



# **DIGITAL INNOVATION IN BANKING AND OPEN BANKING APPLICATIONS: KEY FACTORS AND BARRIERS TO ADOPTION**

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## **Abstract**

*PSD2 was introduced in 2018 and it has led to major changes in the financial sector. Part of PSD2 was the new approach “Open Banking” which enforced banks to make their client data accessible for third-party companies who could then use these to create innovative financial apps for tech demanding consumers. So far, the adoption of these apps hasn’t been as high as expected, but few empirical works examine the issues. This work explores key factors and barriers for open banking application adoption from customers. It is an empirical qualitative study focusing on experts and professionals from banking and fintech sector. A number of experts from banks and third-party application developers were interviewed and thematic analysis followed afterwards. Results show that the reluctance of consumers comes from lack of awareness, data privacy concerns and the current offering of products on the market. In comparison, a clear benefit, communication, and trust are key factors for the adoption. In terms of effectiveness, open banking has increased innovation as well as competition, but is still at the beginning of long-term change.*

*Keywords: Open Banking, Payment Systems Directive, Technology Adoption Model, Technology Acceptance Model, Digital Banking*



## INTRODUCTION

Financial data are among the most regulated types of data and are protected by tight legislation in European Union (EU). This is considered as one of the key factors that has prevented financial sector from embracing mass innovations (Ma et al. 2018). To alter this, Payment Services Directive 2 (PSD2) was implemented in 2018 in European Union (EU) as a driver to modify the legal foundation for financial data exchange significantly. PSD2 initiative aimed to increase competition in payments industry, encourage banks to participate and collaborate with third parties and guarantee payment security for customers. Following this initiative, technology innovations would be much easier to be introduced and followed by end users (Ünsal et al., 2020).

From a technological point of view, the directive promoted architectures of open application programming interfaces (APIs) for communication between software applications, shared among clients and participating organisations. Banks, as one of the main pillars of the initiative were expected to expose their data as services, so any interested third parties can develop user applications that can aggregate information from various providers, and thus offer users data rich solutions (Premchand and Choudhry, 2018). Except for the improved customer experience, another objective was to create an ecosystem of financial services providers and create a market for fintech companies, while disrupting the banking dominance in the industry and reducing costs by increased competition (Kassab and Laplante, 2022a). However, to benefit from the implementation of PSD2, the critical factor is customer adoption of the novel applications. In general, users of financial services tend to be loyal to the applications offered by the banks they keep their accounts and are hesitant to use third party applications for their sensitive financial data. This is partly because of a lack of knowledge about the new services and partly because of lack of trust to share their financial information (Guibaud, 2016). Something expected, as some open API implementations are frequently implemented improperly and without taking advantage of open banking's innovative potential (Omarini, 2018). Despite the difficulties, numerous open banking apps are available now that have been successful in their approach, however adoption remains a challenge and there are mixed opinions on whether the directive was successful in increasing innovation and competition in the financial sector. However, even if many new products exist in the market, consumer adoption does not seem to be as high as expected and the reasons are not clear (Dratva, 2020).

Following the above, and the relative lack of empirical studies in the domain, this work explores some of the key factors for consumer adoption of open banking applications as well as the effectiveness of open banking implementation. The study is exploratory aiming to uncover some of the key aspects that drive adoption of applications on the one hand, and on the other

hand to identify the point of view of companies that implement solutions. So, a number of focused interviews was performed with a number of third-party companies, which develop open banking applications along with adequate qualitative analysis. The specific work fills a gap in existing literature, as empirical studies are rare, and offers insights on how technology companies that develop open banking applications perceive PSD2. Initially, we present an overview of existing research in the domain, along with key findings and trends. Next, we introduce the research methodology and key elements of our data analysis. Finally, we conclude with discussion and summary of results.

