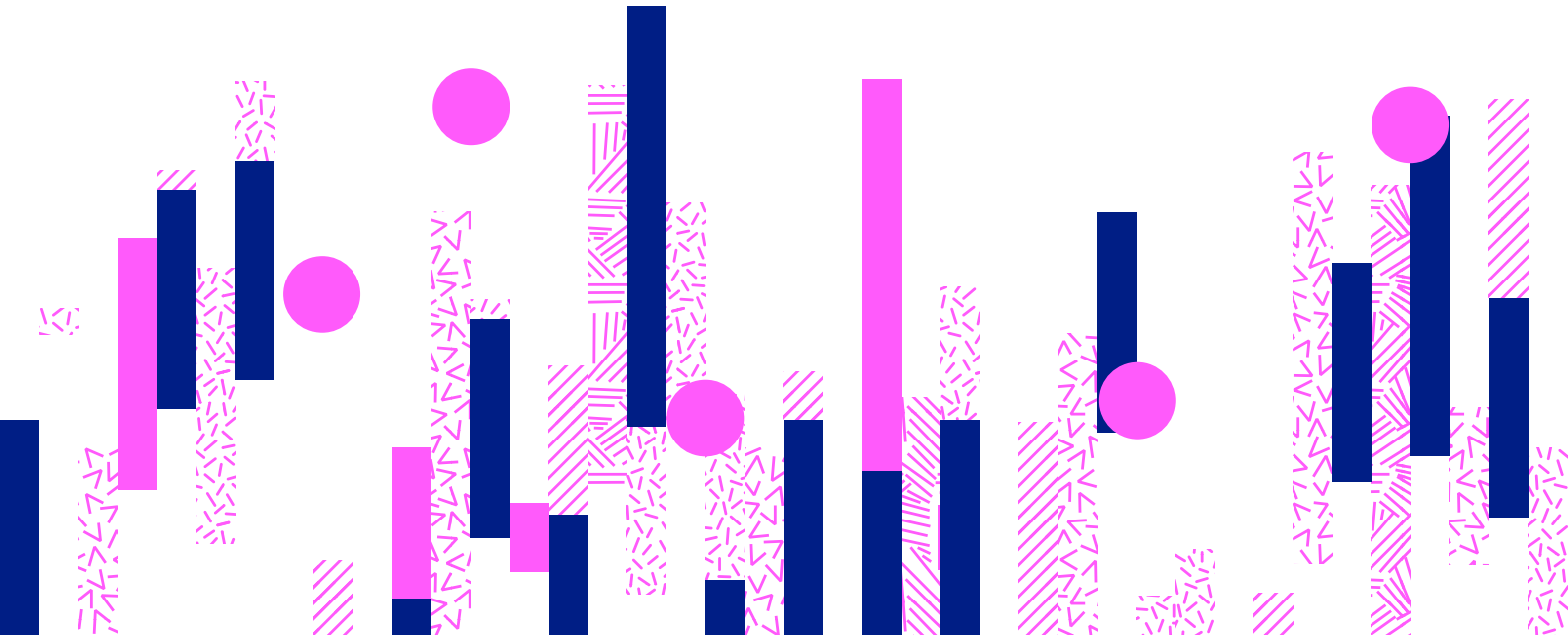
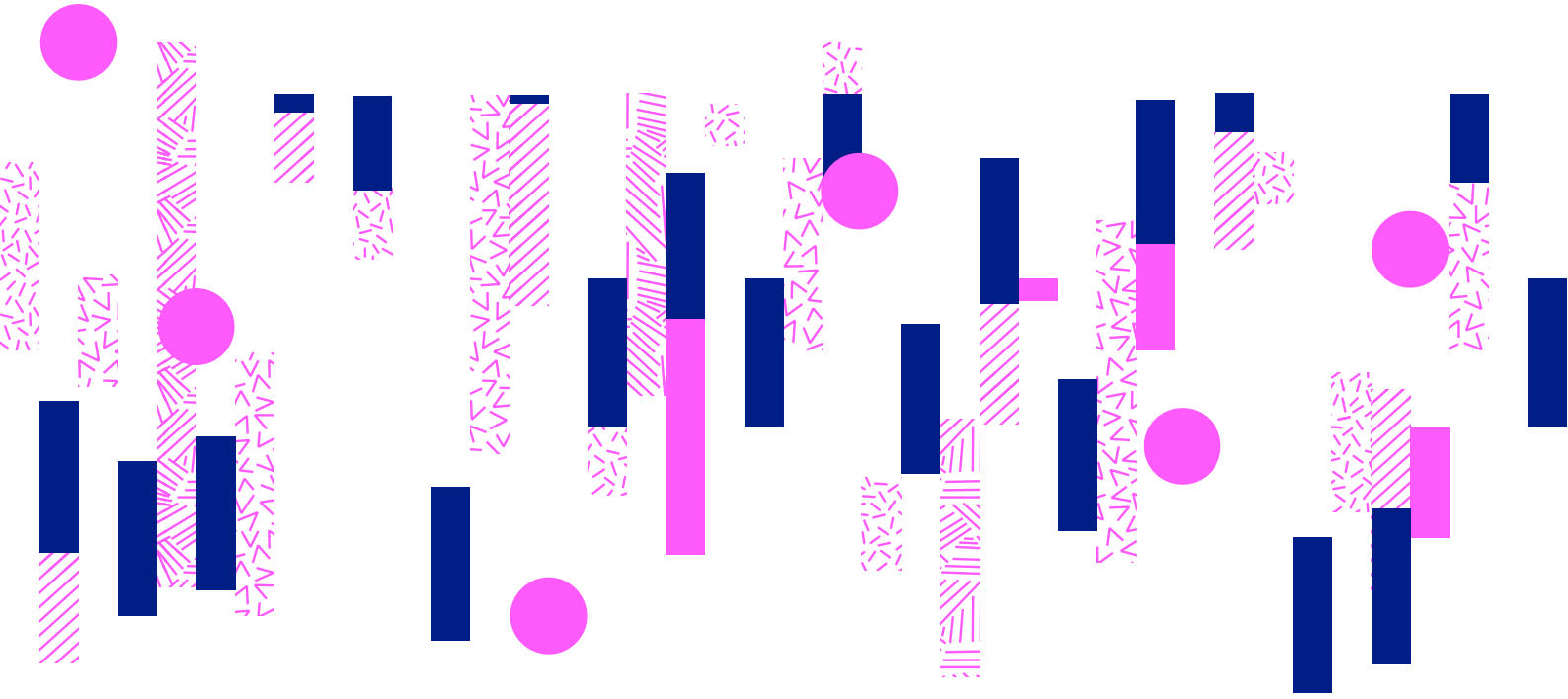
EIF Research
and Market Analysis

Working Paper 2023/94



Open banking and inclusive finance in the European Union: perspectives from the Dutch stakeholder ecosystem

Massimo Preziuso, Franziska Koefer and Michel Ehrenhard



Massimo Preziuso
Directorate of Law, Economics, Accounting and Finance, Salford Business School, University of Salford, Salford, Manchester M5 4WT, UK

Franziska Koefer
Department of High-Tech Business and Entrepreneurship (HBE), Faculty of Behavioural, Management and Social Sciences (BMS), University of Twente, Drienerlolaan 5, 7522 NB Enschede, The Netherlands

Michel Ehrenhard
Department of High-Tech Business and Entrepreneurship (HBE), Faculty of Behavioural, Management and Social Sciences (BMS), University of Twente, Drienerlolaan 5, 7522 NB Enschede, The Netherlands

This working paper is a re-publication of research originally published in Financial Innovation 9, Article number: 111 (2023). The main content of the paper remains unchanged from its original publication. The original can be found at: *https://doi.org/10.1186/s40854-023-00522-1*

Massimo Preziuso (Corresponding author, *m.preziuso@salford.ac.uk*) conceptualized the paper, designed its methodology, was in charge of the data acquisition, analysis and interpretation, and wrote the entire work. **Franziska Koefer** assisted in the acquisition of data. **Michel Ehrenhard** participated in the conceptualization and reviewed the work. All authors read and approved the final manuscript.

Editor:
Helmut Kraemer-Eis,
Head of EIF's Research & Market Analysis, Chief Economist

Contact:
European Investment Fund
37B, avenue J.F. Kennedy, L-2968 Luxembourg

Tel.: +352 248581 596
http://www.eif.org/news_centre/research/index.htm
Luxembourg, October 2023

Scan above to obtain a PDF version of this working paper

Disclaimer

Preface

The EIF supports Europe's SMEs by improving their access to finance through a wide range of selected financial intermediaries. To this end, the EIF primarily designs, promotes and implements equity and debt financial instruments which specifically target SMEs. In this role, the EIF fosters EU objectives in support of entrepreneurship, growth, innovation, research and development, and employment.

The EIF has been involved in the European inclusive finance - including microfinance - sector since 2000, providing funding (equity and loans), guarantees and technical assistance to a broad range of financial intermediaries, from small non-bank financial institutions to well established microfinance banks to make inclusive finance a fully-fledged segment of the European financial sector. The EIF has become an important pillar of this segment, by managing specific initiatives mandated by the European Commission, the EIB, and other third parties, as well as by setting up operations using own resources.

This working paper results from a research project on "Strengthening Financial Inclusion through Digitalisation" (SFIDE), initiated by EIF's Research & Market Analysis division. The project is funded by the EIB Institute under the EIB-University Sponsorship Programme (EIBURS). EIBURS supports university research centres working on research topics and themes of major interest to the EIB Group. Digitalisation and financial innovations in the European SME finance sector is strategically relevant to the EIF and to the EIB Group. The EIF believes that supporting financial innovations can disrupt funding instruments, including inclusive finance, and improve its ability to contribute to the achievement of social policy targets.

The aim of the SFIDE project is to investigate the potential of technological and financial innovation to increase the efficiency of the inclusive finance sector, through the identification and promotion of best practices. In the European Union, the revised Payment Services Directive (PSD2)[1] aims to provide more convenient and customized financial products through open banking (OB)[2] platforms. However, little attention has been paid to the role of OB in improving the financial well-being of the EU's underserved individuals and businesses. The paper discusses how the PSD2 and OB impact inclusive finance in the EU, based on perspectives and experiences from the Netherlands, a country with a well developed financial technology (FinTech) landscape. This working paper is expected to be followed by other papers conducted by researchers involved in the SFIDE project.

Helmut Kraemer-Eis
Head of Research & Market Analysis (RMA),
Chief Economist, EIF

Salome Gvetadze
Senior Research Officer,
RMA, EIF

Wouter Torfs
Senior Research Officer,
RMA, EIF

[1] In 2015 the EU adopted a new directive on payment services (PSD2) to improve the existing rules and take new digital payment services into account. The directive became applicable in January 2018. The payment services directive established the same set of rules on payments across the whole European Economic Area covering all types of electronic and non-cash payments, such as credit transfers, direct debits card payments, and mobile and online payments. See *Payment services (europa.eu)*.

[2] Open banking is the process by which third-party service providers access users' account data held by banks and other payment account providers. PSD2 gave open banking a stable regulatory framework, imposing an obligation on banks to facilitate access to payments data for third-party service providers via a secure interface. See *Revised rules on payment services (europa.eu)*.

Abstract

In the European Union (EU), the revised Payment Services Directive (PSD2) aims to provide more convenient and customized financial products through open banking (OB) platforms. However, little attention has been paid to the role of OB in improving the financial well-being of the growing number of the EU's underserved groups, which currently constitute approximately a quarter of its population. This study examines how the PSD2 and OB impact inclusive finance in the EU based on the perspectives of the Netherlands' ecosystem, one of the leaders in the EU's financial technology (FinTech) landscape. A fundamental distinction can be drawn between the OB users and the ecosystem's players. Regarding the impact of financial services on the users' inclusivity, while the PSD2 strengthens the infrastructure necessary for financial inclusion, many challenges remain, mainly because it was not designed for this purpose. This study identifies several areas of improvement that include adjustments to the know your customer (KYC) and anti-money laundering (AML) processes for underserved customers, innovative ways to communicate the PSD2's potential, and the regulation of technology providers' activities to build trust. Meanwhile, from the ecosystem's position, there is a need to strengthen and improve microfinance regulation according to the opportunities provided by the PSD2 to support microfinance institutions (MFIs) in scaling up and reaching underserved clients across borders with innovative services. OB improvements can also be achieved by organizations formed by MFIs and FinTechs in collaboration with banks. Such hybrid institutions will combine the best features of each of them: knowledge of the needs of local underserved clients from MFIs, technological innovations from FinTechs, and large and trusted customer bases, infrastructures, and access to institutional investments and governments from banks. Finally, an EU inclusive OB sector depends on the centrality of trusted regulators as coordination bodies.

Highlights

- The PSD2 requires adjustments for underserved populations' specific needs.
- OB improvements can be achieved by organizations formed by MFIs and FinTechs in collaboration with banks.
- Regulated technical service providers (TSPs) are crucial to building trust and customer adoption in OB.
- The European Banking Authority (EBA) may function as coordination body to design inclusive rules by engaging with OB stakeholders.
- As inclusive finance moves into open-finance and data eras, an increasing regulatory complexity and scope will require networks of innovative and trusted regulators.

