*

All of the cases in this study have used some level AI to fulfil this purpose, although some of them had more sophisticated ML algorithms that allowed them to be more flexible and adaptable whereas others used simpler algorithms for basic transaction categorization. The level of sophistication was incumbent upon the amount and quality of data fintechs could access and feed into their AI models, as explained below:

> *"The more people using AI, the faster it learns. […] Until an AI system goes through enough training data and is exposed to several use cases, it likely won't perform any better than conventional software." (AI Expert)*
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> *"Quite often within fintech what happens is, if you talk about AI, you talk about lots of statistical methods and stuff, but they are fundamentally doing it on a very poor dataset, so the outcome is nonsensical. So we think a lot about the quality of the dataset, the structure of the business model, the structure of the product, as well as applying good stats and all that stuff." (Payloans Founder & CEO)*

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which can be defined as "algorithms [that] learn from existing patterns in data to conduct statistically driven predictions and facilitate decisions" (Choudhury, Starr, and Agarwal, 2020; p 1382). ML technology improves in parallel with the amount of data that is fed into the ML algorithm.

[33] The use of the term 'AI-driven' rather than data-driven is a conscious choice. 'Data-driven' emphasizes data, whereas 'AI-driven' focuses on the processing ability that enable actors to extract insights from data as well as to act on those insights (Colson, 2019). The fintechs in this study rely on AI capabilities in their value proposition, which establishes them as AI-driven new ventures.

Consequently, data was a prerequisite for these firms to build their AI-driven value propositions. Therefore, serving the customers was a means for not only value capture but also value creation, as it enabled them to access and collect data.

a. Client selection and scale-up challenges. Due to their AI-driven value propositions, these new ventures required access to mass data to train and improve their algorithms. Hence, they needed to scale up quickly to both sell their products to survive as well as to increase the quality of their core proposition to grow, as discussed below:

> *"Data is the fuel your model learns from, and there is no good substitution for using data for training that has been captured in the exact same conditions as the in-production environment. On the model output side, getting unambiguous, high quality data is more important than spending time on improving the model itself." (AI Expert)*
>
> *"I think our product is not nearly as good as we want it to be, and when we launched, no one has built a good PFM [...]. What everyone's very sceptical is, there is no demand for these PFM services, but - when the data is not accurate and there is always other challenges and the product is not quite right, of course the customer is not happy, it would be strange to have mass market appeal, right? You need to get these basics right…" (Blackboard CEO)*

However, customer acquisition was difficult in a highly regulated and data-sensitive market. Even though the UK banking industry has long been characterized by a lack of competition, these fintechs with innovative and competitive services still struggled to defeat customer inertia and scale up. They had no brand name, and thus, lacked customer trust, which was quite a difficult challenge to overcome, as explained below:

> *"I spent the first 5-6 years trying to avoid going out of business. Our inability to build a customer base or to align the business model [was the challenge pushing us out of business]. Quite fundamental things! Trying to build a customer base requires some marketing budget, the Angel funding we had was always just enough to build a new piece of technology." (Blackboard Founder)*

To gain legitimacy and trust, fintechs positioned themselves as agents "looking after the customers' financial wellness". This was what differentiated them from incumbent banks, as explained below:

> *"Unfortunately, banks still make a lot of their money of fees and charges. Quite a lot of their profit is driven from fees and charges, it is just not in their interest to help people avoid those fees and charges. Whereas it is completely in our interest, because we wouldn't make money of fees and charges. We would make money by having loyal customers who wants to keep using the app." (FinCen Executive)*

These start-ups expected a new generation of banking customers to give them the boost they awaited. They believed that the more digitally savvy new generation who prioritized good user experiences and was more accustomed to digital world would be choosing their offerings over traditional banks', as explained below.

> *"Things are moving at a pace. When you look at where new apps, new services, and digital-enabled services that are moving to - yes, we'll have people in their 60s-70s and 80s who probably won't change; but especially with the millennial generation, if there is a better service, I think they will change. [...] When you can start offering really clever features which make your life better, then people will switch." (FinCen Executive)*

However, this expectation offered no solution to the obstacles they faced in the short term. Thus, customer acquisition posed a very difficult and costly challenge to overcome, even though these B2C entrants were operating at a lower cost base compared to big banks due to their lighter regulation and digital-only presence. The challenges in customer acquisition as well as the resource-limited nature of being a start-up created a lot of pressure on these fintechs.

b. Monetization challenges. This B2C business model enabled an easier and relatively lightly regulated entry for fintechs into the highly regulated banking industry. However, despite the cost advantage in terms of regulatory overhead, the challenges in customer acquisition translated into high costs of scaling up, as explained below:

> *"There are very few products that sell themselves to consumers. So in effect, unless you're very, very lucky, and I mean very lucky, you will have to sell your app. For every single consumer that uses your product directly, there will be a cost of acquisition, and it tends to get higher and harder once you've got the low-hanging fruit - the early adopters." (FinCen CEO)*

Consequently, going with a B2C offering in a highly regulated and data-sensitive market required a large amount of funding for a long period of time (i.e., until the business got profitable), as explained below:

> *"The first wave of consumers, the first 1,000 or 10,000 - quite often, they can be acquired at a fairly inexpensive cost and it gives you false hope. [...] Unless you have a very well VC-backed business that is happy for you to keep putting your hands into the funding jar, to the tune of anywhere beyond £100 million, and could easily be £200 to 500 million, I'd be worried about that business model." (FinCen CEO)*
>
> *"If you look in the past, the guys like Mint in the US that are pure PFM providers, they've all tried for some time and burned quite a bit of money in the process." (Melinda Executive)*

Correspondingly, lack of customers in these business models also meant lack of revenues. Therefore, despite the superior value proposition they owned compared to established players, it was "*expensive to roll up a user base"* and difficult to *"figure* *out a way to monetize that user base"* for start-ups in a data-sensitive, regulated market.

Furthermore, which monetization models would be appropriate in this market context were not always straightforward. When investor pressures for profitability got higher at some point after market entry, it put fintechs who advocated for financial wellness in a difficult position. The dilemma they faced was due to the mismatch between the simplest revenue generation opportunities available to them and their 'financial wellbeing' offering to the customers. Most of the time, the easiest money-maker was not in the best interest of customers, as it usually involved selling suboptimal (i.e., costly for the customer) but profitable financial products to the people in need of financial guidance. This incompatibility between fintechs' value proposition and available revenue channels constrained their path to profitability. FinCen CEO explained:

> *"You enter with that business model, you get some traction, and then you come under pressure from [funders] to deliver some kind of revenue. Quite often, the low-hanging fruit on revenue tends to be things that I don't necessarily think are in the best interest of customers." (FinCen CEO)*

These start-ups could also monetize by selling anonymous data to 3rd parties, which could help alleviate some of the challenges at their early stages. Yet, this option had the risk of damaging the focal firms' newly developing brand name, as selling sensitive data could cause a backlash from customers that already found it difficult to trust these players. Two informants explained:

> *"[...] Otherwise, you end up going into the realms of Facebook and Google where people know that you're just providing them with data that they sell – and that's okay if it's Facebook or Google, but if it's your banking data, the users aren't really happy with that." (Industry Expert)*
>
> *"Our model works without having to monetise customer data. We prefer to keep that data sacred and use the insights gained to understand where people are not being serviced and to help our bank and fintech partners serve them better." (Bold Founder and CEO)*

FinCen, a B2C entrant among the research cases, tried to monetize by introducing a subscription model, which created another bottleneck in growth, as the number of customers that would sign up to a non-familiar paid service was even lower. Another more popular attempt for monetization was to offer a financial services marketplace of 3rd parties. This proposition created a bank-like bundle with additional financial products and smart features (i.e., new product recommendations and in-app switching options to save money), where AI-driven fintechs made personalized suggestions. An informant explained the logic of this monetization model below:

> *"If you don't have the products to create a profit margin for your business, you have to think about other ways of creating revenue. So, you have to look at interactions." (Firebolt CEO)*

In return, the central PFM fintech would earn money from referrals to these 3rd parties. Providing a bank-like product built on the initial PFM offering was also a logical model for firms who wanted to get a banking license eventually. However, becoming profitable with the B2C model was still difficult even after expanding the value proposition to include a marketplace, because it still necessitated a large scale, as explained below.