## **BACKGROUND**

### **PSD2**

Financial services is a domain that follows and adopts technological trends and digital transformation at a large extent. As the financial information can be easily digitized, it is not surprising to see that the electronic means of performing financial transactions is widely used in all aspects, from payments to banking and trading. However, due to the nature and sensitivity of financial data, the domain is highly regulated and banks play a key role in the ecosystem, as a key pillar to ensure trust. The dominance of banks in the financial and payment services was not advancing technological innovation and competition however, as the banking services were not open to third parties. In EU, this was considered as a deficiency to competition and after consultation a series of directives were issued in order to turn the payments industry to a market where involved parties would compete to offer services to end users efficiently and cost effectively. So, an initial Payment Services Directive was issued on 2007 setting the main agenda for the domain, followed by the PDS2 on 2018, which is a revised version taking into account the electronic payments technologies and consumer desire for technological advancement (Petrovic, 2020). PSD2 was aiming to increase transaction security, improve the efficiency of EU payment ecosystem and generate business competition and innovation in the industry (Radnejad et al., 2021). Competition was expected to develop by allowing third-party companies to enter the market and offer new concepts and innovative customer applications (Petrovic, 2020). This would also motivate banks to innovate, as due to the tight regulations banks were not setting innovation as their priority. PSD2 was a required legislation for all EU countries, but also a compliance requirement for parties outside EU willing to collaborate with EU providers (Noctor, 2021). United Kingdom (UK) for example included PSD2 in its legislation to allow for smooth collaboration with EU financial sector.

In terms of whether PSD2 succeeded in its aims, some researchers (Radnejad et al., 2017) argue that it has increased competition, as data access is not any more restricted to banks,

and new players have entered the market. On the other hand, banks have not adopted the new initiative as a new business perspective but rather as a compliance mandate, so they tend to perceive it as a threaten to their competitive advantage and continue to operate as before, with additional cost for them to comply, however. According to Dratva (2020), it depends on banks whether they will benefit from PSD2. If they implement changes properly and use them to collaborate with other tech companies to create innovative products, there is a high potential of increasing customer satisfaction and revenue. Guibaud (2016) agrees with this hypothesis and states that the opportunities through open APIs can be the key for traditional banks to compete with Fintechs that are becoming a major competitor in recent years. However, up to now, it looks like Fintechs are embracing these new opportunities and becoming even bigger competitors, while more traditional banks tend to resist the change and only implement the minimum requirements. According to Anagnostopoulos (2018) there are two main reasons why banks are comparatively slower or less interested in implementing innovative technology. First, most large banks have a good market position and do not see the need for new technology. Second, their IT departments are already utilized to capacity with implementing requirements from new complex regulations. Banks have legacy systems for their core business processes which complicates the maintenance and further development. Because of this, innovation is very costly for more traditional banks and often times seen as unnecessary overspending. Overall, PSD2 enabled a lot of new business models with high potential for the tech demanding market which banks as well as third party providers can profit of. Even though most of the banks seem to only adapt the necessary requirements, there will be forced to be more innovative in the future in order to keep up with other competitors on the market (Omarini, 2018).

## Open Banking

PSD2 enforces banks to open their services and share their data to third parties, which in turn will be able to develop client applications and add value for customers. For this, PSD2 makes use of open banking concepts for the sharing of client data between financial institutions and third-party companies. In this approach, bank data will be provided via open APIs in a secure and on-demand way (Mansfield-Devine, 2016). So, open banking follows a financial software as a service (SaaS) approach, that allows third parties techs to access client data in their banks and create financial applications for these clients. In the traditional approach, banks were the data owners and sole providers of applications related to a customer account and financial data, but following the PSD2 directive, a customer is the data owners and has the ability to select the application provider and link it to the bank that keeps the data. Open banking demands high standards for the creation of APIs in order to protect client data. These cover

