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How does a data strategy enable customer value? The case of FinTechs and traditional banks under the open finance framework

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Abstract

The coupling of data and digital innovation opens the way for new business in the financial services sector, where customers are placed at the centre of decisions and data can help to develop customer knowledge. To carry out our research, we adopted a multi-case study approach to explore how a data strategy is developed in the retail banking industry, together with its relationship with customer value, paying particular attention to the heterogeneity between traditional banks and financial technology companies (FinTechs). Two main points emerged from the study. Firstly, there are three possible approaches to Open Finance, which are mainly defined by their different corporate cultures, organisational configurations, technological architecture and data value. Secondly, it is not enough to be a FinTech to be best placed to exploit the market, as some traditional banks share the FinTechs' approach to Open Finance. Designing new tailored products, customising their prices and offering them over the right channels through targeted communication are all data-driven initiatives that stem from cross- or up-selling potential, core to the retail banking industry for turning a customer into a cash flow, thus enabling value to be created for customers. Our findings additionally revealed that there is a form of *external* information asymmetry between the customer and the bank, and that there is also an *internal* asymmetry between bank departments, as their visibility on information about the same customer may differ.

Keywords: FinTech, Open finance, Customer orientation, Customer centric, Data valorisation, Open banking

Introduction

What does customer centricity[1] mean? It simply means that, in everything you do, in whatever you set yourself to do in any company, you must always think of what impacts and benefits there are for your customers [...]Because, in the end, in a bank like Bank A, the customer is somehow a number, a piece of data (Bank A).

Data and technology are becoming key assets in the financial landscape (Li and Xu 2021). As customers are redefining their expectations, taking their cues from other

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[1] In this paper, we use customer-centricity and customer-orientation interchangeably (see Gummesson 2008).

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industries that offer multi-channel access, seamless integration and precise targeting, it is important that all players should take the steps necessary to ensure high responsiveness to the changing customer needs. Companies must crucially exploit all available data if they are to design successful products and services, opening the way to co-creating value (Shirazi et al. 2021) and offering individualised services, thereby enabling companies to deploy a full customer-oriented approach (Kanungo and Gupta 2021), which does not simply mean predicting customer behaviour (Fernández-Rovira et al. 2021). The emerging factor is that it is essential to leverage on digital innovation and data quality, not just on volumes of data or big data (Arnaboldi 2018; Bapat 2014; Gomber et al. 2018; Sullivan et al. 2014), because investing in analytics and service techniques improves customisation and performance (Sullivan et al. 2014).

While every industry has its own structure and challenges in terms of technology, uncertainty and competition (Ghouri et al. 2021a), retail banking is lagging behind in the trend to use data. Historically, banks have developed a product-centric mindset, giving priority to internal practices and processes, and considering the customer as a target for their marketing undertakings (Lähteenmäki and Nätti 2013). Their ultimate goal was to sell the best products, rather than taking their customers' real needs into account, as a customer-centric firm would (Hedley et al. 2006). Organisationally, banks created distinct functional areas revolving around products, with an underlying silos-type architecture, which determined a huge legacy burden when banks began placing customers at the centre of their business, as each unit and department has an established view of its clients and the underpinning structure is fragmented (Lähteenmäki and Nätti 2013; Riemer et al. 2017).
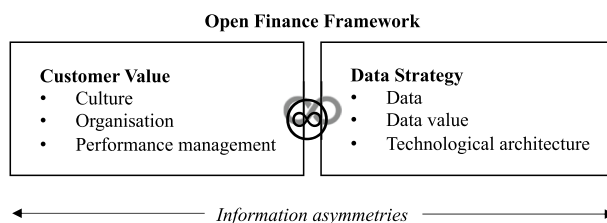
The financial industry has undergone significant change. In the past few years, retail banking has gone through unprecedented transformation, with new dynamics for competition, greater focus on data and increased attention to customer centricity (Pousttchi and Dehnert 2018). These changes are further reaching than large global banks and small niche entities simply increasing their market share at the expense of mid-sized establishments. The arrival of new, technologically innovative players has pinpointed the importance of building relationships with customers (Bapat 2014; Chen et al. 2021; Hedley et al. 2006; Schaefer et al. 2012), challenging traditional views and competition (Bollaert et al. 2021; Alt et al. 2018; Gomber et al. 2018). The new outfits, FinTech startups or simply FinTechs (see also Gomber et al. 2017, and Lee and Shin, 2018), have upturned the sector, improving the efficiency and quality of services (Ferrari 2016; Lanfranchi and Grassi 2021), while posing new challenges for regulators and incumbents (Arner et al. 2015). These technology-enabled financial startups with novel digital imprinting try to cater to their customers' needs in a new and innovative way, exploiting digital technology and data-driven approaches as their primary asset to build tailored services. The FinTech approach demonstrates the potential of acquiring customer insights, redefining strategies and investing highly (Riemer et al. 2017) in a customer-oriented approach (Alt et al. 2018; Gomber et al. 2018). Digital native banks have emerged—platforms that use digital channels to expand their business—built on the value proposition that most products and services are delivered digitally (Buchi et al. 2019), although a certain complementarity between old-school banks and FinTechs must also be taken into account (see Carbó-Valverde et al. 2020b; Dolson and Jagtiani 2021; Tang 2019).