Table of Contents

1 | Introduction

Since the global financial crisis in 2008, financial regulation and its associated costs have limited the capacity of traditional financial companies to innovate (Arner et al., 2016). Meanwhile, financial technology companies (FinTechs) have led a new wave of digitalization in financial services, unbundling their value chains (Alt et al., 2018). Customers of traditional financial organizations have been captivated by how FinTechs have applied technologies to agile, customizable, and internet-based business models at an affordable cost (Gomber et al., 2017). FinTechs offer personalized and data-driven solutions that are mainly targeted at tech-savvy millennials (Lee & Shin, 2018). They are aligned with the current societal need to quickly move into digital and mobile environments, occupying a central position in the new configurations of financial ecosystems.

While 1.4 billion adults remain unbanked worldwide, Fintech institutions can play an active role in improving the lives of people in arduous circumstances (Findex, 2022). Broadly, financial inclusion enables equal opportunities for individuals and businesses to access affordable financial products and services such as credit, payment, savings, and insurance (Mader, 2018). More specifically, FinTechs have made financial services available to people who were excluded from or had limited access to them for economic, geographical, or social reasons (Philippon, 2019). For example, FinTechs democratize the availability of investments and funding to social projects through services such as crowdfunding (Nguyen et al., 2021) and finance cooperation without intermediation through blockchain platforms (B. Scott et al., 2017). They can also support vulnerable populations, such as women and immigrants, by providing peer-to-peer lending at lower interest rates (Dorfleitner et al., 2021).

It is estimated that FinTechs have already increased income and consumption levels in developing countries (Suri & Jack, 2016; Lashitew et al., 2019). For example, in Africa, financial innovations such as the availability and use of mobile phones were adopted to offer financial services that promoted savings at the household level, resulting in increased amounts of savings (Ouma et al., 2017). Nevertheless, in some developing countries, FinTechs have often experienced shortcomings due to their inability to understand the specific needs of local customer experiences (Buckley & Webster, 2016) or contributions that accelerate problems such as over-indebtedness and financial instability (Bateman, Duvendack & Loubere, 2019; Van Hove & Dubus, 2019).

According to Claessens et al. (2018), because FinTechs have yet to exist over an entire economic cycle, it is too early to verify their impact on individual customers and at the macroeconomic level. However, there are clear perceptions of the need to balance consumer protection and financial stability with innovation and competition in financial services (Van Loo, 2018; Cambridge Centre for Alternative Finance & World Bank, 2019).

In this respect, open banking (OB) regulation has been instrumental in granting customers ownership of their data and the power to share such data with regulated FinTechs to access new products and services (Zachariadis & Ozcan, 2017). In January 2018, the European Union (EU) launched its OB initiative through the Payment Services Directive 2 (PSD2) to increase competition

and innovation in the financial sector while preserving its customers (European Commission, 2015). Consequently, a new wave of financial services is emerging, raising the question of whether the EU's underserved customers will benefit from such new competition dynamics. As discussed in section 2 | below, previous research on the opportunities and challenges of the PSD2 and OB for financial inclusion has a limited focus. Moreover, such studies are scarce, fragmented, and do not consider the views of the European ecosystems regarding the PSD2.

Unbanked individuals in the EU are much fewer than those in developing countries, approximately less than 4% (13 million in 2021), and this number has more than halved (31 million in 2017) in the last four years (WSBI-ESBG, 2022), although with significant differences within the region. However, in 2016, underbanked customers still constituted 27% of its population (Mastercard, 2016). Unlike the unbanked, who entirely lack a bank account or access to financial services, the underbanked may have access to a bank account but still obtain products or services outside the banking system (Xu, 2019).

Stakeholders of national inclusive-finance ecosystems can assist in establishing the role of the PSD2 in promoting inclusive finance, as they are positioned at the forefront of the sector's transformation, allowing them to identify implementation issues and impacts. Understanding what the organizations (and end-users) impacted by a technology think about it and its development is essential to contextualize potential benefits (Clohessy & Acton, 2019; Garg et al., 2021). Thus, focusing on the Netherlands, this study aims to answer the overarching research question: What are the PSD2's impacts on inclusive finance in the Netherlands? Based on the views of the Dutch inclusive-finance ecosystem's actors, this study critically analyzes the PSD2's potential to improve underserved populations' financial inclusion in the EU by providing different insights for policymakers and practitioners.

The article is divided into six sections. It starts with a theoretical background in which the views on the nexus between the PSD2, OB, and inclusive finance are briefly explained. Next, the methodology is described to provide details on the design of the qualitative interviews with a group of stakeholders representing the Dutch inclusive-finance ecosystem. The results of the thematic analysis of the interviews are then presented in the findings. This section builds on six aggregated dimensions—themes on the inclusive-finance effects of the PSD2 on users and the players' initiatives to advance inclusive-finance ecosystems. They are selectively analyzed in the discussion using theoretical lenses to distil opportunities and challenges for new policy that can result in positive effects on financial inclusion. Concluding remarks are drawn in the final section.

The study acknowledges the PSD2's incompleteness for inclusivity purposes due to the fact that it was not designed with such a focus. In practice, there is a risk of contributing to persistent or aggravated vulnerabilities rather than opening up financial services to a wide range of underserved populations. It identifies opportunities that emanate from three different aspects: technological, regulatory, and sectoral. Finally, the study confirms that a European inclusive OB sector will arise only through the coordination of the activities of local actors and niche ecosystems. Such a role could be performed by a trusted regulator such as the European Banking Authority (EBA) to reduce complexity and develop inclusive rules, engaging with the OB stakeholders with innovative tools.

2 | Theoretical background

2.1 | PSD2 and OB

2.1.1 | Overview

Over the last few years, many jurisdictions have adopted OB regulations representing the latest liberalization policies in the financial sector, moving away from the universal retail-banking model. The EU has driven this trend through its PSD2, meaning a narrow, payment-centric approach to OB is being adopted (Lynn et al., 2020). This aims to build an open, integrated, and efficient payment market in the EU and level the playing field for payment providers. It also focuses on creating a safer and more secure payment system that provides third parties access to customer data (European Commission, 2015). Under a broader approach, OB enables platform-mediated networks and business approaches in the banking sector (Economides, 1996; Gawer & Cusumano, 2014).

Generally, technological innovation in the banking sector has been linked to increased productivity, better services, and more profitability (Berger, 2003; S. Scott et al., 2017). This holds true for OB platforms (Romanova et al., 2018), which rely on the secure sharing of banking data between banks and third parties via digital interfaces known as application programming interfaces (APIs). However, according to Romanova et al. (2018), OB platforms are also accompanied by security and privacy risks, which can be reduced with secure APIs and layered-permission access. Through the platform approach, traditional banks have had the opportunity to build a cooperative environment with FinTechs (Drasch et al., 2018), avoiding the disruptive effect that technological innovation usually generates (Schumpeter, 1942).

2.1.2 | Competition dynamics

Banks have an advantage over FinTechs that is primarily due to their strong brands, economies of scale, and large customer bases (Lai, 2020). For instance, a specific study in the Netherlands has shown that traditional banks are trusted by their customers, who still consider such institutions a secure and regulated place to store money (Bijlsma et al., 2020). However, banks are subject to innovation constraints, such as strict regulations, organizational complexities, and expensive, multilayer, legacy information-technology (IT) systems populated by unstructured and fragmented datasets (Stulz, 2019). These types of limitations do not apply to FinTechs. As the latter are data-driven, digital, agile, less regulated, and more innovative, they may quickly scale up their operations by leveraging the large customer bases, financial resources, and data owned by the incumbents (Cambridge Centre for Alternative Finance & World Economic Forum, 2020).

Thus, Morales et al. (2022) found that FinTechs were associated with a higher risk level than the traditional financial sector, and that such a difference was not captured by classic financial-risk ratios. Consequently, potential financial instability should be avoided by innovative regulations.

Meanwhile, evidence suggests that financial incumbents risk losing a large part of their universal business model, particularly to the large, technological, United States (US) multinational companies (Cortet et al., 2021), also known as BigTechs. Such companies already have a well-established presence in digital markets, leveraging multifaceted platforms for commerce or innovation (Frost et al., 2019). For instance, while FinTechs could mainly jeopardize the horizontal banking integration by offering specialized services that were not connected to balance sheets, BigTechs could take over trusted communication with the customer, vertically breaking the model (Boot et al., 2021). While the goal of the PSD2 is to increase competition, in such a manner, its outcome may be the concentration of data-driven financial services in the hands of a few, dominant BigTechs (Arner et al., 2020).

Presently, this is the reason for the emergence of ex-ante regulations in the EU and United Kingdom (UK) against the "asymmetry of regulation" and "ecosystems effects" favoring the BigTech group, Google, Apple, Facebook, and Amazon (GAFA), and posing risks to financial stability, consumer protection, and fair competition in financial services (Chaudhry et al., 2022; Smith & Geradin, 2021). For instance, Di Porto and Ghidini (2020) suggest a necessity to complement the free access to users' payment accounts data with a "reciprocity clause" between BigTechs and the banks to level the playing field, thus improving competition and welfare.

As a consequence of such policies, which aim to avoid "super firms take all" scenarios, banks will continue to ensure that money is trusted and that financial transactions are secure. Thus, even if they have slowed down the adoption of the PSD2, large banks will probably continue to play an essential role in the future financial sector. Meanwhile, they will be forced to become more customer-centric and competitive, among others, to avoid the higher levels of churn introduced by OB (Broby, 2021). This is why the risk of new limitations in competition dynamics, which a strong incumbent could impose as a platform owner, must be considered by regulators (Borgogno & Colangelo, 2020).

2.2 | PSD2 and financial inclusion

2.2.1 | Overview

Systematic investigations of ways to achieve financial inclusion have identified four dimensions of growing complexity (Hannig & Jensen, 2010). The first aspect is access to financial services from formal institutions, and the second aspect is quality in terms of the relevance of such services to the customers' needs. Third, financial inclusion entails use beyond the basic adoption of

banking services until the last stage of impact, where changes in the customer experience from using the services are measurable.

Existing academic research on information systems has shown little engagement with FinTech's contributions to financial inclusion (Lagna & Ravishankar, 2021) and, thus far, it has barely managed to address the impacts of the PSD2.

2.2.2 | Advantages

While OB policies such as the PSD2 mainly support the average financial customer who is familiar with technology, it has already been recognized that they can fill financial-inclusion gaps by improving borrowing, savings, household bills, and financial health (Reynolds & Chidley, 2019). Among the synergies between OB and financial inclusion, it is unquestionable that the PSD2 encourages innovative companies to develop new services targeting underserved groups, such as credit assessment, faster loan approvals, and mobile payments and banking (Vives, 2019). This means that such clients can more easily build a financial profile and a transaction history than it is possible with the traditional banking system (Hollanders, 2020). For instance, the PSD2 fosters credit offerings at lower prices for individuals and businesses through competition dynamics (Guzman, 2000). Kassab and Laplante (2022) discuss new opportunities for small and medium enterprises (SMEs), particularly in the areas of debt collection, automation of business processes, and financial management. Another significant advance is that OB can trigger new business cases for inclusive-finance organizations (Plaitakis, 2019). Thus, OB may empower the activities of what Moro-Visconti (2021) termed "MicroFinTech", an organization created by the convergence of microfinance patterns with FinTech applications.

2.2.3 | Challenges

Nevertheless, some studies have directly or indirectly identified risks for underserved populations derived from OB related to the trade-offs of machine-learning applications to financial problems that affect society (Wall, 2018). Wolters and Jacobs (2019) argue that the development of the market for payment services driven by the PSD2 has a higher priority than the level of security and privacy around such services. Consequently, this might augment the problems already visible in the FinTech sector. For instance, Bao and Huang (2021) found that FinTech dealt with triple delinquency rates in loan repayments during the COVID-19 pandemic while the pandemic had non-existent effects on traditional bank loans. Furthermore, organizations operating in the payments sector are "particularly conscious of the risk of bias, for example, in anti-fraud controls or the identification of suspicious transactions" (Cambridge Centre for Alternative Finance & World Economic Forum, 2020). Generally, using machine learning (ML)/artificial intelligence (AI) applications in FinTech may result in discrimination toward specific populations due to embedded biases in algorithms or because they rely on specific systems (Philippon, 2019).

Furthermore, financial institutions tend to consider such underserved customers with high churn as costly because they require complex due diligence without the guarantee of a long-term relationship (Village Capital, 2020). Nevertheless, know your customer (KYC) and onboarding to

OB services can be tricky for these individuals, while the language used may be misleading. In this sense, Macchiavello and Siri (2022) found that they lacked the necessary experience or skills, and data were not available or provided.

Research on microfinance in Vietnam has shown the necessity to simplify anti-money laundering (AML) and KYC procedures for two reasons (Tran & De Koker, 2019). First, their customers' activities are unlikely to be associated with terrorism or money laundering. Second, they lack the skills to comply with such requirements. Overall, previous experiences in developing countries indicate that stakeholders have a relevant role in developing financial inclusion initiatives by designing banking technologies "with the unbanked in mind" (Leonardi et al., 2016; Lagna & Ravishankar, 2021).

Meanwhile, general studies have demonstrated various obstacles to the widespread adoption of OB in the EU (European Banking Authority, 2021). Among the reasons for such limitations is consumers uneasiness concerning such innovative solutions for privacy and security reasons (Brodsky & Oakes, 2017), which is not limited to unbanked customers. This is because security tends to be a key factor for service providers and users in engaging in financial transactions using a particular FinTech solution (Hwang et al., 2021). Rosati et al. (2022) have found that "perceived risk"—a factor that comprises the elements of privacy and security mentioned above—inhibits consumers' propensity to adopt account-information services (AIS). ING (2020) showed that only 30% of European retail-banking customers were comfortable sharing their financial information with third-party providers (TPPs).