customer operations-specific rules and security profiles. Additionally, the client must consent before the bank can share their information with other businesses (Kassab and Laplante, 2022 b). To ensure compatibility, the bank must supply the API with standardised data protocols. Because of this, external developers can use the data without being familiar with the system that provided it (Nanaeva et al., 2021). PSD2 and implementation of open banking is recognized as a disruptive force for banks, as open APIs enable the transition from online banking to banking platforms and can be used to incorporate new services into current platforms (Guibaud, 2016). However, open APIs, can be utilized by banks as well to build interactive platforms that can enhance the service that banks offer to their customers following customer-centric strategies and cutting-edge technologies (Premchand and Choudhry, 2018). New business models can be developed by banks, like joint services in collaboration between a bank and a third party, that can be used by bank's clients, or a bank to act as the data consumer and improve existing platforms using APIs from other financial organisations (Premchand and Choudhry, 2018). Therefore, it is crucial that banks try to fully capitalise on these new opportunities and develop a plan to provide value through open banking. The formation of brand-new businesses that create their own applications in response to consumer needs, however, is what happens most frequently. These are entirely independent and can connect any number of open APIs from banks so that as many private individuals as possible can use their financial services (Nanaeva et al., 2021).

### **Customer adoption**

For the commercial success of any service or application that relies on volumes, customer adoption is the key priority. Applications might offer numerous innovations, but they might not achieve to reach the critical mass for their success. Although, there has been a digital explosion in everyday life, and banking customers are familiar with technical services across all industries (Guibaud, 2016), they are also taking into account non technological aspects as well, like security and data protection, where banks, as a regulated industry, have a considerable advantage compared to FinTechs. Open banking standards can be a solution to ensure trust for FinTechs (Aytas et al., 2021), however it is not yet clear to users and it seems that open banking services appear to be poorly received (Dratva, 2020).

To analyse consumer willingness to adopt a technology, the technology acceptance model (TAM) introduced by Fred Davis (1989) is one of the most frequently used models. Davis (1989) defines two variables which determine whether technology will be accepted by users or not, "perceived usefulness" and "perceived ease of use". The perceived usefulness is the extent to which a person thinks that adopting a certain system would improve his or her efficiency.

Therefore, technology is more likely to be adopted if it supports the user in being more efficient at his or her tasks. Perceived ease of use is defined as the degree to which an individual perceives that adopting a certain system would be without effort. If a new technology requires more effort than the way a task has been done so far, there is a low chance of user acceptance. Ultimately, both of these variables can be measured using a scale and together determine the acceptance of a technology. Throughout the years, numerous variations of the TAM model have been presented to take into account specific dimensions, like trust, privacy and security.

In terms of open banking, opinions are mixed on why newly released open banking products aren't getting as much attention as expected. There seem to be barriers that prevent users from using these services (Dratva, 2020), but on the other hand customers are not aware of the services and their benefits related to PSD2 and open banking. Another perspective is that maybe the services provided fail to satisfy customer expectations and needs (Guibaud, 2016). It is not enough value for a customer to just execute funds transfer for example. Instead, clients wish to have access to advanced functionality like loyalty programs and tailor made transactions based on their risk profiles. According to Kassab and Laplante (2022 b), client trust in the new services is crucial to open banking's success. Nanaeva et al. (2021) also claims that customers must not only be informed about the benefits of open banking but also educated on how the relationship between the bank and third-party functions. This will result in the transparency required for customers to have faith in the system. A study of Chan *et al.* (2022) showed that there are four key factors that affect a customer's intention of using an open banking product. These include social influence, perceived risk, effort expectancy, and performance expectancy. This model is similar to the TAM with the addition of two further factors, social influence and perceived risk. In this case, social influence means the extent to which one expects other people out of their close environment would use a service. Perceived risk is associated with the risk that a person feels with sharing their data with third parties. The same study showed that the initial trust and financial literacy are irrelevant factors and have no impact on the usage intention of a person. Ultimately, there seem to be no clear explanation why customers are not using open banking services and what factors could determine them to do so. Therefore, this work aims to identify some key factors and barriers of consumer's adoption through interviewing successful open banking app providers. Following the above review, it is apparent that there is a gap in research regarding open banking, especially in adoption and factors that affect it.