Traditional banks reacted to the escalation in competition by adopting digital technologies in response (Stulz 2019), launching their own digital banks to meet the evolving customer expectations quickly and effectively (Citigroup 2019). Strategies vary widely and include starting programmes to incubate FinTech companies, setting up venture funds to finance FinTechs, establishing partnerships and developing FinTech subsidiaries internally (Romanova and Kudinska 2016). Additionally, given the heavily regulated sector, banks already possess most of the necessary information and data, courtesy of various directives, which for years have required sensitive data to be collected and maintained. The internal availability of these data, their quality, timeliness and true connection with the business is thus certain.

In this new ecosystem, an Open Finance framework is starting to play a key role, whereby data, data availability and data sharing are fundamental enablers (Jagtiani and John 2018; Kitchin 2014; Kohtamaki et al. 2019), opening new ways to create and deliver value to their customers (Iheanachor et al. 2021). The enabling factor is for banks and third-party providers to share data and use customer-permissioned information (European Commission 2020; Goldbarsht et al. 2021), facilitating such access and exchange of data with FinTechs (Feyen et al. 2021). The antecedents of Open Finance are Open Banking and the EU Payment Services Directive 2 (PSD2), which were initially designed for the payment sector, and required banks to ensure that third party access (e.g. payment service providers, PSPs) to their customers' accounts and payment services was secure and only granted after the customer had given consent. Application programming interfaces (APIs) were considered the most reliable and tested technology for such secure access (Zachariadis and Ozcan 2017). However, financial data APIs are now used far more extensively than just in payments, and affect all financial businesses, from lending and investments to insurance and digital identities. To sum up, we claim that Open Finance started as Open Banking and then evolved to take in all financial activity. In Europe, the European Commission has made Data Strategy and Open Finance a clear priority, setting the stage for new services, leading to improved financial products, better targeted advice, wider consumer access and greater efficiency in business-to-business transactions.

In the light of the changing context of the financial industry, the objective of this study is to explore how a data strategy for customer value is developed within the retail banking industry, paying particular attention to the heterogeneity of traditional and FinTech actors, viewed through the lens of information asymmetry. For this purpose, a multiple case study approach was adopted, where a conceptual framework based on previous relevant studies was formulated to interpret the results. Our unit of analysis were retail banks based in Italy, including both traditional players and FinTechs, to account for their degree of innovativeness in business models and technology.

Our first finding is that there are three possible approaches to Open Finance, which are mainly defined by their different corporate cultures, organisational configurations, technological architecture and data value. Our second finding is that it is not enough to be a FinTech to be best placed to exploit the market better, as some traditional banks share the FinTechs' approach to Open Finance. Designing new tailored products, customising their prices and offering them through the right channels using targeted communication are all data-driven initiatives that stem from cross- or up-selling potential,

Open Finance Framework

Customer Value		Data Strategy
• Culture		• Data
• Organisation		• Data value
• Performance management		• Technological architecture

Information asymmetries

Fig. 1 Research framework

which is core to the retail banking industry for turning a customer into a cash flow, thus enabling value to be created for customers. Our findings additionally revealed that there is a form of *external* information asymmetry between the customer and the bank, and that there is also an *internal* asymmetry between bank departments as their visibility on information about the same customer may differ.

The rest of this paper is organised as follows. Current knowledge extrapolated from literature and our framework is outlined in Section two. with the methods utilised in the research process being described in Section three. Section four presents our main results and sets out a discussion of the findings, highlighting three approaches to Open Finance that emerged from the study. Section five contains the conclusions and several key remarks.

Customer value and data strategy in banking

Over the past 60 years, the debate around customer needs has evolved to customer value (Zeithaml et al. 2020) and has been recently amplified to take in the potential of data (Wijaya et al. 2020). This renewed attention is also entering the retail banking industry (Ramdani et al. 2020; Stulz 2019), a sector that has been slow in putting customers, with their specific and sometimes very individual needs (Alt et al. 2018; Kilara and Rhyne 2014), at the centre of its operations.

Within this section, customer value and data strategy are viewed through our interpretative lens as tending towards a reduction in information asymmetry (Fig. 1). A standout finding is that the centricity of customer value and data strategy help to reduce information asymmetry. Alford and Jones (1998) supported the idea that information asymmetry increases as the amount or quality of information decreases. From a customer-oriented perspective, involving customers, cultivating a long-term dialogue and acting as customer advisors all play an essential role in generating new high-quality information and knowledge, which can help banks understand their customers' individual needs. Customer orientation, effective processes and horizontal solutions where information can reach otherwise distinct teams smoothly and promptly (Moorman and Rust 1999) are all ways to reduce such asymmetry, both internally and externally. From a data strategy perspective, data related to credit bureaus and similar solutions historically acted as databases for selected and regulated information, which was captured to ease deserving consumers' access to credit (Omede 2020). In the absence of effective screening and monitoring procedures, borrowers with poor credit had room to hide their inability to repay a loan (Deng 2021). Multiple sources (including those mandated through legislation) and real-time data lead to increased and improved information. To encourage

such developments, technological architectures are strategically placed to reduce internal information asymmetry among the various departments and units, for example, by overcoming the traditional departmental arrangement of having own data warehouses, employees and spreadsheets, and instead orchestrating the flow of data and information.