According to Radnejad et al. (2021), such limited adoption is also a consequence of the fact that OB in Europe is regulation-driven and overlooks ex-ante, market, and customers' needs. For Mansfield-Devine (2016), among the problems is that most companies operating on interconnected OB platforms are small and may lack essential security requirements; consequently, the entire process is susceptible to corruption and fraudulent activity. For instance, if someone steals users' banking data stored on the servers of an account-information service provider (AISP). Carr et al. (2018) add that TPPs often result in complex dispute-management problems. Such risks can be even higher in the context of the PSD2 passport, which allows a business to carry on activities and services regulated under EU legislation in another European Economic Area (EEA) country based on authorization or registration in its country of origin (European Banking Federation, 2019). For example, in 2019, soft-regulated Lithuania hosted the second-highest number of non-banking payment-technology (PayTech) companies in the EU, providing an opportunity for cross-border services in other EU countries through such passports (Polasik et al., 2020).

2.2.4 | Beyond the PSD2

In the context of the PSD2, the literature has already pointed out that the risks for the vulnerable sectors of society will undoubtedly increase once it moves from banking to the entire financial sector and then to other economic industries, according to the European Commission's push on Data Strategy and Open Finance (Grassi et al., 2022). This implies an increase in the complexity of the financial ecosystems. Threats such as loss of the control people hold over their data, more

significant financial exclusion, and automation in decision making (Nicholls & Clarke, 2021) could lead to an extension of the risk of "commoditisation" of personal data (Gabor & Brooks, 2017). Such risks have been highlighted by González Fuster (2016) concerning the PSD2's applicability due to its regulatory contradictions with the General Data Protection Regulation's (GDPR's) provisions on consent, its withdrawal, and the conditional personal-data erasure right (article 17) (European Parliament & European Council, 2016).

3 | Methodology

3.1 | Research context

The Netherlands provides relevant input to analyze the impacts of OB on financial inclusion. Although the country's access to finance is not an issue, in 2018, almost 40% of Dutch households were found to have payment difficulties (Nationaal Instituut Voor Budgetvoorlichting, 2019). Moreover, during the COVID-19 pandemic, 29% of individuals declared that they had insufficient savings to pay for two months' worth of expenses (Nationaal Instituut Voor Budgetvoorlichting, 2020). In the Netherlands, the SME-financing gap reached 22% of the GDP in 2019, which was considerably higher than the 3% average gap among Eurozone countries (Euler Hermes, 2019). With a financial sector historically characterized by high levels of digitalization and innovation, the Netherlands achieved the most extensive FinTech adoption in Europe, at 73%, in the same year (Ernst & Young, 2019).

3.2 | Sampling, data collection, and analysis

This study applied a qualitative method to obtain an overarching viewpoint in analyzing the impacts of digitalization, the PSD2, and OB on the Dutch inclusive-finance sector.

The sample design started with the actors in a FinTech ecosystem defined by Lee and Shin (2018), comprising FinTech firms, technology developers, government actors, financial customers, and traditional financial institutions. This group was later expanded and adapted to the inclusive-finance sector. Because the focus was on the perspectives of the inclusive-finance organizations (players), financial customers (users) were excluded from the sample.

The final sample design included a representative range of leading Dutch inclusive-finance organizations to extract different insights regarding the opportunities and challenges for the users of inclusive-finance services and players operating in its ecosystem to improve the lives of underserved populations.

During 2020, the researchers conducted online interviews with individuals representing twenty organizations, including governmental organizations, start-ups, FinTechs, nongovernmental organizations (NGOs), OB providers, microfinance institutions (MFIs), entrepreneurial organizations, technical service providers (TSPs), venture capital (VC) firms, impact investors, and SME finance operators (Table 1).

Table 1: The sample of organizations interviewed

N	Organization type	Description of the activity
1	Entrepreneurial organization 1	A leading Dutch entrepreneurs' organization
2	TSP 1	A technological connector of consumers, finance professionals, providers, commissioners and funders
3	MFI	A hybrid MFI, leveraging traditional banking with information technology (IT)
4	TSP 2	An organization that manages a company's payment interaction with customers
5	OB provider 1	An aggregator of the needs of business owners around accounting, invoicing, payments and banking
6	SME finance 1	An asset manager of SME debt for institutional investors
7	OB provider 2	An international open banking technology provider that helps to create new financial services throughout Europe
8	SME finance 2	A company that designs SME financial solutions
9	TSP 3	A company that allows the access to the whole life cycle of a loan in one place
10	Start-up	A platform that enables start-ups and businesses in Africa to raise capital in the diaspora in Europe
11	FinTech 1	A FinTech that makes it easy to set aside the clients' spare change, transfer- ring it into an investment account
12	VC firm	An investment fund that belongs to a large Dutch bank, supporting strategic FinTech (and agricultural technology—AgriTech) startups with a thematic focus on financial inclusion
13	FinTech 2	A debt prevention app that helps vulnerable users pay and manage their bills
14	Entrepreneurial organization 2	A national organization that represents, connects and supports the growing community of social enterprises in the Netherlands
15	FinTech 3	A FinTech that uses PSD2 license to collect bank transactions and then enriches them with data, and makes extensive financial analyses
16	TSP 4	An enabler of asset managers and lenders to offer SMEs unique market- leading product propositions in all categories
17	International NGO	A global partnership of more than 30 leading development organizations that works to advance the lives of poor people through financial inclusion
18	Governmental organization	A leading Dutch financial policy maker
19	Entrepreneurial organization 3	An independent ecosystem that connects people and organizations in the financial value chain
20	Impact investor	A large international organization supporting impact-driven, seed-stage start-ups

The interviews followed a semi-structured format, an appropriate data-collection method to discover new and unpredictable insights by discussing a broader range of topics that will help answer the research question. It is a flexible format that permits adaptations throughout the interactions, depending on the interviewees' backgrounds and experiences. Even if semi-structured interviews guide the data collection toward the main themes, they leave room for added discussion points (Kallio et al., 2016).

The researchers followed a protocol to ensure rigorous and trustworthy data collection (Jacob & Furgerson, 2012; Kallio et al., 2016). It included communication guidelines before an interview, a script for the interview's beginning and end, and the predetermined interview questions.

More specifically, the questionnaire (Table 2) contained 12 open-ended questions divided into two parts: the impacts (among the other developments) of digitalization, the PSD2, and OB on inclusive finance, financial institutions, and underserved clients (part A); and the effects of PSD2 and OB on inclusive-finance ecosystems (part B). Alongside the interview questions, some prompts were provided to keep the interview on the right track (Jacob & Furgerson, 2012). A series of follow-up questions were formulated and asked ad hoc to gain more information about emerging topics (Kallio et al., 2016). Finally, the introduction and theoretical background (section 2 |) were used to design the interview questions, as indicated in Table 2 below.

Table 2: The questionnaire

Part A – Inclusive finance and OB

Question	Sources
Inclusive finance in the EU: current situation and developments	Introduction (i.e., Mader, 2018; and Phillippon, 2019), and item 2.2.2 (i.e., Reynolds & Chidley, 2019)
The most important developments in inclusive finance in the EU	Introduction (i.e., Mader, 2018; and Phillippon, 2019), and item 2.2.2 (i.e., Reynolds & Chidley, 2019)
The impact and role of "digitalization" in inclusive finance	Introduction (i.e., Van Loo, 2018; and Cambridge Centre for Alternative Finance & World Economic Forum, 2019)
The role of OB in inclusive finance	Introduction (Zachariadis & Ozcan, 2017), and item 2.2.2 (Vives, 2019)
The risks and challenges of digitalization for financial institutions and their clients	Items 2.1.2 (i.e., Stulz, 2019; Cambridge Centre for Alternative Finance & World Economic Forum, 2020) and 2.2.3 (Brodsky & Oakes, 2017)
How OB influences financial services to the elderly, migrants, and the socially excluded	Items 2.2.2 (i.e., Plaitakis, 2019; Reynolds & Chidley, 2019; and Vives, 2019)

Part B – Mapping the effect of OB on the inclusive-finance ecosystem in the Netherlands and the EU

Question	Sources
The organization's key actors and stakeholders	Introduction (i.e., Clohessy & Acton, 2019)
The key roles and activities needed to provide OB products and services	Introduction (i.e., Clohessy & Acton, 2019)
The changes in actors, roles and activities due to OB	Item 2.2.2 (i.e., Plaitakis, 2019; and Vives, 2019)
Emerging opportunities and business models	Item 2.2.2 (i.e., Guzman, 2000; and Plaitakis, 2019)
Future of the ecosystem: centralized vs. decentralized	Items 2.1.2 (Frost et al., 2019; Stulz, 2019; and Bijlsma et al., 2020) and 2.2.3 (Mansfield-Devine, 2016)
Market and ecosystem barriers to maximize OB benefits for inclusive finance	Item 2.2.3 (i.e., Brosdky & Oakes, 2017; Romanova et al., 2018; Wall, 2018; and Village Capital, 2020)

Figure 1: Data structure

All interviews were recorded, with the final count including approximately 25 hours of recorded videos, which were later transcribed into more than 170 pages. To organize and assess the results of the interviews, the researchers used the thematic-analysis approach (Braun & Clarke, 2013), which is a method intended to systematically identify, organize, and offer insight into meaning across a dataset. The researchers applied all the suggested steps, including reading the dataset, familiarization with the materials, searching for aggregated dimensions (themes later defined and named), and writing up a coherent narrative.

The tasks followed a conventional coding approach (Hsieh & Shannon, 2005), which is useful when existing theory and the literature on an emerging phenomenon are scarce, and researchers aim to directly obtain new insights from the data. The data analysis followed the method developed by Gioia et al. (2013), which entails the design of a data structure based on first-order concepts, second-order themes, and final aggregated dimensions.

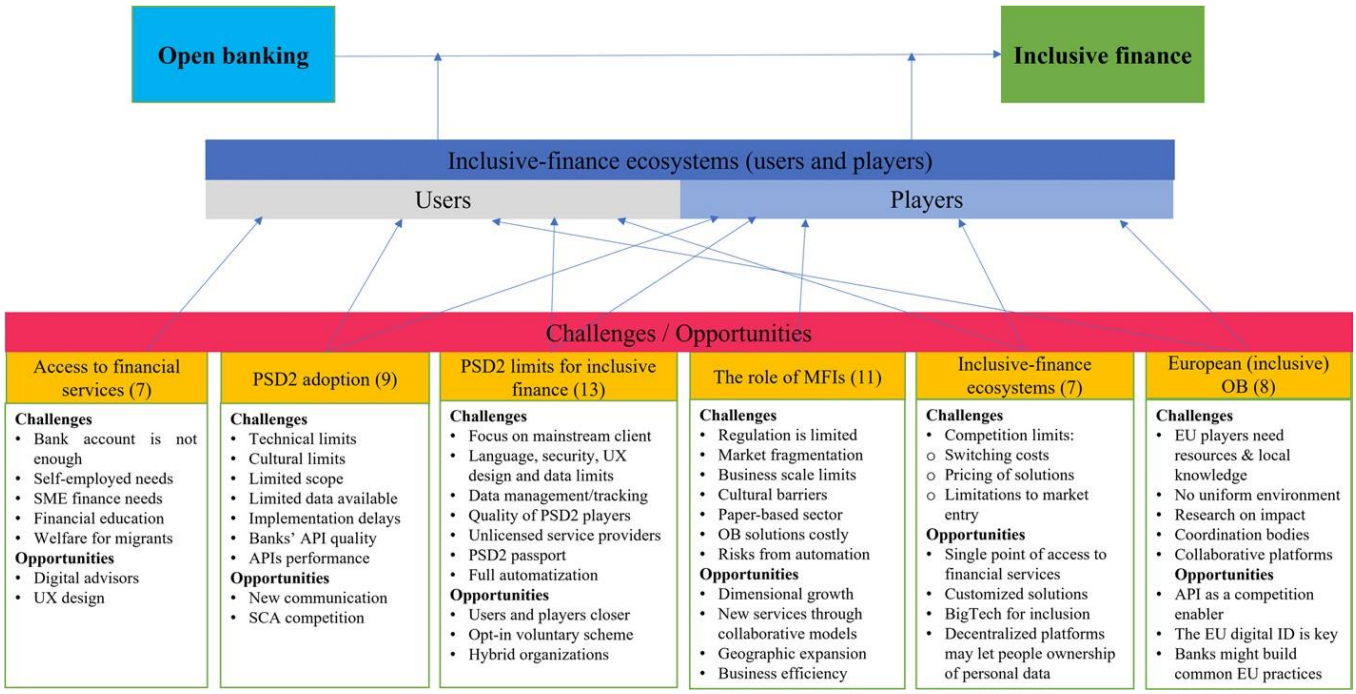
First, the data were coded by highlighting quotations in the full transcript (the twenty interviewees' responses to the twelve questions) and connecting a few words of code to each answer. Thereafter, the extensive list of initial codes was reviewed for, among others, relevance and duplicates. After merging, deleting, or renaming some codes, 170 first-order concepts emerged, comprising a broad range of concepts. The next step was to search for similarities and differences among the first-order concepts to determine 55 second-order themes. The second-order themes refer to the broad topics discussed in the interviews. Starting with the set of second-order themes,

a final investigation was conducted to further distil them into 6 aggregated dimensions. The aggregated dimensions represent the main topics observed and discussed in the data collection.