## MATERIALS AND METHODS

The aim of this work is to explore factors that make customers reluctant to use open banking applications and how existing open banking apps have worked around them to be

successful. Even though the focus is on adoption from customers, open banking is a specialist topic and most people are not aware of it, so we decided to focus on experts in the field coming from the supply side, instead of end users. Thus, a qualitative approach with expert interviews was selected, as the research design, with industry experts coming from different involved parties of open banking business model including spokespersons of banks, third-party providers, as well as consultants working in the financial industry.

For the sampling, we defined three broad categories: banks, third-party providers, and banking consultants, as each one provides a different perspective and enables a multisided discussion of the research topic. The criteria for inclusion were also defined based on purposeful approach. In total, around 80 potential interviewees were contacted initially through their professional contacts. The final number of interviews were 10 including 2 coming from bank group, 2 from bank consultants group and 6 from third-party providers.

The interviews were conducted online as it was more convenient for the interviewees and would allow for increased participation. The interviews were semi-structured with an open set of questions so that there was a possibility for follow-ups during the process (Collis and Hussey, 2014). Each interview was recorded and automatically transcribed and the average interview duration was about 30 to 45 minutes. Because of the three different categories of interview partners, the questionnaire for each category was extended according to their expertise.

Following data collection, thematic analysis was conducted using NVivo software in order to identify the key themes and patterns. To avoid bias during the analysis, an open coding approach was followed with only the first layer of nodes being predefined.

## **ANALYSIS & RESULTS**

From the analysis on open banking adoption we distinguished two thematic areas, the barriers on the one hand and the factors that influence adoption on the other. The barriers can be attributed to lack of awareness, data privacy concerns and missing innovation. While the factors, emerged from the analysis, that can influence the adoption were the overall benefit, the ease of use, proper marketing and increased trust.

### **Barriers**

#### ***Lack of awareness***

Almost all interviewees share a common view that customers do not tend to use open banking apps from third-party providers as expected. Lack of awareness for open banking was attributed as one of the main barriers and was mentioned in almost all interviews. What was



evident is that all agreed that most users are not familiar with PSD2 terminology and payment directives and for their benefits.

“I read a survey, if people know what open banking is and more than 90% of the people had no idea what it meant. So, when you have no idea what it means you cannot use it by definition.” – (Bank consultant 1)

“It [*lack of awareness*] prevents people from using it. People will download the app, seeing an advert and then realize they need to connect a bank account and suddenly start freaking out.” – (Open banking app provider 6)

However, there is no consensus on the reasons for lack of awareness. Some relate it to reduced user interest in financial sector news, while others to lack of official promotion, including banks or government organizations.

“I would also like to see that banks make the clients more aware. It would be nice to have banks recommended it to their clients that would really help with this trust issue we have right now that people would trust us more.” – (Open banking app provider 2)

“So, we have one part on our website dedicated to open banking, where we inform them, what we offer in terms of open banking, and how their data is protected if they want to use it. But we haven't necessarily made them aware, like actively send out information or something like that.” – (Bank employee 1)

Despite the various opinions, all participants seem to consider lack of awareness a barrier to adoption for open banking services.

### ***Data privacy concerns***

The second barrier in terms of importance is data privacy issues. Customers seem in general reluctant to authorise sharing their financial data with third parties, that do not hold the status of a bank institute.

“I think the biggest barrier is probably the fear of sharing their data, especially when it's about financial data..” – (Open banking app provider 2)



“I think financial data probably second to medical data is probably some of your most sensitive and so even though it is all through secure bank level security API's.” – (Open banking app provider 6)

“I don't think that consumers really trust those third-party companies with their financial data.” – (Bank employee 1)

However, there is some opposing view claiming that customers themselves don't care as much about it.