> *"A dead marketplace that no one ever goes to doesn't generate that much money or engagement." (Blackboard CEO)*
>
> *"To a certain degree, you can monetize through third party product provision and commissions and stuff like that, but that's still challenging." (Melinda Executive)*

In sum, the monetization options in this model were based on a 3rd party revenue model (selling data), subscriptions or marketplaces, but the market characteristics and lack of customer acquisition inhibited fintech start-ups from employing and exploiting these revenue channels.

c. Data Access Technology and Impact on Value Proposition. Depending on the success these fintechs achieved upon entry, their business model could be expanded by making additions to the value proposition (by adding new services, as discussed above) and creating a bank-like bundle without the regulatory overhead of a banking license. An informant explained:

> *"At the end of the day, if we can provide a way where you can seamlessly apply for a loan, apply for a mortgage, and view and manage your current account; then, to provide you a good service, do we need to actually be holding your money? I think the answer is no." (FinCen Executive)*

Thus, to obtain relevant resources depending on their strategic growth ambitions and future product goals, fintechs strived for maximum accuracy and quality not only with respect to their AI models but also the relevant data inputs, as discussed below:

> *"If you're building a PFM app, you might require a fast categorisation engine with a reasonably high categorisation rate and a large number of categories, but having a low error rate is not critical; because the app users wouldn't mind the results not being 100% correct. However, if you're planning to use categorisation for credit risk purposes, like automated credit decisions, having a low error rate is critical to ensure accurate credit decisions." (Industry Expert)*

However, the challenges described above constrained the development of these new ventures' AI capabilities and so, the quality of their value proposition. An industry expert explained:

> *"Nothing is more important for personal finance assistant development than big data. An AI assistant must be able to quickly dig through large volumes of both structured and unstructured data. For instance, an AI financial app has to run through transaction history and display it in dashboards or graphs." (Industry Expert)*

In this market period (before 2015), the most common data access technology for independent fintechs was *screen scraping*, which required customers to share their banking credentials with fintechs. Then, fintechs acted as the customer to log in to their bank accounts and retrieved / aggregated their financial data within the PFM app. However, the challenges of B2C start-ups arising from market characteristics and trust issues were amplified due to the shortcomings of this technology. Using screen scraping for data access worsened the trust issues that fintechs experienced as it required exchanging sensitive data in an unsecure way, as explained below:

> *"Consumers have been told the very first time they open an account as kids never ever to share their banking credentials, their passwords, and that's the only way to use PFM today. So first they go 'Oh, it's a money management app, I think I'll give it a try', and then it gets to the screen which says, 'Now give me your [Bank] password'. They are like 'What?!' – like 'is this safe, is it not?'. So I think it's been a massive hurdle which shouldn't be." (Blackboard CEO)*

Banks also fuelled customers' fear at this point by sending out letters to warn people against sharing their sensitive data and bank credentials with 3rd parties, on the basis that it was a violation of their terms and conditions, as explained below:

> *"We went to the Secretary of Treasury at the time, and said "Look, [Bank] had written a letter to all their customers saying 'Never use services like [Fintech] because it breaks your terms and conditions, if there is a fraudulent event you are not covered' – and we were like 'How can we build a business while the banks are effectively bullying and trying to block our competition?'" (Blackboard CEO)*

Therefore, the strategic growth opportunities presented by the flexible and extendable entry value proposition in this model was significantly constrained by the scale-up challenges (especially customer acquisition and data access challenges) and subsequent monetization issues. In their effort to survive and grow, I observed that new ventures with an AI-driven, B2C value proposition in this data-sensitive and regulated context employed various strategies, i.e., differentiating their business model from incumbent competitors through utilizing digital resources and capabilities, including and emphasizing 'customer wellness' as part of their value proposition, offering more seamless and user-friendly channels to deliver value, and lowering their regulatory costs via value propositions with lighter regulation. However, these strategies did not always work, especially when customer trust issues and data sensitivity trumped the appeal of the offering. This, in turn, posed a threat for fintechs' survival due to lack of profitability and more importantly, challenges in accessing data, which was the crucial input for these firms' propositions (see Figure 14). Due to these challenges, B2C firms with an AI-driven value proposition had to pivot by adopting B2B business models.

> *"The decision to be B2B was made around a whiteboard when we said, 'For our business to be the most successful, it needs access to data very quickly', and we said, 'We can work with this particular client that we have, they have 8 million digitally banked customers. It would take us in this trajectory, however many years, to get a million customers. We could probably close this deal in one and a half. What should we do?' And everyone voted, and we voted to be B2B." (Bold Executive)*

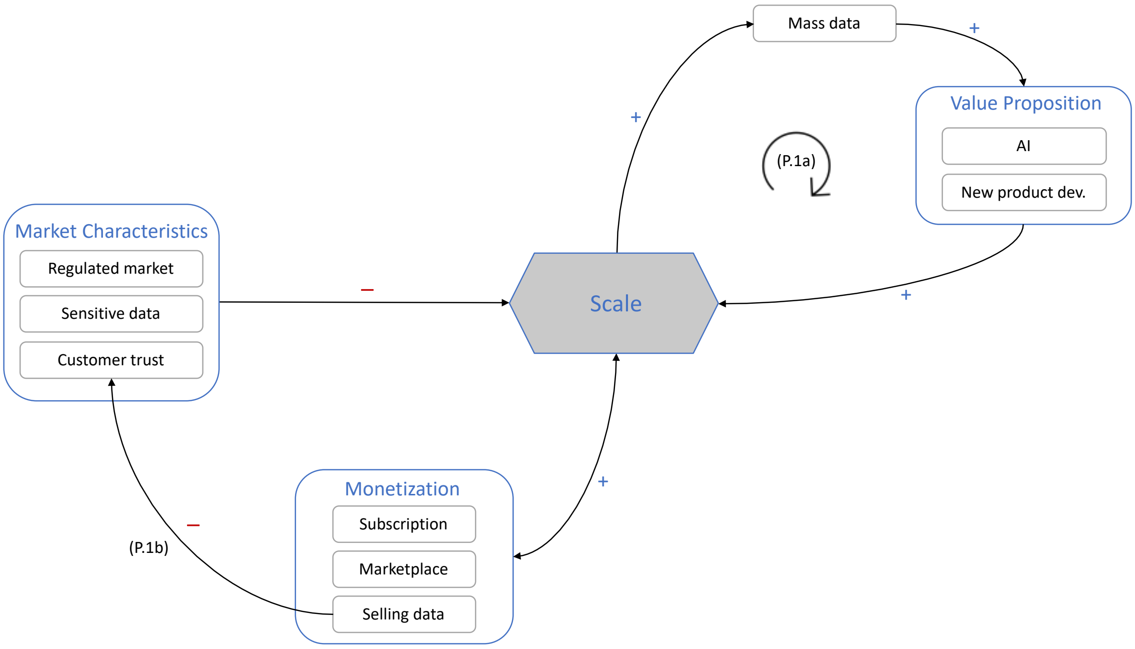
Mass data
+
Value Proposition
AI
New product dev.
+
(P.1a)
Market Characteristics
Regulated market
Sensitive data
Customer trust
–
Scale
+
+
Monetization
Subscription
Marketplace
Selling data
–
(P.1b)

Figure 14. Feedback loop in B2C model

This state of affairs explained above motivated the regulators later to step in and introduce open banking regulations in 2015 to increase the openness and accessibility of rich customer data, which was traditionally reserved by the bank. By this way, the regulators wanted to eliminate the biggest bottleneck for competitive and innovative new entrants with AI-driven propositions. This regulatory change, called Open Banking regulations in the UK, introduced new rules regarding data openness and established an industry standard for data access technology to ensure interoperability.