In the light of lessened information asymmetry, a proper data strategy supports customer value. Today, Open Finance enables retail banks to collect additional information through private and public sources, and from the customers themselves, whose value and business initiative are now emerging in this current study. Thus, the combination of real-time and updated public and private information will lead to greater openness and trust, and more desirable economic and social outcomes (Deng 2021; Baek et al. 2020), and timely response to customers (Zhang 2020; Dashottar and Srivastava 2021), and may also affect internal costs (Dashottar and Srivastava 2021).

In conceptualising our framework, we have been mainly inspired by studies in technological development and innovation and strategy, concentrating on consumer value, which, according to recent literature, is linked to culture, organisational structure and performance metrics. We then integrated our thinking into the literature on digital and data strategy, where data, data value and technological architecture have emerged as the building blocks of extant research, with the purpose of framing this study within the banking industry, considering the pressure coming from the Open Finance context (European Commission 2020).

Customer value

Underlying the idea of customer value is an orientation towards customers, actively connecting with them (Chan 2005; Gulati 2009). Customer orientation is linked to the organisation's capacity of involving its customers continuously and actively, moving the focus from the offer to the entire customer experience. The outcome is to create and maximise long-term value (Fader 2012; Ghouri et al. 2021b; Kumar and Sharma 2018; Lamberti 2013; Zietsman et al. 2020) in profitability and sustainable competitive advantage (Day 2000), as well as to increase business value (Loshin and Reifer 2013). Cultivating long-term dialogue with customers drives decision-making processes (Prahalad and Ramaswamy 2004), build loyalty and customer retention (Bolton 2004) and support growth in revenue (Simon et al. 2016). Being truly customer-centric is far from easy. Customer orientation requires companies to rethink their entire organisational design, meaning that they must deliberately re-configure their organisational structures and performance management and instil a coherent culture to create an effective organisation that can achieve their chosen strategy (Kates and Galbraith 2007; Hemel and Rademakers 2016; Gummesson 2008; Shah et al. 2006; Payne and Frow 2005).

Culture

The culture of an organisation reflects its values, norms and vision (Bedarkar et al. 2016). Bolton (2004) suggested that employees should be trained and encouraged to advise their customers, and take account of their well-being and long-term good, becoming a sort of trusted personal agent. This approach requires serious commitment from the leadership (Shah et al. 2006) and an alignment of leadership behaviour with brand beliefs (Mosley 2007), with accountability and ownership at all levels (Sheth et al. 2020).

While culture supports organisational behaviour effectively and efficiently (Kolar 2006), it also tends to be formal, inflexible and risk-averse, meaning that there is strong resistance to change (Riemer et al. 2017; Lähteenmäki and Nätti 2013; Mosley 2007). Although bank managers find it relatively easy to define customer value, they often lack the confidence to make the corresponding management changes required, and may see customer value as very risky, time consuming and extremely costly (Lähteenmäki and Nätti 2013). In order to address all the above aspects, Bennett and Durkin (2002) proposed a series of facilitators, such as sharing knowledge internally, giving employees the proper tools and data for them to handle customers and creating appropriate reward systems, while Deshpandé et al. (1993) suggested that innovation may have a moderating effect.

While the traditional retail banking model based on trust, loyalty and relationships is being questioned in the light of digital and other innovations (Pousttchi and Dehnert 2018), FinTech players have emerged as being truly customer-oriented (Li et al 2017; Jakšič and Marinč 2019) in a context where building stronger relationships with customers is fundamental to achieving success (Schaefer et al. 2012; Gomber et al. 2018; Sullivan et al. 2014). According to Hemel and Rademakers (2016), the true meaning of being customer-oriented is likely to be underestimated, with companies usually concocting a new setup for the sales and marketing units to make them more "customer-focused".

Business and customer strategies are highly important processes in customer-oriented firms (Payne and Frow 2005), where customer knowledge is the most valuable asset (Day 2003) and information and data play an essential role in understanding customer needs (Matsuno and Mentzer 2000). A customer-oriented approach narrows the scope of investigation to the individual customer (Sheth et al. 2000; Cheng and Dogan 2008), stressing the importance of the customer rather than market intelligence, cultivating dialogical interaction with customers (Ramani and Kumar 2008), building success by fully understanding one's customers, meeting their expectations and anticipating their requests (Bolton 2004). A possible creative approach is to co-create potential solutions that involve customers directly, as in design thinking (Petrovic and Siegmann 2011), and so address customers' pain points or necessities, help companies to identify customer needs and create value (Payne and Frow 2005), and bring customer data into strategic planning (Knight et al. 2020).

Organisation

A non-coherent organisational style does not allow organisations to formulate an integrated solution to their customers' needs (Lähteenmäki and Nätti 2013), although there could be room for completely reconfiguring a number of non-effective processes. Shaping a coherent organisational structure is particularly important, with departments being aligned towards the end customer, avoiding vertical and hierarchical solutions (standalone silos structures), opting for horizontal solutions where information can reach all the distinct teams smoothly and promptly (Moorman and Rust 1999). For instance, a data warehouse combines customer information from a variety of operational systems, which can be stored, combined and used in various reports to support newly-designed processes throughout the company (Bolton 2004). So far, however, but this method is not sufficient for a coherent data strategy.