“And most people are very willing to share their data now, so long as they feel that they're getting something in exchange.” – (Open banking app provider 5)

### ***Missing innovation***

One of the main aims of PSD2 was to increase innovation in the financial sector. However, some interviewees argue that there just haven't been enough innovative ideas yet to disrupt the market and attract a lot of customers.

“There hasn't been that much more innovation [...], certainly we're just touching the start of this journey. And there's probably a lot more innovation starting to come. [...] But I think it's all around new innovative ideas which give benefits to consumers.” - (Open banking app provider 3).

### **Key factors**

#### ***Benefit***

Next to the barriers of consumer adoption, there are also some key factors that can increase customer numbers. The participants of the interview were asked what factors are most important in order to improve consumer adoption. The factor that has been emphasised the most is a clear benefit for the customer.

“I think it's a question of trade off and benefit. There has to be a benefit to someone to use a product and people have to understand why their connection is required to their bank and why their data is being used. If they don't, and there's not enough of benefit to them, they're simply not going use the product.” – (Open banking app provider 3)

“The benefit for the customer has to be very clear. Why would someone use an app if they don't know why, if it's not making their life easier or better in any way? So, there should be a clear benefit, to be willing to share data and to spend your time on it.” - (Open banking app provider 2)

### ***Ease of use***

According to the TAM, there are two variables that determine the adoption of a new technology. These are the perceived usefulness and perceived ease of use. While the usefulness (respectively, benefit) was mentioned by almost every interviewee, the ease of use was just mentioned once for the adoption of open banking apps.

“What I know from my experience is that users with apps or websites have very low patience in terms of getting to know the app, or the patience for understanding an app. So, for example, if a user downloads your app, opens it and it's not immediately clear what he or she has to do in order to use it. You already lost them because no one is okay with reading a manual first.” – (Open banking app provider 2).

### ***Successful marketing***

As with every new product on the market, there is a need to advertise it to potential customers. Especially in the case of open banking, because most consumers don't seem to inform themselves about new financial apps. With the low awareness of these products, marketing is even more important. One factor that is also interrelated with marketing and lack of awareness of open banking is the way the customer is being addressed. For most people, open banking is a topic that they might not understand or even be afraid of. Furthermore, financial affairs are complicated for many consumers and connected to the fear of doing something wrong with their own money or being taken advantage of by criminals (Open banking app provider 1).

“When people don't understand something because of fear of adoption, because, I mean, the banking industry and finance industry at large is full of fraud of different kinds, you know, and it's very difficult and there's a lot of people out there who are taking advantage of the lack of understanding about financial services with people and so we can see why people are obviously nervous of this industry. And so, a lack of understanding would essentially be the big problem that needs to be addressed and financial and technology literacy are obviously big challenges.” – (Open banking app provider 1)

“When you are trying to communicate with people in a conversation, I guess, you don't necessarily refer to the phrase open banking, because as the user, why would you care?” – (Open banking app provider 4)

“What we realized in terms of open banking is that the wording itself is very important and how you ask the people for permission to use their financial data. When we ask for their permission to share financial data for our transaction analysis, that's the point where a lot of people just stop and they don't go forward because when they read that, they get scared. We changed the wording and made it sound a bit less scary. [...]. And since then, we saw in numbers that way more people proceeded with that process and gave their permission.” – (Open banking app provider 2).

### ***Trust through open communication***

As already mentioned within the section about barriers to consumer adoption, many consumers don't trust the newly founded third-party providers with their financial data. The financial industry has always been prone to fraud of different kinds by criminals who take advantage of the lack of financial literacy of consumers. For this reason, consumers are afraid of technological changes in this area and are reluctant to share their data with unknown companies (Open banking app provider 1). In comparison to that, banks enjoy a high level of trust from their clients in terms of data privacy. Therefore, many consumers would prefer to leave their data in the bank. In order to increase trust, banks and the government have to support third-party companies and recommend the services to their customers (bank employee 1).