It required all banks (initially, the biggest 9 banks in the UK) to publish standard APIs so that licensed 3rd parties (i.e., fintechs) could easily plug in to access customer data, with customer's consent.

Open baking regulations were introduced to mainly resolve data access problems of innovative start-ups. Along with this regulatory change, UK's Financial Conduct Authority (FCA) launched a 'regulatory sandbox', which was "a *safe space* in which businesses can test innovative products, services, business models and delivery mechanisms without immediately incurring all the normal regulatory consequences of engaging in the activity in question." (Financial Conduct Authority, Regulatory sandbox, November 2015). Here, financial institutions (start-up or incumbent) that were accepted into the sandbox could test their innovative products with a limited number of real customers. By this way, they could make necessary adjustments in their business models (i.e., make changes in the value proposition, client selection or cost bases by altering the regulatory overhead) depending on the learnings from the testing process and customer feedback. For example, fintechs could gain a better understanding of the regulatory licenses their products would need after these experiments.

In a report published in 2017, FCA shared the learnings from the sandbox experience and explained that the sandbox was helpful to fintechs in assessing their customer acquisition potential, as explained below:

> *"A number of tests in the sandbox have been designed to assess customer uptake and commercial viability. [...] In many instances this is in itself a useful finding where the firm wants to test the commercial viability of their proposition on a small scale without necessarily committing the same level of resource they would need to get to market without the sandbox." (FCA Report)*

The report underlined that fintechs who joined the sandbox without a well-established customer base later experienced more problems in customer acquisition. The sandbox experience also underlined the high potential of bank-fintech partnerships in accessing data, as explained below:

> *"Partnerships between large firms and start-ups in the sandbox have proven to be successful for both parties, particularly for giving the start-up access to a larger pool of existing customers to test with." (FCA Report)*

Overall, the sandbox was helpful for fintechs in incorporating regulation into their business model, given they had an almost fully developed product, by speeding up the process of getting licenses and helped them adjust their products based on customer feedback. However, rather than being a means to develop and improve AI-driven propositions, it was an environment to test the viability of the business model and make necessary adjustments (regulatory or otherwise), if needed. Thus, apart from revealing the potential of bank-fintech partnerships in bringing incumbent data and entrepreneurial innovation together, the sandbox did not help fintechs solve data challenges and develop advanced AI capabilities[34]. Consequently, the customer and data acquisition challenges of AI-driven B2C fintechs still persisted, even after open banking regulations along with the FCA sandbox were introduced [35].

However, in this period, there were an increasing number of incumbent players attempting to adopt some of these innovations. To do so, they turned for collaboration to fintechs that were present in the market and in possession of relevant data analytics/AI capabilities. Adopting an existing firm's solution was an attractive option for incumbent banks, as fintechs' PFM services could be used to complement the banks' existing product set. Furthermore, this would enable them to quickly respond to a potentially disruptive regulatory change by adopting an already-present innovation. Consequently, existing B2C firms that were struggling to survive gained interest from incumbent players with a large established customer base. This growing attention from incumbents and potential synergies emerging for bank-fintech partnerships further motivated the business model change of existing B2C firms. In the meantime, new fintechs also started entering the market to benefit from the opportunities created by an open banking environment, either with B2C models with sufficient funding support or with B2B models.

Overall, due to the challenges in the B2C model and the contextual factors described above, most of these B2C start-ups had to change their business model and pivoted to B2B to survive. Data access considerations underlaid these pivots, emphasising the role of data as a key resource for AI-driven new ventures and data access as a key component of their business model. Among the cases, between 2010 and 2020, a total of six fintechs entered the market with a B2C model, where five of them entered before 2015 and one after 2015. All of these B2C entrants pivoted to a B2B model: three of them (Melinda, Blink, Bold; all entered before 2015) removed B2C from their value proposition and focused purely on B2B (*replacive business model change*), whereas the other three (FinCen and Blackboard, entered before 2015; Firebolt, entered after 2015) made a B2B addition into their existing business model to create new revenue channels and access more data (*additive business model change*). Thus, I propose:

---

[34] 4 of the cases analyzed in this chapter were part of different cohorts of the FCA regulatory sandbox: 3 of them were B2C entrants (Bold, Blackboard, FinCen) that later pivoted to B2B; and the other one was a B2B entrant (Payloans).

[35] In the summer of 2020, FCA and the City of London Corporation collaborated to launch a 'digital sandbox pilot'. With this digital sandbox, FCA would provide support for early-stage fintech products that do not qualify for the regulatory sandbox and that need data access and standardisation for further development. The support offered via the digital sandbox would include access to synthetic data to enable testing, training and validation of innovative technology solutions.

Proposition 1a (P.1a): When AI-driven start-ups enter a data-sensitive market, they face the chicken-and-egg problem of getting customers (and data) and developing their AI-based value proposition.

Proposition 1b (P.1b): Compared to AI-driven firms in other markets, selling data for monetization in a data-sensitive context is riskier for firm survival and future growth as it severely limits customer trust.

Proposition 1c (P.1c): AI-driven start-ups that struggle with data access and monetization with a B2C model are likely to pivot to a B2B model.

B. Transition from B2C to B2B, Business Model Variations and Trade-offs

The main advantage of having a B2B element in the business model was that it facilitated access to a large customer base (and thus, mass data) and monetization. For resource-limited B2C fintechs, pivoting to B2B was a quick solution to difficult problems of customer acquisition, access to data and monetization in this regulated data-sensitive market. Therefore, AI-driven start-ups that entered during the regulatory transition period (between 2015-2018[36]) devised a B2B model, either as their core entry model (Taken, Payloans, Openers) or as an immediate addition to their B2C entry model (Firebolt). The informants from B2C entrant fintechs that later pivoted to B2B explained:

> *"It was really hard to get the economics right - ok fine, we kind of have a product, we've got a user acquisition strategy that is working, then there is no revenue or monetisation, never mind profits – so how do you do that?" (Blackboard CEO)*
>
> *"We are still providing the software for the end consumer to use, it's more about the distribution channel. We just don't have multimillions to spend on advertising, acquiring a lot of direct customers." (FinCen Executive)*

For existing fintechs, the value proposition in B2B was initially a repurposed, white-labelled PFM sold to business clients, which had the potential to evolve into more sophisticated applications of AI in time depending on the influx of data coming from B2B clients. For new players entering with a B2B model after new regulations, on the other hand, the value propositions tended to be initially around providing infrastructural technologies and tools as well as digitalizing and improving existing product lines that have traditionally been provided by established players (such as credit scoring or lending). These firms in the latter group created digital journeys for traditionally manual processes as a means to improve existing services and products – thus, offering innovations in *value creation* and *value delivery*. The monetization model here was typically SaaS-based and/or based on sales of the end product.

---

[36] The year 2018 is selected because it was the initial deadline for the implementation of UK Open Banking regulations.

Differently from B2C entrants, B2B entrants considered adding PFM to their value proposition after securing a trusted relationship with the customers, rather than entering with a PFM model, because PFMs were "*asking for something before giving something useful back*". The experiences of previous PFM entrants and their challenges in accessing data also informed this decision, as explained below.