Because customer knowledge and awareness of the customer's importance is shared and communicated extensively in customer-oriented companies, the key points are to integrate the customer experience throughout the organisation (Hayes 2013) and to manage the multichannel interface with the customers along all touchpoints (Lamberti 2013). Hence, customer orientation is related to a company's capability to produce customer intelligence, gathering explicit and hidden needs and elaborating customer information and data by leveraging on the repositories containing data on the customer-firm interactions (Lamberti 2013). The customer relationship management (CRM) unit supports a process that collects customer data and makes them available to decision-makers across the firm (Galbraith 2005). The process spurs internal communication and the sharing of knowledge (Harris 2000), following ad hoc processes whereby resources can be used and combined throughout the company, expanding their scope beyond the single unit and the coordination mechanisms in play between distinct units and departments within the company (Galbraith 2005; Shah et al. 2006).

Performance management

It is decisive to measure the financial impact of customer-oriented decisions, setting clear customer-oriented metrics and Key Performance Indicators (KPIs) that can motivate people to perform so as to achieve organisational goals, and guide the process of establishing company-wide customer orientation (Shah et al. 2006), linking salary revisions to clearly defined customer-related metrics (Day 1999). These metrics include the share of customer spending (Cooil et al. 2007; Galbraith 2005; Keiningham et al. 2011; Kumar and Reinartz 2006;), customer satisfaction and loyalty (Galbraith 2005), Customer Lifetime Value (CLV) (Galbraith 2005; Hogan et al. 2002; Pfeifer et al. 2005; Ascarza et al. 2017), customer churn or rate of attrition (Glady et al. 2009), Net Promoter Scores (NPS) (Reichheld 2003; Markey and Reichheld 2016) and the Recency Frequency and Monetary value (RFM) (Colombo and Jiang 1999; Kumar and Reinartz 2006). However we have to intend it as a strategy point as a reward system based on these values would be effective only if the company's culture is customer oriented (Sheth et al. 2020).

Data strategy

Data and Technology are becoming pivotal assets for organisations, in innovation and to benefit their consumers (Serrado et al. 2020; European Commission 2021a).

Firms are now more able to create products and services from which they can extract data, and consumers are now incessant generators of data (Erevelles et al. 2016), producing intrinsic knowledge about customers and information on which to build data-driven strategies to create customer value (Payne et al. 2021; Davenport 2013; Sa et al. 2020; Matsuno and Mentzer 2000).

It is not important to have continuously new data at one's disposal, but to have these data analysed, integrated and evaluated to provide consistent support to new decisions. This is data strategy (DalleMule and Davenport 2017). In his review of the key challenges concerning the dynamic capabilities needed for digitally-enabled process innovation, Chirumalla (2021) used empirical data to extrapolate three main topics on data strategy:

the centrality of data, the value of such data and the technological architecture of the system.

Data

The identification, collection and organisation of digital data are fundamental steps in a data strategy, and to extrapolate value from those data. The source of the data is certainly important, but the kind of data is even more significant. Demographic data (e.g. age, gender, ethnicity, country of origin, marital status, race, income level, education level, household size and number of children, Loshin and Reifer 2013) are less likely to change, and are generally the starting point in any relationship. It would, however, be absurd to assume, for example, that all 45- to 55-year-old men living in a given country with a given household income will be interested in buying the same items and have the same spending habits (Lenzen 2004). Demographic data, geographic information and the customer's purchasing history (Zahay et al. 2004) are integral parts of the customers' financial transactions. Overall, the literature refers to these data as transactional data.

However, transactional data can only sketch a partial picture of the customer (Hershey et al. 2007). Values, motivation, beliefs, outlook, lifestyle, preferences and personality (Loshin and Reifer 2013) give a wider overview of the customer, playing a role in customer loyalty and satisfaction (Susanti et al. 2019). These data are captured digitally (Peltier et al. 2002) and referred to as relational data.

Currently, other types of data, known as alternative data, are starting to be considered. Alternative data can range from web traffic using web logs (Waisberg and Kaushik 2009), JavaScript tagging, web beacons and packet sniffing, to geo-localisation and social media data (Stodder 2012), thereby moving to the sphere of unstructured data (Greco and Polli 2020).

Regarding sources, retail banks can leverage on the alternative sources associated with the alternative data, but they mostly utilise data collected first-hand from customer. The various regulatory frameworks to protect customers in the financial landscape (e.g. Anti-Money Laundering, AML; Know-your-customer, KYC[2]; Markets in Financial Instruments Directive, MIFID) require banks to collect data via digital or paper questionnaires, to check the data carefully and to store them in an appropriate way, generally digitally. Today, these data reveal relevant information on customers with consistent historical series, and are of the highest possible quality. Concerns have, however, emerged about the "life" of these data. Lau et al. (2004) argue that when banks collect data, their ability to build profiles and engage in cross-selling increases, but the windows of opportunity for selling during which these profiles are valid are becoming shorter. The companies' ability to update data frequently will thus become an element of competition. Broader data protection regulations, such as the European General Data Protection Regulation (GDPR), sets new challenges for processing sensitive data, (Schulz et al. 2021) in order to offer more personalised services that fit the customers' specific needs

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[2] Know Your Customer. "The scope of KYC includes core identity attributes required to prove a person's identity. It also includes other information collected either for anti-money laundering purposes, other financial crime purposes or suitability purposes" (European Commission, 2019, p.16).

(European Commission 2020). Broader data protection also implies multiple and simultaneous access to data, with employee roles and responsibilities still evolving (Serrado et al. 2020).