## **DISCUSSION**

From the analysis the key result is that the reluctance of consumers to use open banking apps is due to a number of barriers and the biggest one seems to be the lack of awareness of open banking in the public. What becomes apparent in the interviews is that there is a consensus that consumers are not aware of what open banking is. Also, banks don't feel responsible for making clients more aware, because they are not interested in promoting services from other companies. One of the biggest issues for third parties is the missing trust from customers because they aren't convinced that sharing their data wouldn't lead to fraud. Banks are highly regulated and have high security measures in place to secure client data.

Opening this data to other companies might lead to data leaks that would reflect negatively on banks.

This overlaps with the data privacy concerns of consumers that is the second barrier of consumer's adoption. Lee *et al.* (2015) argue that consumers still have a high level of concern when sharing sensitive information online, especially if they are supposed to share it with lesser-known companies. The success of the open banking apps which were interviewed for this dissertation demonstrates the opposite. Even though these companies admitted that there was reluctance in the beginning, they found ways to increase their user numbers. The key factor seems to be communicating the benefits of the app to the customer. If benefits outweigh the concerns of the customer, they will share their bank details with the app. This matches the technology acceptance model of Fred Davis (1989) which says that the presumed usefulness is one of the two most important factors for user adoption. This presumes that the app has features that meet the needs of the customer and that the value is explained to the customer. If the customer understands the value and why there is a need to connect a bank account, there is a high chance that the user will give their permission to connect. For this, using easy language without mentioning technical specifics or the term "open banking" seems to be the most successful way. Furthermore, the ease of use could be a factor in increasing consumers' adoption. But even though this is one of the main variables of the technology acceptance model (Davis, 1989), it has only been mentioned once in the interviews. This shows that it might be important for the development of new technologies in general, but it is not one of the key factors in the open banking environment.

The interviewees that came from the perspective of banks state that the products on the market aren't innovative enough to attract enough customers. In general, some of the responses of these participants give the impression that they are ill-informed about third-party providers and are ignorant of their products. They claim that the apps aren't innovative, they aren't real competition, and they haven't been marketed enough. On the other hand, they also won't help these companies and won't make their clients aware of it. This raises suspicion that banks might feel threatened by the new players in the market but don't want to admit it. This matches the opinion of Omarini (2018) who states that banks should feel threatened by the new players in the market and that they have to act quickly to stay relevant to consumers.

In general, open banking is at the beginning of its development and there will be long term implications (Zachariadis and Ozcan, 2017). Banks in most cases haven't really used the new opportunities through open banking for themselves. Instead, they are providing mediocre APIs to comply with the law (Omarini, 2018). This might change in the future because some researchers claim that going with the open banking trend is crucial for banks to stay competitive

long term (Guibaud, 2016). Those long-term changes for traditional banks allow for more research in the future.

## CONCLUSION

This work focuses on exploring key barriers and factors that influence adoption of open banking applications in the current environment of the financial sector. The study was based on a number of interviews with people coming from the industry, like banks, application providers and consultancies trying to uncover the key obstacles towards adoption. The key barriers were identified as the lack of awareness and data privacy concerns, while the key factors that could influence the adoption are the benefit and ease of use. Despite the sampling limitations, that does not allow for generalization, the study sheds light to the key factors from an empirical point of view and contributes to the limited research in the field. A survey from customer point of view might offer other some extra important barriers and key factors of adoption not present in this study.

From the analysis it is evident that one of the biggest issues in open banking adoption is the lack of trust from consumers in third party applications because they are not convinced that sharing their data will not result into fraud. So, one recommendation that emerges from this study for banks, and policy makers in general, is to enhance the level of trust for customers by promoting the third party applications jointly with the third parties. This might look as conflicting with existing bank business models, but in the long term it will generate a lot of collaborations and lead to market development. So, even if there is not any motivation for banks to promote their competitors, considering that trust is a core component of financial markets it is for the benefit of the market to safeguard it.

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