The concepts, themes, and aggregate dimensions are shown in a data structure (Figure 1) to explain how the raw data were transformed into themes and dimensions.

The six aggregated dimensions (themes) are described in the section on the findings of this study (section 4 |) after a graphical model (Figure 2) that was developed for potential solutions for the users of inclusive financial services and players in inclusive-finance ecosystems. This model is a "box and arrows" representation of the interrelationships between the second-order themes, aggregate dimensions, and key concepts of the research. It lends transparency to the relationships and describes the phenomenon of interest (Gioia et al., 2013).

Figure 2: Outcomes of the research



Finally, according to the conventional coding approach (Hsieh & Shannon, 2005), in the discussion section (section 5 |), the interviewees' perspectives were connected to a broader context. This entailed comparing the views with concepts, practices, and policies of the inclusive-finance scholarship to distil specific PSD2 opportunities and associated challenges for the Dutch users of inclusive-finance services (users) and players in inclusive-finance ecosystems (players), which may be of interest to other European countries.

4 Findings

Based on the data structure presented in Figure 1, a graphical model was developed (Figure 2) for opportunities and challenges for the users of inclusive-finance services and players in inclusive-finance ecosystems. While Figure 2 shows the connection between the second-order themes and the aggregated dimensions in relation to the research question, the following subsections describe these results in detail. Each subsection comprises emerging themes that pertain to the PSD2, OB practices, and inclusive finance, including their configurations and business models, with specific considerations for the Dutch financial ecosystem. Table 3 then introduces the six themes that emerged and their highlights.

Table 3: Themes and related highlights

Themes	Highlights
Access to financial services	Access to a bank account does not necessarily mean access to financial services.
PSD2 adoption	PSD2 adoption is limited, due to a combination of technical and cultural challenges within the limited scope of the PSD2.
PSD2 limits for inclusive finance	The directive has been designed for other purposes other than inclusive finance. Adjustments are required to consider the underserved's needs.
The role of MFIs	The PSD2 is a huge potential opportunity for MFIs, but many barriers to their required digital transformations exist.
Inclusive-finance ecosystems	There is no unified view on how platform-based ecosystems will evolve to promote inclusive practices.
European (inclusive) OB	In order to emerge, European OB players will need substantial investments, local knowledge of the national markets, and support from coordination bodies.

4.1 Access to financial services

All the interviewees fully agreed that obtaining access to a bank account in the Netherlands was almost universal, as in most European countries. However, it was recognized that part of the EU population remained outside the banking system, which was attributed to banks' acting as gatekeepers on behalf of governments. Such a role involves applying restrictions to access to bank accounts, such as for KYC and AML reasons. Being able to open a bank account is not always sufficient, as it does not necessarily mean having access to financial services.

For instance, a FinTech operating in the SME sector asserted that self-employed workers would inevitably require working capital. This has created an enormous demand for small financial tickets, which traditional banks currently do not provide. This is a severe problem, as self-employed individuals constitute a growing percentage of workers in the Netherlands, where flexible work contracts improve large companies' competitiveness. Such a situation aggravates the social divide, according to an entrepreneurial organization. Similarly, SMEs struggle to access financial services, particularly for medium-sized tickets. Banks often cannot provide this type of financing due to a combination of high transaction fees and growing regulations at the European level. Nonetheless, as some FinTechs highlighted, SME finance is critical for inclusive finance, as evidenced by previous experiences in the developing world.

Access to finance is also intertwined with financial education and coaching, as several organizations mentioned during the interviews. Accordingly, a FinTech stated that almost half of the Netherlands' households struggled with their finances as they lacked the information or skills required to accurately analyze their circumstances. As an investor noted, these problems will become prominent once the governmental support for the COVID-19 pandemic crisis ends. Furthermore, FinTechs pointed out that despite a large proportion of the population seeking to invest money to build financial stability, they did not have the expertise to do so. The same applies to SMEs that cannot meet the minimum bookkeeping standard as they can be excluded from access to financial services if the providers cannot assess their performance.

Coaching was even more essential for businesses managed by migrants, some start-ups stated. The current welfare policies restrict access to growth opportunities and full social integration. Therefore, migrants have considerable difficulties obtaining jobs or starting entrepreneurial activities. Yet, as some added, the problem of access to financial services was exacerbated not only by illiteracy or lack of experience with technology but also by advanced age and insufficient understanding of the "new means of doing things." Thus, to successfully leverage the OB opportunities without transforming the excluded or vulnerable into failed individuals or organizations, it is crucial to build a layer of education around them.

On a positive note, a large proportion of the organizations agreed on the solid potential of the PSD2 to improve individuals' and small businesses' financial literacy through digital advisors, virtual agents, and coaching. Furthermore, as one FinTech remarked, tech companies are experts in creating perfect user-interface designs, and building user-friendly platforms is essential in reducing the need for financial literacy.

4.2 | PSD2 adoption

Many interviewees shared that the limited implementation of the PSD2 in the Netherlands was due to technical and cultural barriers. For example, according to a group of FinTechs, the technique is not fully developed to build sufficient added value and create a seamless journey for customers to onboard. Moreover, they have also observed behavioral barriers as some people are not used to disclosing their personal information and interacting with a computer.

For an MFI representative, the PSD2 started with a limited scope comprising payment initiation and decision making based on only business-to-consumer (B2C) payment transactions. As it does not cover business-to-business (B2B) transactions, many companies fall outside the scope of OB activities. Moreover, the current PSD2 data provision is suitable for short-term payments and credits to individuals. It can provide third-party digital access to three months of transactions on a customer's payment account. However, as an entrepreneurial organization noted, the limited data do not allow access to important information about the customers' mortgages, credit cards, savings accounts, shared accounts, or business accounts. Consequently, the PSD2 does not support the provision of complex and long-term financial products, which will probably remain centralized in banking systems. The PSD2 provides financial providers access to a customer's bank account only for the initial risk assessment, not for a continuous evaluation of risk during the loan-provision period or for access to past information beyond a year. As a TSP explained, it is impossible to export data from a mortgage contract signed thirty years previously for the risk management of loan portfolios. For a financial provider to perform risk evaluations during the loan disbursement or payback time, the customers must renew their account access every three months. Extended access to data would allow alternative financial companies to develop flexible products.

An international NGO suggested that European citizens still required education on the OB's benefits and risks to increase PSD2 adoption. National governments must urgently consider new ways of connecting people with this technological platform, perhaps through TV, radio, social networks, or local organizations. Because governments have demanded such communication from banks, only a few of the latter contemplate the PSD2 as a tool to help grow their businesses. Furthermore, in September 2019, the EBA granted the option for banks to delay the full implementation of the PSD2's strong customer authentication (SCA) feature until January 2021, further hindering the process.

According to a global technological OB enabler, the successful adoption of the PSD2 as a tool to enable inclusivity depends on the banks' willingness to fully open their high-quality APIs. The problem is that the advantages of partnering up with technology companies are unclear, without any monetary compensation for the banks' sharing of their data; moreover, sharing financial data means allowing access to their most valuable assets, which the banks have previously never had to share.

Consequently, the performance of the banks' APIs is low in terms of data parity, user experience, and customer interfaces. Yet, according to an international FinTech, there is no need for a single standard, as determined by OB regulation in the UK. Instead, more benefits can arise from sane competition in building the best possible customer experience. The most successful application would embed the best SCA. Consequently, only the banks with the highest quality APIs can benefit from the highest-quality TPP services. In such a context, the role of FinTechs and TSPs is essential to help incumbent banks understand that the future of financial services is all about improving customer experience. It entails investing in OB and developing new services to lead the future by providing the most compelling customer experience, enabling financial inclusion, and increasing market share.

4.3 | PSD2 limits for inclusive finance

The respondents agreed that financial companies would become closer to their clients due to OB platforms. In their views, the PSD2 had already transformed the onboarding and assessment of peoples' credit or financial situation, providing a better idea of the risks associated with underserved customers. For instance, one FinTech declared that it switched from static scoring mechanisms or credit scores that looked backward to predictive scores that relied on actual cash-flow variables to better understand unconventional customers' capacity to repay.

However, to become an opportunity for financial inclusion, the PSD2 must be adjusted to the needs of the underserved. Many organizations pointed out that anti-fraud concerns mainly triggered OB regulations. According to a global impact investor, the PSD2 only provides the infrastructure for new financial products designed for language, security, and user interfaces for mainstream customers. Usually, these customers already have high levels of digital literacy and steady income and do not struggle with access to financial services. As a TSP stressed, digitalization is insufficient to promote financial inclusion. It has become vital to building new services based on different regulations, cultures, and customized needs through experiences. This requires considering that some communities have low levels of digital literacy, do not own the necessary data to access OB services, or distrust digital-banking tools. Onboarding in an OB environment can be challenging for such people. Although there are valid reasons to maintain the high bar for granting access to financial institutions, such as avoiding fraud and illegal activities, efforts should be made to securely manage new entrants' data through an unexclusive standard while ensuring security and confidence.

Regarding the challenges of protecting vulnerable populations, many interviewees mentioned customer concerns that financial companies could misuse their data. As a FinTech pointed out, customers may lose track of who still has access to their data in an OB environment. This means that regulatory bodies will need to prevent a backfire to the OB progress at a certain point. Generally, in an environment already characterized by low trust, it is vital to enhance the quality and transparency of financial-services providers who use the PSD2. Currently, a FinTech requires a license to provide account-information or payment-initiation services. However, there is considerable skepticism regarding the extent to which they can maintain their responsibility in how they use, store, and transfer personal financial information.

Consequently, traditional financial-service providers are also intimidated by the idea of partnering up with them. Such risks increase with the centrality of unlicensed TSPs in the supply chain for providing financial services on OB platforms. According to a TSP, without high standards in service delivery, there is a higher risk of compromising the entire ecosystem and destroying trust. It is a significant problem, exponentially increased by the PSD2 European passport. Using the passport, a FinTech can register as an AISP or acquire a license as a payment initiation service provider (PISP) in less-regulated countries and then enter more regulated ones. To summarize, as a TSP stated, trust lies in four pillars: regulation, competence, security, and integrity. If a TPP fails in one of these four pillars, this will have trickle-down effects on the rest of the ecosystem. The interviewees also recognized the expectations that this problem would soon migrate from the financial world to other economic sectors through open-finance regulations.

Finally, according to many FinTechs, it is essential to acknowledge that increasing digital inclusivity is not always beneficial for everyone. For example, some people enjoy going to physical branch offices and engaging with the workers, and there are fewer opportunities for this in the digital world. In this sense, it is essential to remember that the PSD2 is voluntary and requires an opt-in acceptance, which means that it should not eliminate traditional alternatives to vulnerable customers. Otherwise, as a TSP stated, a future with full automation of decision making can trigger algorithmic bias and loss of control of financial and personal choices.

4.4 | The role of MFIs

Regarding the evolution of inclusive-finance ecosystems due to OB, some organizations have raised concern that MFIs' activities are limited by regulation and fragmented at the national level. Additionally, small and low interest-rate loans require a large scale for profitability. Among the identified problems is that European policymakers have decided that lending activities are under a national regulation for stability reasons. In practice, this has caused fragmentation at the regional level as each national lending framework is subject to regulatory arbitrage, federal interpretations, inefficiencies, and cultural and language barriers. As noted by many interviewees, alongside the digitalization-efficiency gains, the PSD2 may represent a stimulus for MFIs. For instance, from a capital perspective, the threshold for qualifying as an MFI is usually much higher than that for becoming a TPP. The PSD2 also forces MFIs beyond the classic credit provision, which may not respond to vulnerable people's needs. Unequivocally, MFIs offer credit, which can help small businesses increase their supplies. Nevertheless, underserved individuals also aim for other types of financial services than credit, such as debt rehabilitation and smart repayments.

Without exception, all the interviewees envisaged barriers to the transformation of the MFIs' business. First, many microfinance activities in Europe still work merely with paper, whereas the PSD2 requires a digital business to authorize innovative services. Moreover, OB solutions are costly for MFIs and small loan providers in terms of initial investments and operational management. Finally, because underserved clients are not early adopters of new features and innovations, the acquisition costs and churn rates associated with such services may be high. Under such circumstances, the interviewees have suggested an ideal business model to leverage the PSD2 opportunity: the traditional companies working in partnership with FinTechs to access various techniques and data sources that would allow them to scale up. Moreover, as an MFI representative noted, the COVID-19 pandemic crisis has emphasized the importance of government interventions to support the microfinance sector during market failures.

The interviewees also remarked on the risk to MFIs from the automation of decision-making processes. If everybody looks at the same data and becomes very efficient, then MFIs risk turning into types of banks. In such a context, MFIs must find the right balance between efficiency and maintaining their personal touch in their clients' assessments by looking beyond the data.

4.5 | Inclusive-finance ecosystems

Most respondents estimated that the future of finance would probably lie in platforms populated by subscription-based business models. A platform represents the most cost-effective way for financial-services providers to manage their IT, operating as general contractors with clients—a bank, a loan provider, or a technological company—to maintain the interaction with their end customers. In addition, this will allow third parties to easily integrate with different banks.