> *"We solve their big problem today which is high-cost debt, and get them to like us and trust us, get them to engage with us greatly, and over time we can progress to [PFM]. We do think about PFM in the future, but we are not leading with that because it's generally a product that requires high level of user input for it to be useful." (Payloans Founder & CEO)*

Even though all of the cases had a B2B element in their business model in the end of the research period, the emphasis they gave to B2C varied across the case firms. Some of them purely focused on B2B, while others kept B2C as part of their core business model and added B2B as a monetization channel, as explained below:

> *"I guess our app is at the moment the leading proposition, but I also want to be successful with the B2B proposition, especially as now the market is created, shaped, and divided." (Firebolt CEO)*
>
> *"We took a decision very early on, almost from day one, not to pick on B2C, so we are purely B2B. [...] There are different business models in this open banking space. [...] You have PFM providers, which are to some degree also challengers, and then you have more collaborative or service provider type fintechs like us. Over the years, we've seen a lot of players come into the market as independent PFMs and then gradually becoming B2B like us." (Melinda Executive)*

After designing or pivoting to a B2B model, the key decision for these start-ups was the selection of business clients and how the needs of these clients as well as the end customers would be met. Below, I discuss the main value propositions and the challenges faced by fintechs pivoting to B2B depending on the different types of clients they had.

a. Clients with a Complete Line of Products and Competitive Tensions. Fintechs in this group initially sold their existing products as a white label to businesses with a complete line of products, i.e., banks. Since these clients had a complete set of products, a large customer base and a long industry presence, they also had the richest datasets, as explained below.

> *"We'd rather work with tier 1 and tier 2 banks, the good players, and get meaningful volume and meaningful detail into our platform." (Bold Executive)*

The ability to access rich mass data enabled fintechs to improve their AI algorithms significantly, which created an important competitive advantage and made this type of clients very attractive. An informant explained:

> *"We can apply our machine learning algorithm for categorisation that has been trained on, since 2012, that has processed billions upon billions upon billions of transactions and are incredibly accurate within certain countries." (Blink Executive)*

One of the challenges experienced here, however, was around balancing the scalability of a B2B proposition (i.e., expandability of the client-base beyond initial business clients) and customization. Scalability was an important concern for start-ups with this model, as there was *"no point in building one thing for one incumbent bank if nobody else wants it."* On the other hand, incumbent bank clients had concerns that a white-labelled, customer-facing fintech app could lead to a lack of differentiation in case it was also sold to rival banks, as explained below.

> *"The only bad aspect of this is that the partner would want to add some kind of non-competitive clause. From a contract perspective, it becomes a bit complicated for both parties as both have something to lose - the first one becomes heavily dependent on the AI company while the AI company cannot sell this same solution to another competitor." (AI Expert)*

Consequently, B2B fintechs with this model were pressured to strike the right balance between scalability and sufficient levels of customization (i.e., differentiation of the business client). Additionally, these clients also tended to take a defensive approach towards innovative fintech products since they had their own complete product suite, causing strong competitive tensions to arise. These tensions made building and offering competitive products more difficult for fintechs, as the clients usually imposed limitations on fintechs' strategic growth. These pressures hampered competitive endeavours of fintechs and their goal of improving financial wellness by offering transparency around financial services, as explained below.

> *"The battle [now] is for who can deliver the best relationship. The winning formula is to [...] make sure that [customers] are constantly being provided with the best*

> *products. How do you know what the best products are? Well, you put all products in there and allow people to choose themselves, and in five years, it would be clear where you need to be focusing for development of products." (Bold Executive)*
>
> *"The way our product works is by being impartial. If we had our own products, that would not work. Also, I am not sure our partners would be too happy if we started offering our own services in competition to theirs. However, we have been starting identifying many gaps where customers could benefit." (Bold Founder and CEO)*

Thus, the conflict of interest in this model caused banks to inflict limitations on the number and variety of competitive products fintechs could develop and include in their value proposition, in order not to cannibalize the bank clients' existing services. To manage these tensions, some fintechs had to concede and start delegating different levels of control to banks on their competitive value proposition (i.e., all-or-nothing models or picking and choosing the categories of 3rd party services to be included in fintech's platforms and marketplaces), even though they believed *"both the market and our firm will benefit more from an open system".* The informants explained this model in more detail:

> *"Whatever the product is that [bank clients] want to use, they can put those products and services in the platform [...]. There is a curation [of the marketplace], but it's certainly not curation where they're going, 'No, we can't have that or them'. It's more like, 'Could we avoid insurance, or could we avoid mortgages, or could we avoid credit?'" (Bold Executive)*
>
> *"We could potentially charge a bank more by giving them the ability to limit the scope, but we don't believe that that's creating an attractive ecosystem [for] customers and fintechs. At the end of the day, if there is no traffic in the ecosystem, we lose." (Taken Executive)*

These restrictions on strategic growth opportunities meant that the fintech itself had lower chances of offering an independent B2C app besides their B2B offering, as explained below:

> *"The fact that Blink started doing white label partnerships with banks meant that it would be restricted in terms of going live in certain markets where there would be a one-to-one copy associated with the bank. You're generating revenue from the banks and so, you don't want to take a product to a market that already exists there." (Blink Executive)*

Consequently, the findings show that fintechs in this group (i.e., Melinda, Blink, Bold) repurposed their B2C environment and used it to develop / test new products and features as well as to train their AI algorithms, rather than offering it as a separate direct-to-consumer value proposition. They utilized this environment like a 'sandbox' – i.e., they could onboard a limited number of customers from future international markets before entering so that they could train their AI algorithms with country-specific data. This allowed them to better adapt to the specific market characteristics and meet customer needs. The following quotes describe in more detail how such fintechs used these environments.

> *"We use it to train our algorithm in markets where we're not live yet or where we're pending into going live; but within countries where we are live, we have an incredibly strong categorisation engine. In the UK, [according to the feedback of one of the top banks], we were the number 1 that came out of [the test]. It's all ML and user feedback, which is great recognition for our ML engine." (Blink Executive)*
>
> *"Our app still exists and is a testing platform for our new features. Similarly to when we started, we want to know the impact of all the features we make. By keeping an invite-only, 'always in beta' app, we can deploy [new features] there first and show how people used it, before making it available for banks." (Bold Founder and CEO)*

Such tensions also motivated these B2B fintechs to grow by focusing on AI-based capabilities and tools that can be used by client banks to develop their own innovative customer-facing products. Via these platforms, fintechs provided a set of data analytics / innovation tools, giving business clients more freedom and customization opportunities. This helped fintechs balance scalability with differentiation of customer-facing services in B2B, since each client here was able to create unique end-products through different combinations of fintechs' services. The informants described:

> *"If you look at the apps or the digital banks, they look vastly different, they're not using the same part of our product portfolio, they're not necessarily addressing the same consumer segments, but they're using our platform to innovate in the digital channels." (Melinda Executive)*
>
> *"We offer an out of the box plug and play solution for open banking and marketplace banking with the additional consultation around what the best kind of product is to meet a banking need, to serve that customers or to serve a new customer segment." (Bold Executive)*

Thus, fintechs adopting this model tended to focus on building platforms that involved data- and AI-centric capabilities and tools to support the clients' own value proposition and their AI-driven innovation efforts. These data platforms allowed incumbent banks to build internal teams to leverage the AI and data tools provided by fintechs and develop better products, as explained below.

> *"The development of products was the responsibility of banks, and we would consult with them to help identify the opportunities for their customer, but we would provide a core underlying technology with a combination of different enrichment services to notify and help the customers understand what's going on with their finances." (Bold Executive)*

Along with providing operational efficiencies, data-driven identification of new product opportunities and use cases was an attractive prospect both for client banks and also for fintechs, as explained below.

> *"Where Blink has always provided value is around the categorisation, ML and the opportunities to use those categories in the onboarding for KYC, understanding your customer, in the servicing, providing insights, doing real-time credit scoring, upselling, transferring loans, transferring money, provisioning accounts for either tax reasons or for savings, servicing notifications, prompts etc. - so our value proposition is a lot on the data side." (Blink Executive)*

Overall, despite the advantages in terms of rich data and established customer base, these competitive tensions and limitations imposed on fintechs made it difficult for them to sell to banks. This type of clients forced fintechs to make changes in their value proposition by removing B2C from the offerings but leverage it as a 'sandbox' environment, and they put pressure on fintechs in terms of their strategic growth opportunities. Thus, I propose:

Proposition 2 (P.2): AI-driven B2C ventures that pivot to a B2B model for data access can repurpose their B2C channel as an R&D environment to train their AI for new product development.