Data value

In customer-oriented organisations, data act as a business catalyst for the different functions, leading to a coherent organisation and technological/organisational architecture (Kates and Galbraith 2007; Hemel and Rademakers 2016). Technological development enables the building of new strategies focused on creating customer value (Adapa et al. 2020; Carranza et al. 2021), and gaining a better understanding of customer needs, competitive advantage (DalleMule and Davenport 2017) and decision-making processes of a high-standard (Power et al. 2019; Erevelles et al. 2016). Regarding objectives, a data strategy serves different purposes. It is typically associated with the need to expand an organisation's customer base, design tailored products, micro-target sales, choose the right channels for the right products, increase the effectiveness of cross- and up-selling products and services, improve the customer experience in several ways and prioritise relationships with high value customers (Barbu et al. 2021; Chan 2005; Hassan and Tabasum 2018).

Technological architecture

For technological architectures to be sufficiently solid to exploit value from data and set sail towards data strategy, their design has to enable business initiatives (Stulz 2019; Weill et al. 2002). The integration of different datasets can take several forms, from totally redesigning how data is stored and managed (Loshin and Reifer 2013) to fewer comprehensive approaches, such as creating data layers that act as a communication channel across the "silos" (Nauck et al. 2008). The idea is to overcome the traditional departmental internal management of own data warehouses, employees and spreadsheets (Davenport 2006), where the customer relationship management (CRM) unit orchestrates the flows of data and information, somehow limiting knowledge and real-time access to data.

The data strategy problem originates from the silos-type architecture typical of traditional banks (Baxter 2018). Lau et al. (2004) describe organisational silos as the main element undermining the effectiveness of the banks' customer-centric cross-selling model, noting that they are predominantly structured around products. They point out that even the few forward-looking organisations build "customer departments" and only put them in charge of allocating a fixed amount of capital across several loyalty or marketing arenas.

Methodology

Considering the research questions, the possibility of having control over behavioural events, and the focus on contemporary circumstances, we selected exploratory multiple case studies, an empirical research method generally used to investigate

"contemporary phenomena in-depth and in their real-world contexts" (Yin 2018), as the methodology of this research.

We created a case study database, using retail banking actors as the unit of analysis. We started from the literature review and gathered information from interviews, online material, slides, annual and company reports, as well as from mobile and online banking applications, in order to triangulate the data.

We included both traditional banks and FinTechs in order to accommodate of their varying levels of innovation in business models and technology. Traditional banks reacted to competition by, in turn, adopting digital technologies (Stulz 2019) and establishing their own FinTechs (Citigroup 2019; Romanova and Kudinska 2016).It was possible to identify four mutually exclusive and exhaustive clusters of retail banks: (i) traditional banks without a digital subsidiary, mainly operating through physical channels, such as retail branches, and generally perceived as old-fashioned (Traditional Bank); (ii) traditional banks adapting to trends in innovation which have established their FinTech (Traditional Bank (FinTech)); (iii) recently established FinTechs that are backed by or have strong ties with a traditional bank (FinTech (traditional bank)); (iv) independent banks, operating only through digital channels and not backed by or have ties to a traditional bank (FinTech).

We considered the retail banking actors operating in Italy. We chose Italy for our setting for two reasons. First, Italian banks still have strong connections with their customers, and they play a central role within informal physical ties. Monte dei Paschi di Siena is the oldest bank in the world that is still operating (Broby 2021) and Italy has more retail bank branches, on average, than any other country in Western Europe, about one branch for every 2500 people versus one for every 3100 in the EU28 or one for every 7000 in Sweden (European Central Bank 2021; European Commission 2021c). This strong preference for physical channels is connected to the fact that only 46% of the population uses online banking vs 64% in the EU28, 78% in the UK and 94% in the Netherlands and Finland (European Commission 2021b). Second, Italian bank profitability was affected by the disposal of non-performing loans (NPLs) in Europe (Bolognesi et al. 2020), resulting in a lower ROE than in other countries, on average (4.7% vs. 5.4% in EU28 and 10.6% in Sweden, European Central Bank (2021)), while retail banking actors' recovery plans focus largely on customer centricity.

We started from the complete list of all banks in Italy (European Central Bank 2020) and screened their websites and promotional material for repeated commitment and documented initiatives displaying a sincere interest in shifting towards a customer-centric approach, finding 19 such banks. Table 1 gives the descriptive information for our final set of banks, including type of bank, the bank's retail services and its service delivery channels. We also included the banks' investment in technology, as prior literature indicated that such investment has an impact on the banks' performance (Asadi et al. 2017; Beccalli 2007; Campbell and Frei 2010; Carbó-Valverde et al. 2020a, b; Hauswald and Marquez 2006; Pérez-Martín et al. 2018; Zhu et al. 2002), and shows the banks' commitment to their data strategy.