For some of the interviewees, incumbent banks will continue to lead such platforms because they still play a central role, such as in the fight against money laundering. From a client's perspective, it is advantageous to maintain a single point of contact to access all financial services. The most innovative banks build open infrastructures and APIs to work with third parties. The PSD2 enforces some of these practices, as the banks see the advantage of opening additional platforms and utilizing other APIs from third parties to serve their current clients and add new services. It is expected that the banks will focus on services on the primary platform, while third parties will develop customization, specialization, and personalization for different populations. As predicted by a global FinTech, such a model would make it possible to meet the needs of smaller customers not previously deemed economical. According to entrepreneurial organizations, in countries such as the Netherlands, where three large banks already have access to almost the entirety of the banking clients in the country, such a scenario could limit competition. As closing a bank account is not trivial, customers can be reluctant to change to an alternative provider. Consequently, there is a risk that incumbents will control pricing and access by leading OB platforms, hindering competition.

Instead, a group of FinTech representatives believe that the BigTechs own the customer more than the banks as a matter of convenience. In the EU, emerging regulations tend to prevent these technological multinationals from taking over the entire financial market, and they currently use the PSD2 mainly to avoid payment-service providers. However, such an evolution toward a BigTech leadership could make sense from the perspective of inclusive finance. For instance, many people remain entirely off the financial-services map but are active on social media. According to this view, there is a likelihood that the financial sector will cooperate with technological giants with a much larger dataset that is intertwined with the customers' daily lives. It is possible to envisage a subscription-fee-based platform built through a collaboration between a large bank and a BigTech around which start-ups and software providers navigate. In such a scenario, the incumbent banks risk disappearing, letting people use an Instagram-type platform for financial and banking services.

Another view that emerged from managers of TSPs is that the best configuration of a platform economy will be decentralized, with public- or private-data gateways supporting the functioning of the different ecosystems resulting from competition. Thus, people would be in charge of their own data management, which is currently under the banks' control.

4.6 | European (inclusive) OB

The interviews highlighted that API aggregators were removing barriers to increased international competition by allowing financial-services providers to compete for potential customers across borders. However, the reality is that it is difficult, even for the most dynamic organizations, to work across borders. The case of Funding Circle illustrates this argument. They have failed to move from the UK to the Netherlands, where they found a crowded and challenging market. Future European OB players will need substantial investments and local knowledge of the national markets in which they want to operate beyond technical and regulatory support. As a FinTech noted, Europe differs from the US, which is characterized by a big market and a uniform regulatory and cultural environment.

Furthermore, there is a strong consensus that a portable European digital identity is a crucial tool for leveraging the PSD2 to build individuals' and organizations' financial inclusion and health at the regional level. According to a global impact investor, such an identity has the potential to facilitate the portability of data and identity beyond personal identity, including credit history, phone bills, utility, and other factors used in alternative credit scores. Additionally, for an international FinTech, this would represent the best development to leverage the OB opportunities. However, according to a global SME FinTech, it is also crucial to conduct quantitative research to determine the credit lift based on the outcome relative to the status quo and how it relates to a single digital identity, an OB environment, and standardization.

Regarding OB-coordination initiatives, some FinTech interviewees believe the differences in the types of players and geographies is an obstacle. Thus, an official coordinating body is crucial to bring everyone together. It may be unrealistic to predict that a large banking institution would lead such tasks; however, it seems likely that a combination of a significant number of actors would work together for such purposes under a bottom-up approach. National organizations such as NPM, the Dutch inclusive-finance platform, qualify to be the instigators of such a movement. Until such a collaborative platform emerges, it is easier to see private actors such as large banks create common practices to standardize the interpretation of the regulations than to see governmental institutions design uniform regulations.

5 | Discussion

The above theoretical background (section 2 |) shows that some incipient studies have examined OB for inclusive-finance aspects, including new services, credit risks, security, and privacy. The existing studies are scarce and focus on specific aspects of the impacts of OB on financial inclusion in isolation. A comprehensive approach involving the intersections among the financial ecosystem's initiatives and users' needs for a FinTech-led financial inclusion is missing (Lagna & Ravishankar, 2021). Additionally, FinTech research has shown a natural preference for developing countries' experiences rather than focusing on the financially vulnerable groups in developed regions such as Europe.

In this section, the clustering of the six aggregated dimensions that emerged from the interviews will be contrasted with current research on the PSD2, OB, and inclusive finance, revealing selected opportunities to consolidate the potential for an inclusive OB future. The discussion emphasizes the most relevant findings regarding the potential for financial inclusion for the users of and players in the inclusive-finance ecosystem. From a broader perspective, the findings can be organized based on their dominant implication: either technological, regulatory, or sectoral/market.

Regarding its potential for the users, this research has confirmed that the PSD2 requires adjustments to meet the necessities of the underserved populations, corroborating the general assumption that its design did not consider markets and customers' needs (Lagna & Ravishankar, 2021; Radnejad et al., 2021). Indeed, including the standpoints of beneficiary groups' representatives in a consensus-reaching decision-making model improves equality and democracy (Chao et al., 2021). Moreover, considering users' needs is a fundamental factor in improving the level of customer experience and loyalty in a FinTech (Barbu et al. (2021).

The PSD2 mainly provides an infrastructure for new financial products designed for language, security, and user interfaces for mainstream customers, such as FinTech's millennials (Lee & Shin, 2018). The results reinforce a technological opportunity to simplify the KYC and AML procedures that currently limit underserved populations' access to banking services. Such simplifications make sense as these populations are predominantly not dangerous clients and simply lack the skills to comply with such requirements (Tran & De Koker, 2019) or the availability or willingness to provide data (Macchiavello & Siri, 2022). From a technological standpoint, one way to do this is by providing layered-permission access solutions through innovative APIs, as suggested by Romanova et al. (2018) in relation to the security and privacy risks related to OB. Innovative computational tools can assist such improvements by efficiently identifying subtleties in financial datasets through cluster detection, optimization, and interpretation (Li et al., 2022).

Innovative companies are attempting to overcome these limitations, for instance, by designing user-friendly digital tools to access complex financial services or improving financial literacy (Leonardi et al., 2016). However, since the PSD2 was conceptualized to operate as an opt-in/voluntary tool, it is also fundamental to preserve the right to access financial services in traditional ways for populations that cannot or will not want to use financial services in a digital

manner, to avoid the risk of "commoditisation" of their personal data highlighted by Gabor and Brooks (2017).

Moreover, increasing trust and reducing perceived risk for the widespread adoption of OB services (ING, 2020; European Banking Authority, 2021; Rosati et al., 2022) have regulatory implications that would require innovative communication strategies led by national governments and the availability of solid APIs released by banks. While the results indicate that the latter are still missing, this delay is not entirely a problem because it has brought refinements to API solutions through the competitive dynamics envisaged by the PSD2 regulation.

Regarding the introduction of the EU portable digital identity, which is currently under discussion (Council of the European Union, 2022), individuals will be allowed to electronically identify themselves with certainty within the continent. This regulatory development could symbolize a crucial tool for leveraging OB to build financial inclusion and health at a European level by fostering cross-border competition and innovation. It represents the next step of the GDPR's (European Parliament & European Council, 2016) data-portability right (article 20) on which the PSD2 relies. Meanwhile, its introduction calls for a much more rigorous application of privacy law to avoid the acceleration of the "Black Box Society" (Pasquale, 2015), where an innocent individual risks being even more vulnerable to the penetration and bias of algorithmic decision making. Otherwise, it might increase the already visible friction between the PSD2 and GDPR (González Fuster, 2016).

Regarding the potential opportunities for the players in the inclusive-finance ecosystem, the interviewees also highlighted the importance of strengthening the regulation of FinTechs and TSPs to fight against corruption and fraud (Mansfield-Devine, 2016). Otherwise, there is a risk of compromising the functionality of entire OB ecosystems, ultimately negatively impacting underserved individuals. Meanwhile, strongly regulated FinTech and technology providers can play a crucial role in convincing large banks to build the best customer experience, which is a sectoral implication.

While the PSD2 is extending the offer of financial services in the EU, the use of OB services remains limited for many, including the increasing number of self-employed and flexible workers living in the EU, which is approximately 22 million people (Malt & Boston Consulting Group, 2021). For instance, OB could provide easier access to credit or income-scoring-based loans that could be prohibitive for freelancers working in the platform economy with volatile cash flows (Kibe, 2020). Generally, gig workers have problems related to low and uncertain income and the risk of contract termination, requiring third-party support to review contracts and enforce their rights (Hardy & McCrystal, 2022). They also require quick access to cash for their daily needs and the opportunity to build financial stability through savings, insurance, or pensions. However, large gig-economy digital platforms do not offer quick access to cash and sophisticated financial instruments (Glöss et al., 2016; Muralidhar et al., 2019). This is another example that combines both regulatory and sectoral implications. The regulatory developments could strengthen the market solutions for such a category of workers.

Furthermore, the PSD2 has a limited scope of application, mainly confined to the B2C space. Expanding it toward the B2B and start-up domains would provide the many underserved

companies operating in the EU with numerous opportunities, amplifying sectoral implications. This is particularly true in a country such as the Netherlands where, for instance, SME-funding gaps tend to be significantly high (Euler Hermes, 2019).

Other suggested adaptations to improve the PSD2 adoption considered the limited access to only 90 days of financial data, which currently restricts its adoption and use to reduce underwriting and repayment risks and deploy innovative repayment solutions or long-term financial services such as mortgages or pensions. In August 2022, the European Commission amended the regulatory technical standards (RTS) laid down in Delegated Regulation 2018/389 regarding the 90-day exemption for account access (European Commission, 2022). Consequently, the timeline for renewal of SCA was extended from every 90 days to every 180 days, providing that certain conditions aimed at ensuring the safety and security of the payment service user's data were met.

In the OB environment, MFIs' survival in the competition with FinTechs for services designed for underserved communities would require prioritizing scale, as discussed by García-Pérez et al. (2020) in relation to the availability of technological opportunities to achieve financial sustainability. Thus, there is a clear opportunity for this segment of the sector to leverage the PSD2 to extend beyond credit provision and operate across borders through the European passport (Plaitakis, 2019). For instance, through the PSD2, an MFI can register as an AISP to supply aggregation services, partner with other AISPs to enrich its offer, or obtain authorization as a PISP. Furthermore, as an AISP or PISP, an MFI could use the PSD2 European passport and operate across borders, subject to compliance with the specific regulatory requirements for the provision of microfinance in other EU countries. However, implementing the PSD2 requires substantial investments for the sector to build digital business models, particularly when MFIs must transform their entire paper-oriented environments. The situation is aggravated because the fragmentation of microfinance regulation within Europe results in severe difficulties working across borders. Thus, there is a need to strengthen and improve microfinance regulation according to the PSD2 opportunities to support MFIs to scale up and reach underserved clients across borders with innovative services.

Additionally, MFIs and FinTechs must work together to design the right services (from technological and market perspectives) for different populations, partnering with banks' large and trusted customer bases, infrastructures, and access to institutional investments and governments. Without such changes, European MFIs may be at risk of becoming financially unsustainable due to the same obstacles that banks face in developing countries: high levels of average fixed financial-infrastructure costs and low levels of average account balances and poor clients' activities (Beck & de la Torre, 2007; Markose et al., 2022).

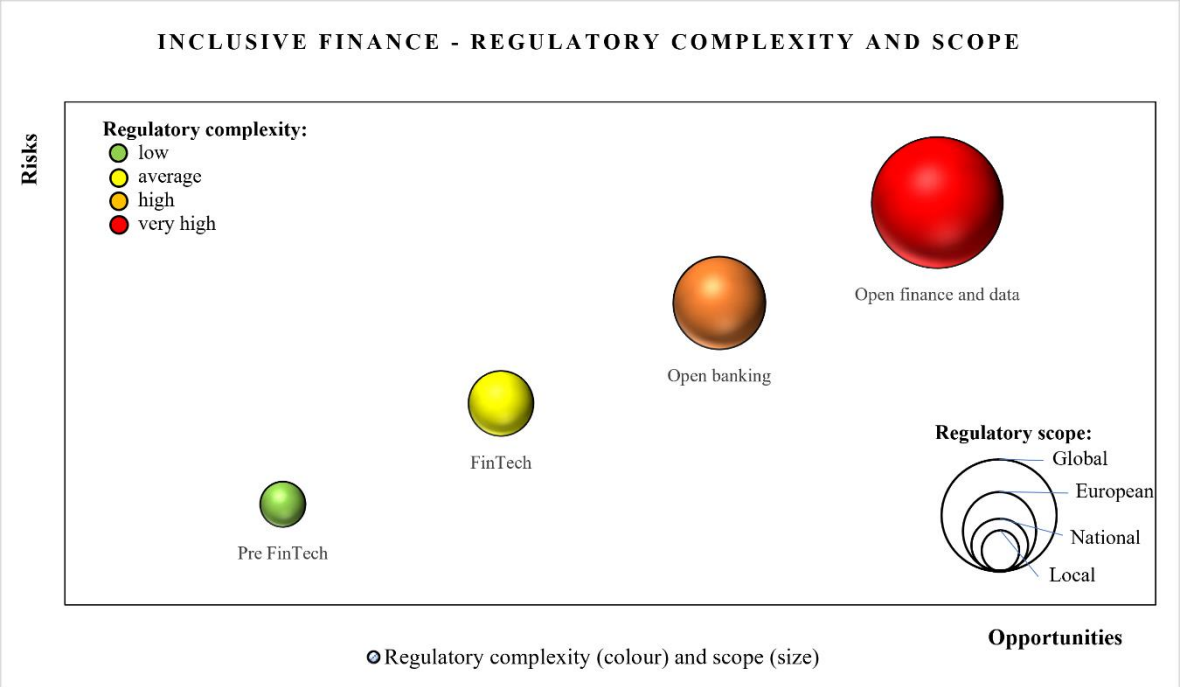
For some respondents, the evolution toward BigTech technological leadership could make sense from the perspective of inclusive finance as large proportions of financially unserved or underserved people and organizations are active on social media. However, BigTechs may choose specific areas of finance that are more contiguous with their core businesses and do not require banking licenses. This is how such companies can avoid transforming themselves into highly regulated financial organizations, with the associated necessity of heavy and expensive infrastructure (Arslanian & Fischer, 2019) and consequence of mounting regulations limiting their actions in the financial sector (Chaudhry et al., 2022; Di Porto & Ghidini, 2020; Smith & Geradin,

2021). The BigTechs' strong penetration in the Dutch payments confirms that direction (Authority for Consumers and Markets, 2020). Thus, even if they have been reluctant to adopt the PSD2, large banks will probably play a leading role as trusted institutions in the future. Thanks to technological innovations, they have tended to become more competitive and customer-oriented organizations (Broby, 2021; Kou et al., 2021). However, as the PSD2's main objective is to open the market through competition for the highest-quality customer experience, from a regulatory angle, governmental or international organizations will likely act as gatekeepers of decentralized ecosystems to avoid the limitations in competitive dynamics imposed when banks lead OB platforms (Borgogno & Colangelo, 2020).