Proposition 3 (P.3): For AI-driven new ventures, B2B clients with full line of products in the same sector constitute a trade-off: they are advantageous for improving value proposition due to their large scope of data, but disadvantageous as a more competitive value proposition creates competitive tensions with the client, which inhibit new ventures' development of new AI-driven product.

b. Clients with a Limited Line of Products and Data Challenges. Non-bank enterprises, on the other hand, had no interest in providing full banking services themselves. They saw little or no competitive threat in fintech partnerships, and so, were easier to work with, as explained below:

> *"When I work with [non-bank] enterprises, they don't have the tension [that banks have]. They are absolutely not going to do open banking or the technology that's required to enable this financial transformation - so they will definitely select a partner to do this with." (FinCen CEO)*

Accordingly, this was a more suitable business model for start-ups with a goal to move towards *Open Finance* and be the financial platform of choice in an open finance ecosystem, without necessarily becoming a bank:

> *"I definitely don't want to become a bank; our genuine ambition is to be the open finance platform of choice in the UK and Europe - and that's quite ambitious, but we would like to be genuinely the number one open finance technology platform of choice." (FinCen CEO)*

In this model, the relationship with business clients was much similar to a partnership model and new ventures went complementary to the existing non-bank players, which either had a limited line of products or had no financial products at all (i.e., enterprises from other industries). Clients in this category included asset managers (used by their customers to connect to their investment accounts), financial advisors (to help the customers' financial decisions), building societies (to connect to mortgage accounts as well as to evaluate creditworthiness), energy providers (to help customers to switch for better rates) as well as employers (to help the employees with their pensions). A B2C entrant that later pivoted to this B2B model explained:

> *"Since that point [of adding a B2B], the business has grown really really well, so the revenue has grown quite quickly and all of a sudden, we are in a position where we have a good product, a user acquisition strategy, a monetisation strategy, so all of a sudden there's been the building blocks to get to a position where this might be a business that works; because PFM is so hard, globally everyone has really struggled." (Blackboard CEO)*

New entrants with this model helped business clients increase efficiency and improve their services with a digital and AI-driven approach. An example was the digitalization of loan affordability assessment process for credit providers to cut costs and increase accuracy, as explained below.

> *"[Credit fintechs] use a totally different data source from existing bureaus, they use individual transaction data from the borrower in question. They provide a user facing experience with transparency and allow people to understand how their data is being used, how they can improve their individual outcome, and looks at that process over time rather than a single snapshot. This is why open banking and PSD2 is really interesting; because it facilitates such business models." (Industry Expert)*

This model was attractive to both some new entrants (i.e., Payloans) as well as to fintechs already existing in the market, especially the ones that wanted to keep B2C as part of their value proposition (i.e., FinCen, Blackboard, and Firebolt shortly after its entry). I observed that fintechs entering with this B2B model identified a specific problem, developed a rough idea regarding how to address that problem, and then supported this value proposition by identifying the right kind of data – and thus, the right type of client, as explained below.

> *"We always lead with loans, then we add savings, pay advance, financial education. We're launching a protection product later. We're launching mortgage products. We basically became a full platform, but we entered the market as a B2B SaaS business with a single product, and then upsell and cross-sell." (Payloans Founder & CEO)*

For new entrants selecting this client segment, having a single, clear value proposition made it easier to convince the clients by showing how they create value for all stakeholders, as explained below.

> *"Loans product basically solves a very easy to understand need. It was very clear; employees have debts, so we can refinance them at a low rate, we can save them X pounds. It was a very neat proposition, so it's very easy to sell. If you try to sell too much, there's too much diligence, too confusing." (Payloans Founder & CEO)*

Existing B2C firms that pivoted to this B2B model, on the other hand, aimed to benefit from the rise of open banking, by utilizing open banking data to introduce innovation and maximum accuracy into clients' existing processes. However, innovation and full accuracy did not always yield the expected results. Blackboard, for example, had a failed attempt of adding a credit scoring and affordability platform into their value proposition, building upon their B2C PFM app to create new monetization channels. In this case, feeding all available customer data into the algorithm caused lower levels of satisfaction for all stakeholders, because it led to lower affordability results. This resulted in less profitable sales for business clients (i.e., creditors) and worse loans for the customers (i.e., borrowers). The CEO of Blackboard explained:

> *"Every time we spoke to [stakeholders], they were like 'it sounds great'; but when we started building it, we realized when you have all the data, literally every single transaction, it normally lowers the affordability, because you've got the true view of what someone can really afford - but what lenders want is to sell as many mortgages as they can. And consumers are 'Oh hold on, I wanted that extra bedroom, I wanted that bigger garden; I don't want this tool actually, this is like the mortgage denial tool'." (Blackboard CEO)*

Therefore, Blackboard had to put this idea on the shelf to reconfigure it in the future, i.e., to make it less innovative and more consistent with how the brokers traditionally went about this assessment process.

Since the business clients' product line determined the type of data fintechs could access in this model, it also affected what kinds of AI-driven products they could develop and add to their value proposition. For example, the findings show that going through employers in the employee benefits space was advantageous for developing lower cost lending products, as it enabled access to payrolls and precise income data through HR systems (i.e., Payloans).

> *"Lending is a function of how much you earn, how much you spend and is there enough money to pay off the loan. Getting reliable income data is incredibly hard, so what people make lending decisions on is very suboptimal data [...]. You get large sets of data on their performance on lending and lives, which don't necessarily reflect what they do today or where their life will go – and then you have incredibly statistically complex processes on pretty poor data sets. The whole thing is pretty nonsensical." (Payloans Founder & CEO)*

This strategy allowed the fintech start-up to make a more robust affordability assessment and collect repayments directly from payroll, lowering the risk for fintech and allowing cheaper loans for employees. The value proposition benefitted all stakeholders, as employees were getting better loans and employers were getting higher employee productivity in the workplace through employee wellbeing. Although still beneficial, the scope of data fintechs could access here was more limited due to the clients' limited product categories. Since the type of data accessed via these clients were typically product-specific, it was more useful for developing new products in the same (or in an adjacent) product / service category. Thus, I propose:

Proposition 4 (P.4): For AI-driven new ventures, B2B clients with limited line of products in the same sector are advantageous in terms of having more freedom in new product development and strategic growth but disadvantageous in terms of data scope.

4.5. Discussion

This study explored how business models of AI-driven start-ups with no initial access to data evolved in a highly regulated and data-sensitive market. I analysed these financial technology start-ups' entry business models and how the challenges they experienced upon entry informed their business model decisions. This study contributes to our understanding of 1. business model design and evolution, 2. the interdependencies among different (and emerging) business model components, and 3. strategic growth potential of different business models in the context of AI-driven new ventures in a data-sensitive and regulated market (please see Figure 15 for an overview of this chapter's contributions).

Design and Evolution of AI-driven Business Models

First, this study contributes to the business model design and change literature by analyzing this process in data-intensive but regulated industries. By illustrating how AI-driven new ventures design and change their business model in a regulated and data-sensitive market, the findings contribute to entrepreneurship literature by identifying and explaining "the conditions under which entrepreneurship takes place, the manner in which entrepreneurship is manifested, and the interaction between entrepreneurial activity and firm, industry, and environmental characteristics" (Foss and Klein, 2019; p. 2).

Through longitudinal and qualitative research, this study identified the key components that AI-driven start-ups should consider when designing their business model and the factors affecting how their business model evolve. I find that *data* is a *key resource* for start-ups in such markets, as it is a prerequisite for developing their value proposition. By demonstrating the significance of customer data both as an input for value creation and as an output of value capture activities, I demonstrate a novel way in which the demand-side contributes to the value creation of the focal firm *by providing key resources* (Lanzolla and Markides, 2020). Moreover, the study shows that customers are more than mere contributors to value creating resources of the firm, contrary to what Amit and Han (Amit and Han, 2017) suggested; but they are a *prerequisite* of value creation in the case of AI-driven firms.