In each bank, we identified the most suitable informants, these being the people with customer-oriented functions requiring them to have some knowledge of data strategy, given the nature of our research. We screened these people through their LinkedIn

Table 1 Case study sample. The column "Cluster" refers to

Case	Cluster	Bank type	Retail services	Tech expenses (on revenue)	Bank channels	Interviewee role	Interview time
A	Traditional Bank	Large bank (offering all banking services, e.g. commercial banking, asset management, investment banking)	Bank accounts, payment services (debit and credit cards), investments, saving accounts, loans, mortgages	€100 m +(5%)	Branches and digital (internet and mobile banking), stressing importance of multichannel services	Head of CRM & Campaign Management	1 h
B	Traditional Bank (FinTech)	Large bank (offering all banking services, e.g. commercial banking, asset management, investment banking)	Bank accounts, payment services (debit and credit cards), investments, saving accounts, loans, mortgages	€10 m +(0.5%)	Branches (account for 90% of revenue) and digital (online/mobile), plus a digital bank subsidiary	Customer Journey and CRM Service Manager	1 h
C	Traditional Bank (FinTech)	Large bank (offering all banking services, e.g. commercial banking, asset management, investment banking)	Bank accounts, payment services (debit and credit cards), investments, saving accounts, loans, mortgages	€750 m +(4%)	Branches and digital (internet and mobile banking), plus a digital bank subsidiary	Head of Internet & Mobile Banking	1 h
D	Traditional Bank (FinTech)	Large bank (offering all banking services, e.g. commercial banking, asset management, investment banking)	Bank accounts, payment services (debit or credit card), investments, saving accounts, loans, mortgages	€1bn +(6%)	Branches and digital (internet and mobile banking), plus a digital bank subsidiary	Marketing VP, Business Intelligence & CRM Strategy	1 h 30 min
E	FinTech (traditional bank)	Medium-sized, innovative, direct bank (subsidiary of a larger group)	Bank accounts, payment services (debit and credit cards), investments, saving accounts, loans, mortgages, account aggregation	€5 m +(8%)	Exclusively digital (online/mobile banking) with a network of remote relationship managers	Head of Strategic Planning & Projects (ex CRM)	1 h
F	FinTech (traditional bank)	Small, innovative, direct bank (subsidiary of a larger group)	Bank accounts, payment services (debit and credit cards), insurance	n/a	Exclusively mobile app (no online banking or physical branches)	Head of CRM	1 h 15 min
G1	FinTech	Medium-sized, innovative, neobank	Bank accounts, payment services (debit and credit card), saving accounts, expense analysis and projects, account aggregation	€20 m +(8%)	Exclusively digital (online/mobile banking)	Customer Engagement Manager	1 h
G2*						Digital Strategy & UX design expert	1 h

(1) Traditional banks without a digital subsidiary, which operate mainly through physical channels, such as retail branches, and are generally perceived as old-fashioned (Traditional Bank)

(2) Traditional banks which are adapting to trends in innovation and have established their FinTech (Traditional Bank (FinTech))

(3) Recently established FinTechs, which are backed by or have strong ties with a traditional bank (FinTech (traditional bank))

(4) Independent banks, which operate only through digital channels and are not backed by or have ties to a traditional bank (FinTech)

Tech expenses as per data reported in the banks' 2021 Annual Reports under "ICT expenses"

* Two interviews, with two different professionals
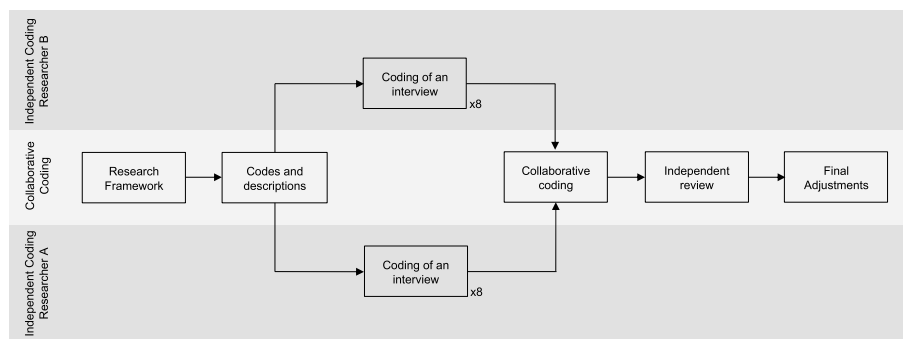
Fig. 2 Representation of the data analysis process

profiles, searching for relevant customer-centric projects or statements about their knowledge of the subject. We initially identified 50 people, and used a prioritisation process to whittle them down to 19 (one per bank). After directly contacting them to see whether they would take part in our study, our final list consisted in seven cases.

Consistently with our case study protocol, we prepared a script before each scheduled interview, containing information tightly related to the literature review for the sole use of the researchers, which focused on customer centricity and data strategy. A semi-structured approach was followed for the interviews, which we recorded with permission in order to organise and classify the material, prepare and code the transcripts. Considering the purposes of our investigation, we opted for a thematic analysis to focus on the wider picture. In the definition given by Braun and Clarke (2012), thematic analysis is a method for systematically identifying, organising and offering insight into patterns of meaning (themes) across a dataset, in order to pinpoint the common elements in the way a topic is talked or written about, and to make sense of those commonalities.

We adopted a directed coding approach (Hsieh and Shannon 2005), in line with our framework. As shown in Fig. 2, the data analysis process started from a careful review of the literature which led to shaping our framework and validating the initial set of deductive codes.

The coding tree follows a two-tiered hierarchical structure consisting of first-level codes and second-level overarching dimensions, as suggested by Gioia et al. (2013). Two overarching dimensions were identified in the deductive tree generated in the first stage of the data analysis process, associated with customer value and data strategy (see Research Framework in Fig. 1). Following the findings from the literature review, we identified six first-level codes (Fig. 1), each associated with a descriptor (to guide the researchers in how they used the codes) and a set of literature references (to ensure the robustness of the tree).

Subsequently, two researchers coded the material individually, and conducted a joint coding session to align the coding structures they had developed and to reach agreement concerning the chunks of text assigned to each code. Lastly, both the coding structure and coded transcripts were passed to an independent reviewer (the third researcher) to make unbiased adjustments.