There is a consensus that OB is becoming a cross-industry phenomenon, consistent with the "banking everywhere" paradigm (King, 2018), which is driven by regulations intended to understand the opportunities and risks of extending OB-like data-sharing to a wider range of products, which is under discussion not only in the EU (Grassi et al., 2022) but also in the UK (Financial Conduct Authority, 2020) and elsewhere. The most advanced example is found in Australia, where the open-data framework called Consumer Data Right (Australian Government, n.d.), currently active in the banking and energy sectors, will move into telecommunication and other parts of the economy. Therefore, it is difficult to envisage the emergence of any platform that will consolidate everything into one ecosystem. Moreover, as the financial market is highly regulated, surveillance of the competition, data management, and system integrity are robust, not to mention that the PSD2 aims to increase competition and not create a single platform.

A European OB sector will emerge only through a coordinated effort of local actors (in geographical terms) and niche ecosystems (i.e., ecosystems built around specific businesses). Together, they could build trusted and solid technological applications supported by improved regulation, innovative communication strategies, and research to test and certify their societal value. An impartial actor coordinating OB platforms among all the different players and geographies is necessary to reduce complexity. It could be found in the EBA. This result highlights the growing importance of trusted regulatory authorities who can convince their stakeholders to jointly design future inclusive regulations through innovative instruments, as happened with the regulatory Sandbox in the UK (Fahy, 2022).

Figure 3: Regulatory complexity and scope



To summarize, Figure 3 shows the increasing levels of regulatory complexity and scope surrounding inclusive finance through four periods: "pre FinTech" (before 2008), "FinTech" (2008-2018), "OB" (2018-present), and "open finance and data" (to be determined). Moving from left to right, while opportunities and risks increase, an increased regulatory complexity (from low to very high) and scope (from local microfinance services to global financial services and beyond) requires an increasing centrality of (networks of) innovative and trusted regulators.

6 | Conclusion

Undoubtedly, the PSD2 is suited to open financial services to the EU's growing and varied underserved populations. However, adjustments are necessary from technological, regulatory, and market perspectives to reach disadvantaged population groups who have difficulties accessing such services and eventually using them. It is also fundamental to remember that the PSD2 should not eliminate traditional alternatives for vulnerable customers. Otherwise, a future involving full automation of decision making could trigger algorithmic bias and loss of control of financial and personal choices.

Meanwhile, national governments must strengthen investments in their citizens' digital and financial education and defend the voluntary philosophy of the directive to avoid a future with an open-finance (and open-data) world that will exacerbate inequalities and financial stress at an individual and systemic level. As it is likely that the same banks that have delayed the PSD2 will remain leaders in OB, at least in the medium term, the EU-level governance must avoid new monopolies, which limit competition and access to opportunities.

To increase customer adoption of these innovative financial services, particularly for vulnerable populations, governments must design communication programs to inform their citizens and build trust in these innovative technologies. Additionally, it is necessary to strengthen the regulation of FinTechs and TSPs, which currently limits the diffusion of OB applications. Finally, extending the breadth of the PSD2's areas of applications (for instance, in the B2B space) into more complex financial services is crucial.

Regarding MFIs, there is a need to strengthen and improve microfinance regulation according to the PSD2's opportunities to support them in scaling up and reaching underserved clients across borders with innovative services. OB improvements can also be achieved by organizations formed by MFIs and FinTechs in collaboration with banks. Such hybrid institutions will combine the best features of each one of them: knowledge of the needs of local underserved clients from MFIs, technological innovations from FinTechs, and large and trusted customer bases, infrastructure, and access to institutional investments and governments (from banks). Otherwise, its current national fragmentation risks compromising the entire sector vis a vis the increasing power of FinTech and technological operators, exposing underserved populations to various threats, including the high churn surrounding OB services.

An inclusive European OB sector can only emerge by public and private organizations supporting and coordinating the activities of national and niche ecosystems. A super partes actor, such as the EBA, could coordinate OB platforms as a regulator with a strong reputation within the sector. It possesses the trust and market knowledge required to convince its various public and private stakeholders to jointly design inclusive regulations through innovative tools while avoiding limitations in competitive dynamics and contradictions with the GDPR. Moving toward open-finance and open-data eras, an increasing regulatory complexity and scope will require the activities of networks of innovative and trusted regulators. However, in the EU, the road that leads to an inclusive OB, finance, and data future remains long.

This research is consistent with the experience and practices in the Netherlands, a country with an economic, cultural, and technological framework that can differ from other European countries. In addition, the interviews were conducted during the COVID-19 crisis, representing a moving target for digitalization development. Future research confronting various national contexts over longer timeframes can bring more robustness to the results.

Annex

Abbreviations

AI: Artificial intelligence
AIS: Account information service
AISP: Account information service provider
AML: Anti-money laundering
API: Application programming interface
BIGTECH: Large technological company
B2B: Business-to-business
B2C: Business-to-consumer
EBA: European Banking Authority
EEA: European Economic Area
EU: European Union
FINTECH: Financial technology
GDPR: General Data Protection Regulation
IT: Information technology
KYC: Know your customer
MFI: Microfinance institution
ML: Machine learning
NGO: Nongovernmental organisation
OB: Open banking
PAYTECH: Payment technology
PISP: Payment initiation service provider
PSD2: Revised payment service directive
RTS: Regulatory technical standard
SCA: Strong customer authentication
SME: Small and medium enterprise
TPP: Third-party provider
TSP: Technical service provider
UK: United Kingdom
US: United States
VC: Venture capital

References

- Alt, R., Beck, R., & Smits, M. T. (2018). Fintech and the transformation of the financial industry. *Electron Markets*, 28, 235–243. https://doi.org/10.1007/s12525-018-0310-9
- Arner, D. W., Barberis, J., & Buckley, R. (2016). The evolution of fintech: A new post-crisis paradigm? *Georgetown Journal of International Law, 47*(4), 1271–1320.
- Arner, D. W., Zetzsche, D. A., Buckley, R. P., & Weber, R. H. (2020). The future of data-driven finance and RegTech: Lessons from EU Big Bang II, S*tanford Journal of Law, Business & Finance*, *25*(2), 245–288.
- Arslanian, H., & Fischer, F. (2019). The emergence of Techfin. In H. Arslanian & F. Fischer (Eds.), *The future of finance (*pp. 69–75). Springer International Publishing.
- Australian Government. (n.d.). *Consumer data right*. Treasury. https://treasury.gov.au/consumer-data-right
- Authority for Consumers and Markets. (2020). *Big tech and the Dutch payment market*. The Netherlands Authority for Consumers and Markets. https://www.acm.nl/sites/default/files/documents/acm-report-on-big-techs-in-the-payment-system.pdf
- Bao, Z., & Huang, D. (2021). Shadow banking in a crisis: Evidence from fintech during COVID-19. *Journal of Financial and Quantitative Analysis, 56*(7), 2320–2355. https://doi.org/10.1017/S0022109021000430
- Barbu, C. M., Florea, D. L., Dabija, D. C., & Barbu, M. C. R. (2021). Customer experience in fintech. *Journal of Theoretical and Applied Electronic Commerce Research*, *16*(5), 1415–1433. https://doi.org/10.3390/jtaer16050080
- Bateman, M., Duvendack M., & Loubere, N. (2019). Is fin-tech the new panacea for poverty alleviation and local development? Contesting Suri and Jack's M-Pesa findings published in Science. *Review of African Political Economy, 46*(161), 480–495. https://doi.org/10.1080/03056244.2019.1614552
- Beck, T., & De La Torre, A. (2007). The basic analytics of access to financial services. *Financial Markets, Institutions & Instruments, 16*(2), 79–117. https://doi.org/10.1111/j.1468-0416.2007.00120.x
- Berger, A. N. (2003). The economic effects of technological progress: Evidence from the banking industry. *Journal of Money, Credit and Banking, 35*(2), 141–176.
- Bijlsma, M., van der Cruijsen, C., & Jonker, N. (2020, February). *Consumer propensity to adopt PSD2 services: Trust for sale?* (Working Paper No. 671). De Nederlandsche Bank. https://www.dnb.nl/en/publications/research-publications/working-paper-2020/671-consumer-propensity-to-adopt-psd2-services-trust-for-sale/
- Boot, A., Hoffmann, P., Laeven, L., & Ratnovski, L. (2021). Fintech: What's old, what's new? *Journal of Financial Stability, 53*. https://doi.org/10.1016/j.jfs.2020.100836
- Borgogno, O., & Colangelo, G. (2020). The data sharing paradox: BigTechs in finance. *European Competition Journal, 16*(2–3), 492–511. https://doi.org/10.1080/17441056.2020.1812285
- Braun, V., & Clarke, V. (2013). Successful qualitative research: A practical guide for beginners. Sage.
- Broby, D. (2021). Financial technology and the future of banking. *Financial Innovation (Heidelberg), 7*(1), 1–19. https://doi.org/10.1186/s40854-021-00264-y
- Brodsky, L., & Oakes, L. (2017). *Data sharing and open banking*. McKinsey. https://www.mckinsey.com/industries/financial-services/our-insights/data-sharing-and-open-banking
- Buckley, R. P., & Webster, S. (2016). Fintech in developing countries: Charting new customer journeys. *Journal of Financial Transformation*, 44, 151–159.

- Cambridge Centre for Alternative Finance & World Bank. (2019). *Cambridge centre for alternative finance, regulating alternative finance: Results from a global regulator survey*. Cambridge Judge Business School. https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-11-ccaf-regulating-alternative-finance-report.pdf
- Cambridge Centre for Alternative Finance & World Economic Forum. (2020). *Transforming paradigms. A global AI in financial services survey*. Cambridge Judge Business School. https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/transforming-paradigms/
- Carr, B., Urbiola, P., & Delle-Case, A. (2018). *Liability and consumer protection in open banking*. The Institute of International Finance. https://www.iif.com/portals/0/Files/private/32370132_liability_and_consumer_protection_in_open_banking_091818.pdf
- Chao, X., Kou, G., Peng, Y., & Viedma, E. H. (2021). Large-scale group decision-making with non-cooperative behaviors and heterogeneous preferences: An application in financial inclusion. *European Journal of Operational Research, 288*(1), 271–293. https://doi.org/10.1016/j.ejor.2020.05.047
- Chaudhry, S. M., Ahmed, R., Huynh, T. L. D., & Benjasak, C. (2022). Tail risk and systemic risk of finance and technology (fintech) firms. *Technological Forecasting and Social Change, 174*. https://doi.org/10.1016/j.techfore.2021.121191
- Claessens, S., Frost, J., Turner, G., & Zhu, F. (2018). Fintech credit markets around the world: Size, drivers and policy issues. *BIS Quarterly Review, Bank for International Settlements*. https://ideas.repec.org/a/bis/bisqtr/1809e.html
- Clohessy, T., & Acton, T. (2019). Investigating the influence of organizational factors on blockchain adoption: An innovation theory perspective. *Industrial Management & Data Systems, 119*(7), 1457-1491. https://www.emerald.com/insight/content/doi/10.1108/IMDS-08-2018-0365/full/html
- Cortet, M., Bakker, M., Groen, P., & Hoppenbrouwer, D. (2021). Establishing the trust anchor in the digital economy: The case for banks to become 'data custodians'. *Journal of Payments Strategy & Systems, 15*(2), 150–164.
- Council of the European Union. (2022). Proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) No 910/2014 as regards establishing a framework for a European Digital Identity. The Council of the European Union. https://data.consilium.europa.eu/doc/document/ST-14959-2022-INIT/en/pdf
- Di Porto, F., & Ghidini, G. (2020). "I access your data, you access mine": Requiring data reciprocity in payment services. *IIC - International Review of Intellectual Property and Competition Law, 51*(3), 307–329. https://doi.org/10.1007/s40319-020-00914-1
- Dorfleitner, G., Oswald, E. M., & Zhang, R. (2021). From credit risk to social impact: On the funding determinants in interest-free peer-to-peer lending. *Journal of Business Ethics, 170*(2), 375–400. https://doi.org/10.1007/s10551-019-04311-8
- Drasch, B. J., Schweizer, A., & Urbach, N. (2018). Integrating the 'troublemakers': A taxonomy for cooperation between banks and fintechs. *Journal of Economics and Business, 100*, 26–42. https://doi.org/10.1016/j.jeconbus.2018.04.002
- Economides, N. (1996). The economics of networks. *International Journal of Industrial Organization, 14*(6), 673–699. https://doi.org/10.1016/0167-7187(96)01015-6
- Ernst & Young. (2019). Dutch fintech census 2019. Ernst & Young. https://assets.ey.com/content/dam/ey-sites/ey-com/nl_nl/topics/financial-services/ey-dutch-fintech-census-eng.pdf