In doing so, the findings bring the concept of *AI-driven business models* into strategy and entrepreneurship literature and illustrate the relationship between data, data access and business model design / evolution of AI-driven firms in regulated, data-sensitive contexts. In contrast with De Reuver et al. (2009), this study showed that regulation significantly affects business model evolution of AI-driven start-ups by shaping customer behaviour (i.e., low customer take-up of new firms' services due to data sensitivity and trust issues), creating time constraints as well as financial constraints for launching services (i.e., regulatory license applications requiring time and money), and imposing compliance requirements and liabilities around certain activities and risks (i.e., data exchanges and risk of leakages). Existence of such regulations reinforce data-sensitivity and risk-averse tendencies of clients (both individuals and businesses). The findings suggest that in such contexts, regulatory frameworks and market characteristics that co-evolved together over a long period of time can create inherent challenges in client acquisition both in B2C and B2B, but especially in B2C.

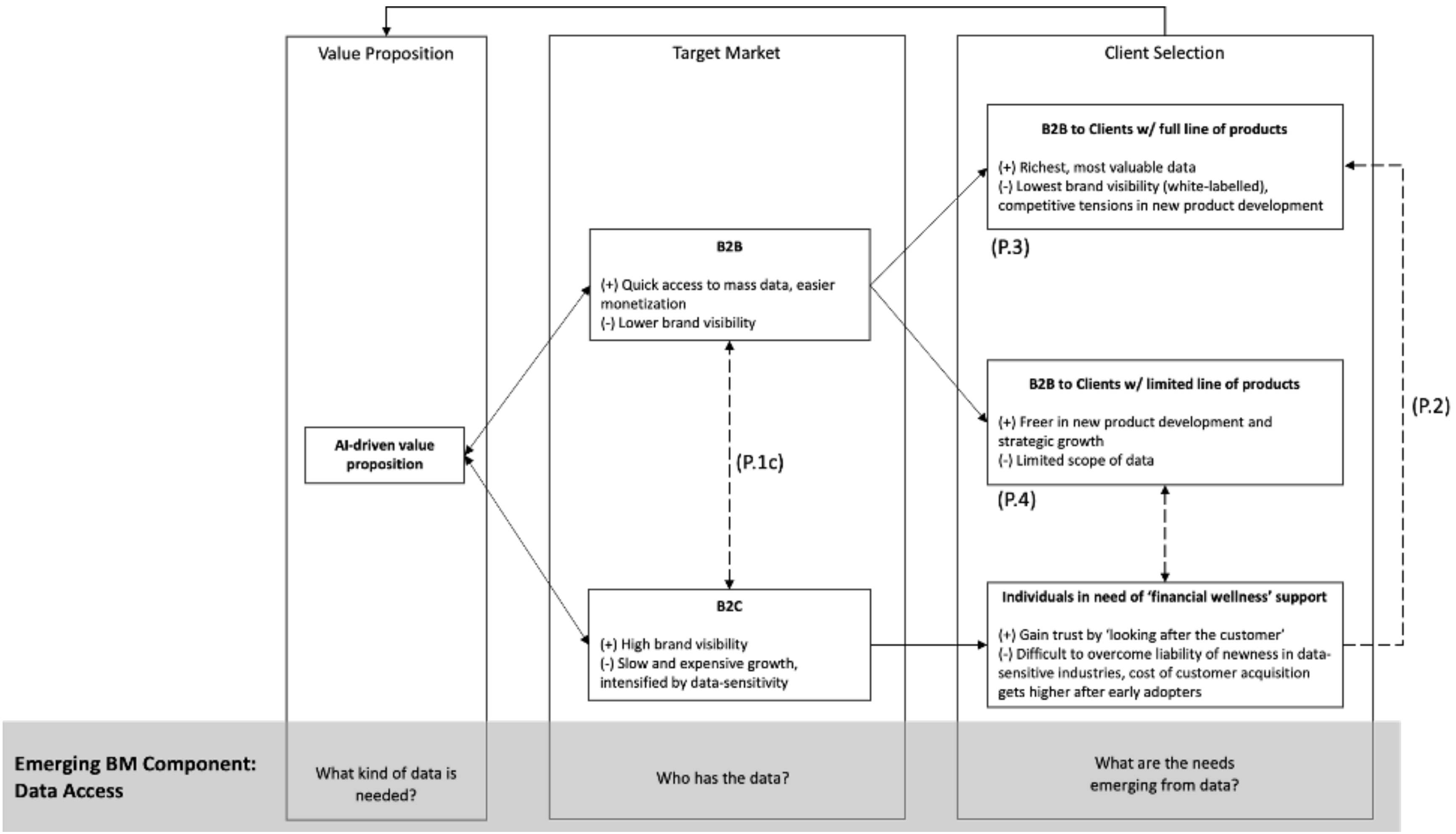
Value Proposition
Target Market
Client Selection
AI-driven value proposition
B2B
(+) Quick access to mass data, easier monetization
(-) Lower brand visibility
(P.1c)
B2C
(+) High brand visibility
(-) Slow and expensive growth, intensified by data-sensitivity
B2B to Clients w/ full line of products
(+) Richest, most valuable data
(-) Lowest brand visibility (white-labelled), competitive tensions in new product development
(P.3)
B2B to Clients w/ limited line of products
(+) Freer in new product development and strategic growth
(-) Limited scope of data
(P.4)
Individuals in need of 'financial wellness' support
(+) Gain trust by 'looking after the customer'
(-) Difficult to overcome liability of newness in data-sensitive industries, cost of customer acquisition gets higher after early adopters
(P.2)
Emerging BM Component: Data Access
What kind of data is needed?
Who has the data?
What are the needs emerging from data?

Figure 15. Business model components in AI-driven new ventures

The study illustrates that new ventures with a B2B model are more advantageous in terms of gaining quick access to mass data and an established customer base, and this could cause B2C entrants to pivot to B2B models. Evidently, for start-ups that sell data analytics and AI capabilities in B2B to both access mass data and improve existing capabilities and/or develop new capabilities (i.e., improve/expand their value proposition), selection of clients has implications on competitive tensions they experience and associated data trade-offs. Thus, business model decisions here is then interdependent with the type of data these start-ups want or need to access to sustain or expand their value proposition, as there is a trade-off between access to rich data and strategic growth opportunities in the B2B model.

Here, the findings contribute to the business model change literature by identifying the challenges AI-driven start-ups experience upon entry into regulated industries and how they circumvent these challenges by pivoting to a different model (Saebi, 2014). This study brings nuance to the business model evolution concept by documenting how new ventures in an established, regulated market that is going through a discontinuous change respond to the environmental constraints by pivoting, or making significant changes in their business models. Furthermore, I show how *client selection* determines the type of business model change – i.e. whether it will be an *additive* or *replacive* business model change (Dos Santos *et al.*, 2015). I document that new ventures that pivot from B2C to B2B by changing their client focus from individuals to businesses with a complete line of products tend to experience *replacive business model change*, whereas ones starting to work with clients that owned a limited line of products have *additive business model change*.

Interdependencies among Business Model Components

In addition to business model components identified by the literature, the findings underlines *data access* as *a key component of business models* for AI-driven start-ups, especially in data-sensitive and regulated markets (Magretta, 2002; Zott *et al.*, 2011), since new ventures need to devise actionable data access strategies for survival and growth in such contexts. In examining this, I uncovered the interdependencies within the start-ups' system of activities, and so, in their business model (Zott and Amit, 2015), by showing how decisions around value proposition can inform the decisions around other components of the business model.