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Results and Discussion[3]

Based on the framework illustrated, in this section, we discuss the main results of our research, which also emphasises the dichotomy between FinTechs and traditional players. The results are organised into two subsections (Customer value and Data strategy), where the cases are presented and discussed from several angles, covering all the dimensions of the framework. The references to emblematic single cases are included as an explanation to help in the discussion. The three approaches to Open Finance that emerged from the study are highlighted in "Three different approaches to open finance" section, while the main findings are summarised in "Main contributions" section.

Customer value

The relevance of customer value first emerged "when banks realised that the weight of the customer's emotions and the value that the customer finds in a brand were becoming increasingly important. From that moment on, they really started to shift their focus to placing the customer at the centre" (Bank A).

What first attracted our attention was how banks refer to their customers. There was no clear distinction between FinTechs and traditional banks. FinTech G refers to a customer as a "human" or "person", someone with certain types of behaviour, preferences, habits and needs that go beyond mere demographic segmentation, while Bank D "still calls their customers 'counterparts'. I do so myself, I call them counterparts, we use counterpart in our slides. What I mean, it's really nasty, how can we even think of putting customers at the centre and then call them counterparts?" (Bank D). Bank A and FinTech F, with their data-driven approach to their customers, hid the fact that they consider customers primarily as data, and do not properly take into account the individual traits that cannot be represented exclusively by data. "At the end, in a bank like Bank A, which has a large bank mentality in general (and even more so with what we are going through), a client is in some way a piece of data, a number" (Bank A). "From a numerical point of view, a customer is a data vector. It's bad to say so, but that's how it is; a vector (a client) is the set of n variables collected for a single customer identifier" (FinTech F).

The crucial point is that banks interpreted the growing importance of customers in their different ways. The topic was "a central theme in banks that are alert to innovation, and ready for and responsive to shifts in the market. The smaller the bank, the more this is true. While I am not saying that a large traditional bank like Bank D is not innovative, is not ready, but it's a giant, it obviously has other priorities and it's also difficult to compare it to what happens outside in the market. It's the same for […] traditional banks, with a physical network" (FinTech E).

Culture

The FinTechs (Cases E, F and G) presented a startup-type approach with their focus on customer needs (Alt et al. 2018; Gomber et al. 2018). They have few cultural barriers to innovation, in part due to being newly established, and organisations are overall geared towards customer orientation. The banks' value proposition and vision are

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[3] To help read the results, we have used "Bank" for Cases A, B, C and D and "FinTech" for Cases E, F, G.

both centred on the customer, an arrangement aided by the banks' organisational simplicity (fewer employees and customers than in traditional banks). In FinTechs E and G, the senior managers' commitment to customer orientation is highly significant, while it is overlooked in FinTech F. In traditional banks, the senior managers' commitment to customer orientation starts from the banks' industrial plans, Board decisions and the chief executive officer's (CEO's) speeches, "You will also hear our CEO, who wears many hats, talking about this leg of our business plan" (Case D), although "what makes the difference in the end is real behaviour, the choices you make to achieve these goals. We are still old world, we work in the traditional way, and if you look at who has the power to make decisions in banks today… Bank C was lucky, but it made a choice, its Board took the wise decision to start creating a dedicated team with everyone in it together" (Bank C).

In FinTech E, the customer's importance is emphasised by redesigning work methods along horizontal organisational lines, running cross-functional projects, creating routine procedures to measure the impact of each decision on end customers and aligning performance evaluation to customer-oriented metrics. Traditional banks face more cultural barriers because of their legacy (Sullivan et al. 2014). The interviewees in Banks (Banks A, B, C and D) all underlined that the shift towards customer orientation is heavily hindered by the employees' mindset. "Obviously there are stops when a section of your colleagues has historically come from that banking mould and are used to that setup with its different way of doing things, its different relationships, and they may still believe in it, and have not taken to heart this new way of relating with customers" (Bank A). The interviews confirmed that the shift in mentality is a slow process and traces of product-oriented methods remain. On the contrary, the employment policies in these FinTechs indicate that their employees come from particularly varied backgrounds, and include internal designers, as in FinTech G. This policy proved to be an enabler: "Let's say that 40% of our employees come from other spheres, from Netflix rather than from other banks, as we believe that this could be value added and an enabling factor of innovation and customer orientation" (Bank E). The size and features of their staff enabled banks to adopt an end-to-end vision. "We are not a great big bank, with lots of people, […] people who only do one little part […]. It is also a good thing though […] as we can all see the bigger picture […] I know my digital products inside out" (FinTech G).

However, reluctance on the part of traditional banks to change their work habits and adapt to customer orientation practices is not fully consistent with our findings, as only Bank B showed few concerns, while the other Banks (A, C and D) described their many initiatives to drive the customer-oriented shift and lower cultural barriers. These banks invested in overcoming their heritage. They upgraded their technology and embraced digitalisation (implementing advanced CRM projects, renewing their data infrastructure, offering new digital services and welcoming multi-channel approaches) and streamlined their processes (re-engineering of procedures, cross-functional integration, multi-skill development). They addressed cultural blocks directly (introducing internal managers and coaches to support the shift in mindset, and recruiting new people to assess customer-oriented aspects). It emerged that "in everything you do, in whatever you set yourself to do in any company, you must

always think of what impacts and benefits there are for your customers in what you want to put forward, in selling your services, and everything else" (Bank A). Unexpectedly, considering the obstacles described by Lähteenmäki and Nätti ([2013]), the same holds true for the traditional players, except for Bank B, where the whole organisation showed itself capable of understanding the impact on clients of decisions caused by departmental isolation.