- European Banking Authority. (2021). *Payment institutions register*. The European Banking Authority. *https://euclid.eba.europa.eu/register/*
- European Banking Federation. (2019). *Guidance for implementation of the revised Payment Services Directive: PSD2 guidance*. The European Banking Federation. *https://www.ebf.eu/wp-content/uploads/2019/12/EBF-PSD2-guidance-Final-December-2019.pdf*
- Euler Hermes. (2019). *European SMEs: Filling the bank financing gap*. Euler Hermes. *https://www.eulerhermes.com/content/dam/onemarketing/ehndbx/eulerhermes_com/en_gl/erd/publications/pdf/20190409-TheView-EuropeanSMEs.pdf*
- European Commission. (2015). *Payment services*. The European Commission. *https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en*
- European Commission. (2022). Commission Delegated Regulation (EU) /... amending the regulatory technical standards laid down in Delegated Regulation (EU) 2018/389 as regards the 90-day exemption for account access. The European Commission. *https://ec.europa.eu/transparency/documents-register/detail?ref=C(2022)5517&lang=en*
- European Parliament & European Council. (2016). Consolidated text: Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (general data protection regulation) (text with EEA relevance). EUR-Lex. *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R0679-20160504*
- Fahy, L. (2022). Regulator reputation and stakeholder participation: A case study of the UK's regulatory sandbox for fintech. *European Journal of Risk Regulation, 13*(1), 138–157. *https://doi.org/10.1017/err.2021.44*
- Financial Conduct Authority. (2020). *Call for input: Open finance*. The Financial Conduct Authority. *https://www.fca.org.uk/publications/calls-input/call-input-open-finance*
- Findex. (2022). *The global findex database 2021*. World Bank Group.
- Frost, J., Gambacorta, L., Huang, Y., Shin, H. S., & Zbinden, P. (2019, April*). BigTech and the changing structure of financial intermediation.* (BIS Working Papers 779). Bank for International Settlements. *https://www.bis.org/publ/work779.htm*
- Gabor, D., & Brooks, S. (2017). The digital revolution in financial inclusion: International development in the fintech era. *New Political Economy, 22*(4), 423–436. *https://doi.org/10.1080/13563467.2017.1259298*
- García-Pérez, I., Fernández-Izquierdo, M. Á., & Muñoz-Torres, M. J. (2020). Microfinance institutions fostering sustainable development by region. *Sustainability, 12*(7), 2682.
- Garg, P., Gupta, B., Chauhan, A.K., Sivarajah, U., Gupta, S., & Modgil, S. (2021). Measuring the perceived benefits of implementing blockchain technology in the banking sector. *Technological Forecasting and Social Change*, 163, *https://doi.org/10.1016/j.techfore.2020.120407*
- Gawer, A., & Cusumano, M. A. (2014). Platforms and innovation. *Journal of Product Innovation Management*, *31*(3), 417–433. *https://doi.org/10.1111/jpim.12105*
- Gioia, D., Corley, K., & Hamilton, A. (2013). Seeking qualitative rigor in inductive research. *Organisation Research Methods, 16*(1), 15–31. *https://doi.org/10.1177/1094428112452151*
- Glöss, M., McGregor, M., & Brown, B. (2016). Designing for labour: Uber and the on-demand mobile workforce. *CHI'16: Proceedings of the international SIGCHI conference on human factors in computing systems, San Jose, USA, May 7–12, 2016*. (pp. 1632–43). New York: ACM Press.

- Gomber, P., Koch, J. A., & Siering, M. (2017). Digital finance and fintech: Current research and future research directions. *Journal of Business Economics, 87*(5), 537–580. https://doi.org/10.1007/s11573-017-0852-x
- González Fuster, G. (2016). EU data protection and future payment services. In Gimigliano, G. (eds), *Bitcoin and mobile payments. Palgrave studies in financial services technology*. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-57512-8_8
- Grassi, L., Figini, N., & Fedeli, L. (2022). How does a data strategy enable customer value? The case of FinTechs and traditional banks under the open finance framework. *Financial Innovation, 8*, 75. https://doi.org/10.1186/s40854-022-00378-x
- Guzman, M. (2000). Bank structure, capital accumulation and growth: A simple macroeconomic model. *Economic Theory*, *16*(2), 421–455. https://doi.org/10.1007/PL00004091
- Hannig, A., & Jensen, S. (2010, December). *Financial inclusion and financial stability: Current policy issues.* (ADBI Working Paper Series 259). Asian Development Bank Institute. https://www.adb.org/sites/default/files/publication/156114/adbi-wp259.pdf
- Hardy, T., & McCrystal, S. (2022). The importance of competition and consumer law in regulating gig work and beyond. *Journal of Industrial Relations, 64*(5), 785–800. https://doi.org/10.1177/00221856211068868
- Hollanders, M. (2020). Fintech and financial inclusion: Opportunities and challenges. *Journal of Payments Strategy & Systems, 14*(4), 315–325.
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687
- Hwang, Y., Park, S., & Shin, N. (2021). Sustainable development of a mobile payment security environment using fintech solutions. *Sustainability, 13*(15), 8375. https://doi.org/10.3390/su13158375
- ING. (2020). ING survey: We're still suspicious about open banking. ING. https://think.ing.com/articles/what-we-say-and-what-we-do-differ-in-a-tech-world
- Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interviews: Tips for students new to the field of qualitative research. *The Qualitative Report, 17*(42), 1–10. https://doi.org/10.46743/2160-3715/2012.1718
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing, 72*(12), 2954–2965. doi:10.1111/jan.13031
- Kassab, M., & Laplante, P. A. (2022). Open banking: What it is, Where it's at, and where it's going. *Computer (Long Beach, Calif.), 55*(1), 53–63. https://ieeexplore.ieee.org/document/9681682
- Kibe, J. (2020). The wrong kind of credit: Why loans to gig workers must reflect income. CGAP. https://www.cgap.org/blog/wrong-kind-credit-why-loans-gig-workers-must-reflect-income
- King, B. (2018). Bank 4.0: Banking everywhere, never at a bank. Wiley.
- Kou, G., Olgu Akdeniz, Özlem, Dinçer, H., & Yüksel, S. (2021). Fintech investments in European banks: a hybrid IT2 fuzzy multidimensional decision-making approach. *Financial Innovation (Heidelberg)*, *7*(1), 39–39. https://jfin-swufe.springeropen.com/articles/10.1186/s40854-021-00256-y
- Lagna, A., & Ravishankar, M.N. (2021). Making the world a better place with fintech research. *Information Systems Journal, 32*(1), 61–102. https://doi.org/10.1111/isj.12333
- Lai, Karen P. Y. (2020). Fintech: The dis/re-intermediation of finance? In J. Knox-Hayes & D. Wójcik (Eds.), *The Routledge handbook of financial geography* (pp. 440–458). Routledge Companions in Business, Management and Marketing.

- Lashitew, A. A., vanTulder, R., & Liasse, Y. (2019). Mobile phones for financial inclusion: What explains the diffusion of mobile money innovations? *Research Policy, 48*(5), 1201-1215. https://doi.org/10.1016/j.respol.2018.12.010
- Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons, 61*(1), 35–46.
- Leonardi, P., Bailey, D., Diniz, E., Sholler, D., & Nardi, B. (2016). Multiplex appropriation in complex systems implementation: The case of Brazil's correspondent banking system. *MIS Quarterly, 40*(2), 461–473.
- Li, T., Kou, G., Peng, Y. & Yu, P.S. (2022). An Integrated Cluster Detection, Optimization, and Interpretation Approach for Financial Data. *IEEE Transactions on Cybernetics, 52*(12), 1-14. https://ieeexplore.ieee.org/document/9546664.
- Lynn, T., Rosati, P., & Cummins, M. (2020). Exploring open banking and banking-as-a-platform: Opportunities and risks for emerging markets. In D. Klonowski (Ed.), *Entrepreneurial finance in emerging markets* (pp. 319–334). Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-46220-8_20
- Macchiavello, E., & Siri, M. (2022). Sustainable finance and fintech: Can technology contribute to achieving environmental goals? A preliminary assessment of 'green fintech' and 'sustainable digital finance'. *European Company and Financial Law Review, 19*(1), 128–174. https://doi.org/10.1515/ecfr-2022-0005
- Mader, P. (2018). Contesting financial inclusion. *Development and Change, 49*(2), 461–483. https://doi.org/10.1111/dech.12368
- Malt & Boston Consulting Group. (2021). *Freelancing in Europe 2021: Welcome to the new work order*. Boston Consulting Group. https://web-assets.bcg.com/77/62/07a1c84f4be6b671ca10ec16f6f1/malt-bcg-freelancing-in-europe-2021.pdf
- Mansfield-Devine, S. (2016). Open banking: Opportunity and danger. *Computer Fraud & Security, 2016*(10), 8–13. https://doi.org/10.1016/S1361-3723(16)30080-X
- Markose, S., Arun, T., & Ozili, P. (2022). Financial inclusion, at what cost?: Quantification of economic viability of a supply side roll out. *The European Journal of Finance*, *28*(1), 3–29. https://doi.org/10.1080/1351847X.2020.1821740
- Mastercard. (2016). *The Road to inclusion: Mastercard financial inclusion survey, key learnings report*. Mastercard. https://newsroom.mastercard.com/wp-content/uploads/2016/12/Road-to-Inclusion_Mastercard-Financial-Inclusion-Survey-2016.pdf
- Morales, L., Gray, G., & Rajmil, D. (2022). Emerging risks in the FinTech industry – insights from data science and financial econometrics analysis. *Economics, Management and Financial Markets, 17*(2), 9–36. https://doi.org/10.22381/emfm17220221
- Moro-Visconti, R. (2021). Microfintech applications. In *MicroFinTech. Palgrave studies in financial services technology*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-80394-0_6
- Muralidhar, S. H., Bossen, C., & O'Neill, J. (2019). Rethinking financial inclusion: From access to autonomy. *Computer Supported Cooperative Work (CSCW) 28*(3–4), 511–547. https://doi.org/10.1007/s10606-019-09356-x
- Nationaal Instituut Voor Budgetvoorlichting. (2019). *Factsheet geldproblemen in Nederland 2018*. Nationaal Instituut Voor Budgetvoorlichting. https://www.nibud.nl/wp-content/uploads/Factsheet-rondkomen-en-geldproblemen-2018-pdf.pdf