This longitudinal study showed that customer needs identified by the start-ups as well as their overall goal and vision shape their value proposition (Amit and Zott, 2015). Then, the AI-driven nature of such start-ups' *value proposition* informs their route for *data access,* i.e., via different delivery channels, which determines their target clients and market segment. Depending on the value proposition and how quickly they need to access data, AI-driven start-ups have two options to access customers and customer data: via B2C or B2B. The study shows that AI-driven start-ups' requirements regarding *data access* inform and affect their *client selection*, and *client selection* determine which *monetization* structures are available with that specific *value proposition* and *client segment*. I observed that after identifying the target market and customer segment, focal firm goes back to the *value proposition* and tweaks it depending on the specific needs of the target clients. Therefore, the *client selection* also feeds back to start-ups' *value proposition* as the type of clients they have in B2C or B2B, type of data they can access and type of new products they can develop are all interdependent (Casadesus-Masanell and Ricart, 2010b; Demil and Lecocq, 2010).

Due to difficulties in customer acquisition in such regulated contexts, the monetization potential of a B2C model is very limited. This finding underlines the trust element as a very constraining factor for new ventures in data-sensitive markets. Tidhar and Eisenhardt (2020; p. 1265) propose that "when user resources (e.g., personal data, revealed preferences, financial assets) provide value for which a third party (e.g., advertiser, employer, investor, marketplace seller) will pay, then a third-party revenue model fits". However, the findings show that even though user data is a very valuable resource that 3rd parties would pay for, a 3rd party revenue model is usually not an option for new ventures in regulated data-sensitive industries. I find that gaining customer trust can be a significant challenge for new ventures in such markets. Thus, the fear of damaging customer trust further by selling sensitive data to third parties prevents them from adopting a 3rd party revenue model. Instead, AI-driven start-ups *with sufficient scale* resort to developing *data and AI capabilities* to analyze data, identify customer needs, and then recommend relevant 3rd party products in marketplaces. In other words, they do not sell data but sell *AI-driven insights* derived from that data. By this way, they manage to not share sensitive customer data but still make money from 3rd parties via *switching services* and *referral fees.* By uncovering these dynamics, this work sheds light on the interdependencies between monetization and AI-driven value propositions in regulated markets and show how traditional monetization models can fail depending on contextual factors.

Overall, this study shows that the *client selection* of AI-driven start-ups is informed by decisions around *data access channels*, which in turn affects how the start-ups shape their *value proposition* over their lifetime (see Figure 14). By disentangling the business model evolution process with a qualitative and longitudinal approach, this chapter contributes to the view that business model evolution should be considered as "sequences that encompass intertwined determined and emergent changes affecting core components or their elements' (Demil and Lecocq, 2010; p. 240). I do so by explaining how AI-driven new ventures respond to resource (i.e., data) constraints that are of critical importance to their value proposition by changing their business model to gain access to new data channels - which then informs their client selection and feeds back to the value proposition. Furthermore, I show that radical changes (such as pivoting from B2C to B2B) can occur even shortly after market entry in case of failure to acquire customers and to access data, as opposed to a radical change happening after a set of incremental changes or adjustments in the business model (Demil and Lecocq, 2010).

Strategic Growth Potential of AI-Driven Business Models

This chapter underlines the role of data in strategic growth of AI-driven new ventures by documenting how accessing / collecting rich data enables resource-limited AI-driven start-ups to rely not only on customer feedback for developing new products and features but to identify customer needs emerging from data to inform new product development (Felin *et al.*, 2019). This allows new ventures to optimally use their existing resources and work towards developing new value propositions with a proven potential for customer appeal. Furthermore, I also show that new ventures in an industry where data becomes a vital resource can assume the role of providing *data enrichment* or *data labelling* services at the infrastructural level. Data labelling is crucial for developing machine learning algorithms, as "the first step in supervised learning is to create (or acquire) a labeled data set" (Verganti *et al.*, 2020; p. 217).

I find that a B2C model is advantageous in terms of building a direct relationship with the customer; however, scaling up as a customer-facing new venture in regulated data-sensitive markets requires a long time and a lot of venture capital funding. To overcome customer acquisition and monetization challenges, AI-driven start-ups with a B2C business model can target unserved/underserved customer segments and include a significant element of *customer wellness* in their value proposition. This enables them to frame and differentiate themselves as players 'looking after the customer'. Even though it is extremely difficult to survive and grow for resource-limited B2C entrants in a data-sensitive and regulated market; if they manage to survive, having full control over the value proposition and a direct customer relationship allows them to remain independent in the long run.

In the analysis of different B2B business models, on the other hand, I explain how small - large firm partnerships formed with different types of clients initiate different co-opetition dynamics. These dynamics and tensions create a dilemma for AI-driven start-ups with a B2B model. Despite the advantage of having relevant capabilities to innovate and extend their value proposition (Shapiro and Varian, 1999) by utilizing data-driven insights for new product development, the best clients that B2B start-ups had in terms of data scope can also end up being the worst ones for their strategic growth (Ozcan and Gurses, 2019). Selling data analytics and AI capabilities as a service to established, powerful clients with a full line of products can limit the growth opportunities for these new ventures; as these clients, in an effort to gain competitive advantage over their competitors by using the start-up's AI-driven services, can force the start-up to have exclusivity. Additionally, the desire of such clients to white-label the start-up's products / services lowers these new ventures' visibility, reducing their chances of pivoting to a B2C model and becoming a fully independent player in the future. Lastly, due to such clients' fear of cannibalizing their own products and their lack of competitive product development, they are threatened by innovative AI-driven services of these start-ups. Therefore, they put restrictions on which products these start-ups can develop and/or add into their value proposition.

To resolve these issues, these start-ups can choose to go through less defensive clients, which typically have a limited line of competitive products. These clients are more advantageous for start-ups in terms of strategic growth potential as they allow start-ups to freely develop data-induced new products and services. However, the limitation of this type of clients is on the data side; as such clients only have product-specific data, of which scope is more limited compared to clients with a full-fledged product set. In order to increase the variance of data they can access; new ventures here strive towards establishing as many integrations as possible with various clients in order to complement their data sets and improve their value propositions.

4.6. Conclusion

This study explored business model design and evolution of AI-driven new ventures from a strategy and entrepreneurship perspective in the context of UK banking, in a period of technological and regulatory transition due to new Open Banking rules. Future studies could address how the *technology* aspect of the data access component affect start-ups' business model decisions and how start-ups with an AI-driven business model manage such technology transitions in a regulated, data-sensitive industry to extend this work.

Chapter 5 – Conclusions

5.1. Summary of Findings

This dissertation presents three empirical studies in the setting of UK retail banking in the face of a potentially disruptive change (Birkinshaw *et al.*, 2018). The broader research question addressed in this dissertation is: *how a disruptive regulatory change affects the industry architecture as well as the business models of incumbents and start-ups in a traditional, regulated, data-sensitive industry?*

More specifically, I asked:

1. *What are the intended and unintended consequences of a regulatory-led standardization process to boost innovation in an established industry?* (discussed in Chapter 2)

2. *What advantages and challenges new players versus incumbents face in creating / transitioning to a platform business model in a regulated, data sensitive industry?* (discussed in Chapter 3)

3. *How AI-driven new ventures with no initial access to data build a business model in a regulated, data-sensitive industry?* (discussed in Chapter 4)

Overall, by tracing a regulatory change that introduces a new standard technology (open APIs) to establish interoperability within the industry ecosystem and facilitate disruptive business models of new entrants (fintechs), this study analyzed how "disruptive innovation theory and systemic industries relates to the modularity of product architectures" and industry architecture (Christensen *et al.*, 2018; p. 1070). In doing so, I documented how a disruptive change initiated by regulators impacts industry architecture, distribution of industry roles, relationships and dynamics between different actors, and business models of incumbents as well as new entrants.

In this research setting, disruptive business models emerged first by using a suboptimal technology (i.e., start-ups that aggregated financial information by using screen scraping). Then, regulators stepped in to replace the available technology with a superior one to facilitate entrepreneurial firms' disruptive business models by mandating the largest incumbents to publish open APIs, which created a threat to incumbents (Cozzolino *et al.*, 2018). Incumbents perceived this as a threat because, first, they were mandated to 'open up' and share key resources that were crucial for building disruptive business models (i.e., customer data) with authorized 3rd parties; and second, the implications of this regulatory change for industry architecture (i.e., modularization and disintegration) also threatened their business model, especially in terms of their vertically integrated nature and being the primary holder of the customer relationship. In the face of this threat, we observed incumbents' efforts to 'delay' the industry-wide usage of the new technology, by knowingly or unknowingly introducing variance in APIs during their implementation and publishing low-performance APIs. However, even though the standardization period was delayed, emergence of new connectivity players still enabled a variety of disruptive business models to function and new modes of value creation / capture to arise. Thus, this study enhances our understanding of regulatory-led standardization and its implications for industry architecture.

By analyzing the platform formation strategies and challenges of different types of players (i.e., new entrants with a disruptive business model and incumbents trying to respond to this threat by adapting), this dissertation also contributes to the platform literature. It extends the platform literature by incorporating industry-specific characteristics into strategies of platform formation and transformation in an established, regulated industry following a disruptive change. Here, the comparison between incumbents and new entrants highlights the trade-offs these players faced (i.e., open vs closed, build in-house vs outsource) and how they circumvented these challenges.

Finally, this study contributes to the business model literature. First, I explain how incumbent firms can respond to a regulatory change and the emergence of disruptive business models. I show how they can try to transform their own business model, while unravelling the challenges and trade-offs they faced. Additionally, I detail what kinds of new industry roles can emerge to resolve the challenges in inter-firm connectivity where industry standardization is delayed as well as the advantages of being data intermediaries in digital ecosystems. Furthermore, I document how contextual factors and available technologies facilitating data access and sharing can shape business model design and evolution of AI-driven start-ups in an established and regulated industry. Here, I highlight the role of 'accessing and leveraging data' as an emerging and crucial business model component in data-driven and regulated industries. Finally, I underline the interdependencies across business model components and how data considerations impact AI-driven start-ups business model choices.

Overall, this study analyzes the combination and interaction of technology, institutional factors (regulations), business models and these factors' impact on the industry architecture (Chesbrough, 2010). Therefore, this dissertation contributes to literature by exploring the interaction of technology, entrepreneurship and business models from a strategic management perspective in an established, regulated, data-sensitive industry (Nambisan *et al.*, 2019).

5.2. Limitations and Future Research Directions

This study is unique in the sense that it followed a policy-driven technological change with a disruptive potential in real-time. Although this facilitated an inductive research design to explore the *process,* the winners of this discontinuous change and the final architecture was not yet clear since the industry transformation was still ongoing at the time of writing (in March 2021). However, this dissertation establishes a basis for future studies that would utilize this fruitful and evolving setting.

This study followed the Open Banking phenomenon over 5 years between 2016-2021 to trace the transformation process at the firm, inter-firm and industry levels. Despite the rich insights derived by exploring this process of disruption and transformation, the ongoing Open Banking as well as the approaching Open Finance initiatives in the UK means that industry architecture as well as the organizations are still transforming and evolving. This could mean that new industry and platform arrangements may emerge in the future, particularly in case other players, like technology platforms from other industries or further new organizational forms, enter the market. However, although the transformation may still be in progress, this study helps us understand the key drivers of these changes and produce a key set of learnings and warnings for different stakeholders. To complement this study, it would be beneficial to keep following the developments in the UK to understand which arrangements and strategies (in terms of government-led standardization initiatives progressing in collaboration with private players, different types of incumbent responses to the disruptive regulatory change, evolution of incumbent as well as new entrant business models etc.) become most successful and high performing.

Furthermore, there are similar government or market-led initiatives at the global level (i.e., Europe, Australia, Hong Kong, Brazil, Canada, and Japan). Therefore, the findings from UK banking industry where Open Banking is the furthest along can be highly relevant for academics and practitioners in these other settings. As a follow-up, I recommend a cross-country comparison to understand the country specific nuances that may lead to different results from such regulations in different countries. Therefore, future studies can address how these processes play out in different jurisdictions. Additionally, given that digital economy surpasses geographical boundaries, how these national level initiatives translate at the global digital level would be beneficial.

Future studies can also replicate this type of study in other highly regulated and data-sensitive industries (e.g., healthcare, education) undergoing a similar transition into digital ecosystems and with digital business models to understand other industry specific factors that may affect firm strategies (i.e., in platform formation and growth) and business model decisions. Finally, future studies can follow earlier papers (e.g., Leiponen, 2008; Gurses and Ozcan, 2015) to explore the role of non-market strategies in such highly regulated contexts, looking, for instance, at incumbents' and new players' efforts to influence regulation. Such comprehensive, qualitative studies will further answer prior calls (e.g., by Gawer, 2014) to uncover not only the patterns of platform emergence but also the darker side of platform-related processes - e.g., reasons and patterns of delays and non-emergence - and their consequences for industry disruption.

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APPENDICES

Appendix A: List of challenger banks with date of UK entry, customer size, number of fintechs on platform

LIST OF CHALLENGER BANKS OPERATIONAL IN THE UK AS OF DECEMBER 2018		
Challenger Bank	**Founding and Key Developments**	**Fintechs on the Platform**
Challenger 1	• Founded in 2015 in London. Offered prepaid cards only until obtaining full license in 2017, current accounts after. • 3 investment rounds since 2016 • Announced £33million in losses in 2017-2018 • Signed 1 millionth customer 09/18 • Voted #1 UK bank for customer satisfaction in 11/18, and #2 in 03/18. • Valued at £1billion in 2018	Energy (4), Investment (4) Mortgages (2), P-2-P Lending (2), Savings (3)
Challenger 2	• Founded in 2014 in London. Obtained full banking license in 2016, launched current accounts in 2017. • 4 investment rounds since 2015 • Entered Rep. of Ireland in 2017 • Started business accounts and lending in 2017 • Announced 200K customers in 08/18 • Voted #1 UK bank for customer satisfaction 03/18	Caregiving (1), Insurance (1), Intl Transfers (1), Investment (2), Mortgages (1), Pensions (1), Post Office, Receipts (1), Rewards (1), Savings (1)
Challenger 3	• Founded in London in 2015. Originally focused on no-fee international payments, offered prepaid cards only until renting banking license in 2017 to offer current accounts. • 2 investment rounds since 2015 • Announced £15 million in losses in 2016-2017 • Applied for EU banking license in 2017, US license in 2018 (both in process) • 2 million customers by 06/18 • Announced plans to launch in Australia, Canada, New Zealand, Japan, Singapore, US • Valued at £1.3billion in 2018 • Received European banking licence in Dec 2018.	Insurance (1), Investment (1), Mortgages (1), P-2-P Lending (1)
Challenger 4	• Founded in Germany in 2013. Obtained EU banking license in 2016 and entered the UK in late 2018. Offers current and savings accounts. • Raised a total of $213million in investment. • Also operates in 16 other EU countries with a total of 1.5 million customers.	Insurance (1), Intl Transfers (1), Lending (1), Savings (1)
Challenger 5	• Founded and obtained banking license in London in 2015. Offers savings accounts since 2016, but no current accounts as of 2018 due to "regulatory uncertainty around current accounts". • 2 investment rounds since 2015 for a total of £400 million • Announced partnership to offer savings accounts in Germany in 2018	SME loans (1), Mortgages (1), Savings (1)
Challenger 6	• Founded in Germany in 2009. Obtained banking license and entered the UK in 2015 with current and savings accounts.	Crowd-financing (1), Insurance (1), Intl Money

	- Acquired by non-UK incumbent bank in 2016, operates under same name. - Also operates in US, Dubai, Singapore. - 200K UK customers by 2017	transfer (1), P-2-P payments (1), Rewards (1), Savings (1)
Challenger 7	- Founded in London in 2015, obtained banking license but lost it due to investment pull-out. Acquired small UK bank to re-obtain banking license in 2018. Offers credit cards and savings accounts since then. - 2 investment rounds to date for a total of £110 million	Money management (1), Savings (1)