- Nationaal Instituut Voor Budgetvoorlichting. (2020). *Factsheet coronacrisis en geldzaken*. Nationaal Instituut Voor Budgetvoorlichting. *https://www.nibud.nl/wp-content/uploads/Nibud-factsheet-coronapeiling-2020.pdf*
- Nguyen, L. T. Q., Hoang, T. G., Do, L. H., Ngo, X. T., Nguyen, P. H. T., Nguyen, G. D. L., & Nguyen, G. N. T. (2021). The role of blockchain technology-based social crowdfunding in advancing social value creation. *Technological Forecasting and Social Change, 170*(June), 120898. *https://doi.org/10.1016/j.techfore.2021.120898*
- Nicholls, M., & Clarke, D. (2021). *Open finance and vulnerability: A policy discussion paper*. The Finance Innovation Lab. https://financeinnovationlab.org/wp-content/uploads/2021/07/Open-Finance-doc_FINAL_2021.pdf
- Ouma, S. A., Odongo, T. M., & Were, M. (2017). Mobile financial services and financial inclusion: Is it a boon for savings mobilization? *Review of Development Finance*, *7*, 29–35. https://doi.org/10.1016/j.rdf.2017.01.001
- Pasquale, F. (2015). The black box society: The secret algorithms that control money and information. Harvard University Press.
- Philippon, T. (2019, June). *On fintech and financial inclusion.* (BIS Working Papers 84). Bank for International Settlements. *https://www.bis.org/events/conf190628/philippon.pdf*
- Plaitakis, A. (2019). *Innovations in EU policy and legislation opportunities for microfinance: An MFC handbook*. The Microfinance Centre. *https://mfc.org.pl/wp-content/uploads/2020/03/PSD2-PAPER_FEB2020.pdf*
- Polasik, M., Huterska, A., Rehan Iftikhar, R., & Mikula, S. (2020). The impact of Payment Services Directive 2 on the paytech sector development in Europe. *Journal of Economic Behavior & Organization, 178*, 385–401. *https://doi.org/10.1016/j.jebo.2020.07.010*
- Radnejad, A. B., Osiyevskyy, O., & Scheibel, O. (2021). Learning from the failure of the EU Payment Services Directive (PSD2): When imposed innovation does not change the status quo. *Rutgers Business Review, 6*(1), 79–94. *https://rbr.business.rutgers.edu/sites/default/files/documents/rbr-060108.pdf*
- Reynolds, F., & Chidley, M. (2019). *Consumer priorities for open banking*. Open Banking. *https://www.openbanking.org.uk/wp-content/uploads/Consumer-Priorities-for-Open-Banking-report-June-2019.pdf*
- Romanova, I., Grima, S., Spiteri, J., & Kudinska, M. (2018). The Payment Services Directive II and competitiveness: The perspective of European fintech companies. *European Research Studies Journal, 21*(2), 3–22.
- Rosati, P., Fox, G., Cummins, M., & Lynn, T. (2022). Perceived risk as a determinant of propensity to adopt account information services under the EU Payment Services Directive 2. *J. Theor. Appl. Electron. Commer. Res. 2022, 17,* 493–506. *https://doi.org/10.3390/jtaer17020026*
- Schumpeter, J. (1942). *Capitalism, socialism, and democracy*. Harper & Bros.
- Scott, B., Loonam, J., & Kumar, V. (2017). Exploring the rise of blockchain technology: Towards distributed collaborative organizations. *Strategic Change, 26*(5), 423–428. *https://doi.org/10.1002/jsc.2142*
- Scott, S., Van Reenen, J., & Zachariadis, M. (2017). The long-term effect of digital innovation on bank performance: An empirical study of SWIFT adoption in financial services. *Research Policy, 46*(5), 984–1004. *https://doi.org/10.1016/j.respol.2017.03.010*
- Smith, T., & Geradin, D. (2021). Maintaining a level playing field when Big Tech disrupts the financial services sector. *European Competition Journal,* 1–39. *https://doi.org/10.1080/17441056.2021.1936401*
- Stulz, R. M. (2019). Fintech, BigTech and the future of banks. *Journal of Applied Corporate Finance*, *31*(4), 86–97. *https://doi.org/10.1111/jacf.12378*

- Suri, T., & Jack, W. (2016). The long-run poverty and gender impacts of mobile money. *Science, 354* (6317), 1288-1292. *https://doi.org/10.1126/science.aah5309*
- Tran, T. T. H., & De Koker, L. (2019). Aligning financial inclusion and financial integrity: Regulating and supervising microfinance in Vietnam. *Journal of Money Laundering Control, 22*(4), 595–613. *https://doi.org/10.1108/JMLC-01-2019-0004*
- Van Hove, L., & Dubus, A. (2019). M-PESA and financial inclusion in Kenya: Of paying comes saving? *Sustainability, 11*(3), 568. *https://doi.org/10.3390/su11030568*
- Van Loo, R. (2018). Making innovation more competitive: The case of fintech. *UCLA Law Review, 65*(1), 232–279.
- Village Capital. (2020). *Breaking down barriers: Fintech solutions for refugees, Europe focus*. Refugee Investments. *https://refugeeinvestments.org/wp-content/uploads/2020/04/FintechRefugees-Report-FINAL_4-3.pdf*
- Vives, X. (2019). Digital disruption in banking. *Annual Review of Financial Economics, 11*, 243–272. *https://doi.org/10.1146/annurev-financial-100719-120854*
- Wall, L. (2018). Some financial regulatory implications of artificial intelligence. *Journal of Economics and Business, 100*, 55–63. *https://doi.org/10.1016/j.jeconbus.2018.05.003*
- Wolters, P. T. J., & Jacobs, B. P. F. (2019). The security of access to accounts under the PSD2. *Computer Law & Security Review, 35*(1), 29–41. *https://doi.org/10.1016/j.clsr.2018.10.005*
- WSBI-ESBG. (2022). *Number of unbanked adult EU citizens more than halved in the last four years*. The World Savings and Retail Banking Institute (WSBI) and The European Savings and Retail Banking Group (ESBG). *https://www.wsbi-esbg.org/number-of-unbanked-adult-eu-citizens-more-than-halved-in-the-last-four-years/*
- Xu, X. (2019). The underbanked phenomena. *Journal of Financial Economic Policy, 11*(3), 385–404. *https://doi.org/10.1108/JFEP-09-2018-0125*
- Zachariadis, M., & Ozcan, P. (2017, June). *The API economy and digital transformation in financial services: The case of open banking.* (Working paper no. 2016-001). SWIFT Institute. *https://swiftinstitute.org/wp-content/uploads/2017/07/SIWP-2016-001-Impact-Open-APIs-FINAL.pdf*

About

6.1 | ... the European Investment Fund

The European Investment Fund (EIF) is Europe's leading risk finance provider for small and medium sized enterprises (SMEs) and mid-caps, with a central mission to facilitate their access to finance. As part of the European Investment Bank (EIB) Group, EIF designs, promotes and implements equity and debt financial instruments which specifically target the needs of these market segments.

In this role, EIF fosters EU objectives in support of innovation, research and development, entrepreneurship, growth, and employment. EIF manages resources on behalf of the EIB, the European Commission, national and regional authorities and other third parties. EIF support to enterprises is provided through a wide range of selected financial intermediaries across Europe. EIF is a public-private partnership whose tripartite shareholding structure includes the EIB, the European Union represented by the European Commission and various public and private financial institutions from European Union Member States, the United Kingdom and Turkey. For further information, please visit www.eif.org.

6.2 | ... EIF's Research & Market Analysis

Research & Market Analysis (RMA) supports EIF's strategic decision-making, product development and mandate management processes through applied research and market analyses. RMA works as internal advisor, participates in international fora and maintains liaison with many organisations and institutions.

6.3 | ... this Working Paper series

The EIF Working Papers are designed to make available to a wider readership selected topics and studies in relation to EIF´s business. The Working Papers are edited by EIF´s Research & Market Analysis and are typically authored or co-authored by EIF staff, or written in cooperation with EIF. The Working Papers are usually available only in English and distributed in electronic form (pdf).

EIF Working Papers

2023/094	Open banking and inclusive finance in the European Union: perspectives from the Dutch stakeholder ecosystem
2023/093	EIF Venture Capital Survey 2023
2023/092	The 2022 EIF SME Access to Finance Index – August 2023 update
2023/091	Using machine learning to map the European Cleantech sector
2023/090	Recent trends in EU corporate demography and policy
2023/089	Entrepreneurial Finance and the Russian War against Ukraine: a Survey of European Venture Capital and Private Equity Investors
2023/088	Fairness in algorithmic decision systems: a microfinance perspective
2023/087	Female access to finance: a survey of literature.
2023/086	Determinants of EU Greentech investments: the role of financial market conditions
2022/085	EIF Private Equity Mid-Market Survey 2022: Market sentiment and impact of the current geopolitical & macroeconomic environment.
2022/084	European Small Business Finance Outlook 2022.
2022/083	The 2021 EIF SME Access to Finance Index. October 2022 update.
2022/082	EIF VC Survey 2022: Market sentiment and impact of the current geopolitical & macroeconomic environment.
2022/081	EIF Business Angel Survey 2021/22: Market sentiment.
2022/080	EIF Private Debt Survey 2021 - ESG considerations in the lending strategy of private debt funds.
2022/079	EIF Private Debt Survey 2021 - Private Debt for SMEs - Market overview.
2021/078	EIF Private Equity Mid-Market Survey 2021: Market sentiment.
2021/077	EIF Private Equity Mid-Market Survey: Fund managers' perception of EIF's value added.
2021/076	The 2020 EIF SME Access to Finance Index - October 2021 update.
2021/075	European Small Business Finance Outlook.
2021/074	EIF Venture Capital Survey 2021: Market sentiment.
2021/073	EIF VC Survey Autumn 2020 - Regional analysis.
2021/072	Financial and social inclusion in Europe.
2021/071	EIF Venture Capital, Private Equity Mid-Market & Business Angels Surveys 2020: Market sentiment – COVID-19 impact – Policy measures.
2021/070	The impact of VC on the exit and innovation outcomes of EIF-backed start-ups.
2021/069	Scale-Up Financing and IPOs: Evidence From Three Surveys.
2020/068	The EIF SME Access to Finance Index - September 2020 update.

2020/067	European Small Business Finance Outlook 2020. The impact of COVID-19 on SME Financing markets.
2020/066	Measuring microfinance impact: A practitioner perspective and working methodology.
2020/065	The social return on investment (SROI) of four microfinance projects.
2020/064	The market sentiment in European Private Equity and Venture Capital: Impact of COVID-19.
2020/063	ESG considerations in Venture Capital and Business Angel investment decisions: Evidence from two pan-European surveys.
2020/062	The Business Angel portfolio under the European Angels Fund: An empirical analysis.
2019/061	European Small Business Finance Outlook.
2019/060	EIF Business Angels Survey 2019 - Market sentiment, public intervention and EIF's value added.
2019/059	EIF VC Survey 2019 - Fund managers' market sentiment and policy recommendations.
2019/058	EIF SME Access to Finance Index – June 2019 update.
2019/057	European Small Business Finance Outlook.
2019/056	The real effects of EU loan guarantee schemes for SMEs: A pan-European assessment.
2019/055	The European Venture Capital Landscape: an EIF perspective. Volume V: The economic impact of VC investments supported by the EIF.
2019/054	Econometric study on the impact of EU loan guarantee financial instruments on growth and jobs of SMEs.
2018/053	European Small Business Finance Outlook.
2018/052	The effects of EU-funded guarantee instruments of the performance of Small and Medium Enterprises - Evidence from France.
2018/051	EIF VC Survey 2018 - Fund managers' perception of EIF's Value Added.
2018/050	European Small Business Finance Outlook.
2018/049	EIF SME Access to Finance Index – June 2018 update.
2018/048	EIF VC Survey 2018 – Fund managers' market sentiment and views on public intervention.
2018/047	EIF SME Access to Finance Index.
2017/046	European Small Business Finance Outlook.
2017/045	The European venture capital landscape: an EIF perspective. Volume IV: The value of innovation for EIF-backed startups.
2017/044	Financing Micro Firms in Europe: An Empirical Analysis.
2017/043	European Small Business Finance Outlook.
2017/042	Credit Guarantee Schemes for SME lending in Western Europe.
2017/041	The European Venture Capital landscape: an EIF perspective. Volume III: Liquidity events and returns of EIF-backed VC investments.
2017/040	Financing Patterns of European SMEs Revisited: An Updated Empirical Taxonomy and Determinants of SME Financing Clusters.

2017/039	Guaranteeing Social Enterprises – The EaSI way.
2016/038	The European Venture Capital Landscape: an EIF perspective. Volume II: Growth patterns of EIF-backed startups.
2016/037	European Small Business Finance Outlook.
2016/036	The role of cooperative banks and smaller institutions for the financing of SMEs and small midcaps in Europe.
2016/035	European Small Business Finance Outlook.
2016/034	The European Venture Capital Landscape: an EIF perspective. Volume I: the impact of EIF on the VC ecosystem.
2016/033	Evaluating the impact of European microfinance. The foundations.
2015/032	European Small Business Finance Outlook.
2015/031	SME Securitisation – at a crossroads?
2015/030	Financing patterns of European SMEs: An Empirical Taxonomy.
2015/029	The Economic Impact of EU Guarantees on Credit to SMEs - Evidence from CESEE Countries.
2015/028	European Small Business Finance Outlook.
2015/027	Bridging the university funding gap: determinants and consequences of university seed funds and proof-of-concept Programs in Europe.
2014/026	European Small Business Finance Outlook.
2014/025	Institutional non-bank lending and the role of debt funds.
2014/024	European Small Business Finance Outlook.
2014/023	Pricing Default Risk: the Good, the Bad, and the Anomaly.
2014/022	Guidelines for SME Access to Finance Market Assessments.
2014/021	Financing the mobility of students in European higher education.
2013/020	European Small Business Finance Outlook.
2013/019	SME loan securitisation 2.0 – Market assessment and policy options.
2013/018	European Small Business Finance Outlook.
2013/017	Forecasting distress in European SME portfolios.
2012/016	European Small Business Finance Outlook.
2012/015	The importance of leasing for SME finance.
2012/014	European Small Business Finance Outlook.
2012/013	Progress for microfinance in Europe.
2011/012	European Small Business Finance Outlook 2/2011.
2011/011	Business Angels in Germany. EIF's initiative to support the non-institutional financing market.
2011/010	European Small Business Finance Outlook.

2011/009	The performance and prospects of European Venture Capital.
2010/008	Impact of Legislation on Credit Risk – How different are the U.K. and Germany?
2010/007	SME Loan Securitisation – an important tool to support European SME lending.
2010/006	Drivers of Private Equity Investment activity. Are Buyout and Venture investors really so different?
2010/005	Private Equity Market Outlook.
2010/004	Private Equity and Venture Capital Indicators – A research of EU-27 Private Equity and Venture Capital Markets.
2010/003	Private Equity Market in Europe – Rise of a new cycle or tail of the recession?
2009/002	Financing Technology Transfer.
2009/001	Microfinance in Europe – A market overview.

#Believe InSmall

www.eif.org

Scan above to obtain a PDF version of this working paper

Follow our stories and work on social media

European Investment Fund

@eif4smes

@EIF_EU

engage.eif.org