The FinTechs attempted to go well beyond these services, turning to the world of design to streamline the user experience in mobile and online banking applications. FinTechs E and G offer conversional banking, where their customers can type questions into a search bar similar to Google's. By offering this service, these digital banks are trying to provide customer assistance throughout their entire experience, by being always on tap. FinTech F has based its services entirely on conversational banking, complete with an "assistant". Customers can access this one-to-one chat service for any need or request (from asking banking-related questions to booking holidays and restaurants), while the FinTechs gather large amounts of data relating to the customers' passions, preferences and habits.

Organisation

The FinTechs stressed that being smaller than traditional banks gave them an advantage in terms of organisational flexibility. They can adapt rapidly to new customer requirements with a low time-to-market. Compared to traditional banks, it is easier to organise smaller groups of people and steer them towards a new goal. FinTechs F and G currently show a high level of flexibility, while FinTech E is facing the challenge to scale up and structure itself more like traditional banks, with departments for macro-areas/products and transversal teams for customer-oriented practices.

FinTech G, an independent digital bank, stands out for its approach of combining the product and marketing functions in its organisational structure to manage its promotional campaigns, so the people creating a product are the same as those designing the marketing campaign, as they have a comprehensive overview of the needs that could be addressed by the product and market it accordingly.

This arrangement did not apply to traditional banks, as they had distinct units for these functions. Traditional banks have always been and still are organised into vertical units, each related to a specific product, producing organisational barriers to customer orientation. The obstacles that emerged clearly were the many isolated departments, the significant number of people to be managed and the slowness of procedures burdened by regulations. "Look at all the layers in a traditional bank. I get an idea, I tell it to my line manager who tells it to his line manager and then it becomes like that little game, Chinese whispers. When it reaches the big boss, the person who has to give the go-ahead, it has become something else" (FinTech F). Today, the banks A, C and D have re-organised their structures and processes, integrating functions (cross-functional integration), bringing in multi-skilled employees and job rotations or bringing up internal communication enablers. Bank A has focused on connecting its distinct functions transversally via CRM as the intermediary, meaning that the bank can avoid restructuring its organisational structure entirely (which somehow reflects an internal barrier). Conversely, Bank D has completely reshaped its detached departments by removing the

boundaries and only running cross-projects. Bank C set up a laboratory where people from separate departments work together, and it asked the more data-related units (i.e. CRM) to transmit knowledge throughout the bank. "We have created a permanent laboratory where salespeople, IT people and support people for legal, compliance, risk, etc. matters, have all been put together" (Bank C).

The strategy that banks use to promote themselves and connect with their customers is core to customer value. Historically, banks channelled their services through their physical branches. For instance, even today, the vast majority of Bank B's products can only be sold in the bank's branch. Under this configuration, banks had management teams, staff units and back offices in their headquarters, with branches to look after the humans, as "the true soul of the bank are the […] thousands of colleagues in the network who develop, do the business, and are the customer's front end" (Bank A). Colleagues in the branches are also involved "to understand if there are particular circumstances behind certain areas of interest" (Bank B). This structure and these processes, however, hindered the implementation of co-design approaches with customers. A bank branch can capture the voice of local customers, but its actual knowledge of customers is limited. "Because a customer who goes to their local branch and is not happy with how they handled a particular transaction may complain to the branch manager, but it's all just "words", it goes no further" (FinTech E).

More recently, traditional banks have also started to introduce digital services, taking up the omnichannel logic, offering products and services through many online and offline touchpoints, which implies going through digital transformation to align themselves to market needs and technological advancements. Traditional banks stressed the need to be consistent, independently of the interaction touchpoint chosen by the customer. In-branch offline processes are easier to execute, as the customer is assisted by a human throughout the procedure. However, when bank branches are spread around the country, it is extremely hard to establish a common vision across the organisation, especially when the branch is in another country. It is difficult to combine qualitative data generated through physical interaction with customers and use them centrally. Banks are, therefore, reshaping the customer experience in branches to give it a "like at home" format, using today's technology to provide timely data to guide the customer. The proliferation of channels is challenging traditional players to create an integrated and common approach for their end customers. "It's inconceivable to offer our customers all possible channels, because the cost would become prohibitive. […] So, while in theory, customers are free to use all channels, in reality, the bank must be able to identify the customer's primary channel and be sure that the channel can create enough of a margin to cover costs and create positive value" (Bank C). "If you know this customer never visits the branch, has never gone there in three years, but has always called customer services or sent an email, then you send them an email or you get customer services to call them" (Bank A).

Although FinTechs started out as digital banks, some decided to include a human presence (Rahi et al. 2021; Akther and Rahman 2021) in segments and value-added services where there was customer demand. A virtual relationship manager can be a way to retain or establish the important relationship of trust (customer trust), while keeping costs down. In FinTech E, despite having no branches, human advisors advise customers

at a distance on asset and wealth management. Given their role in guiding relationships with customers, they can receive sensitive information and create empathy, although the bank's headquarters found that this customer orientation approach reduced its effectiveness, as the advisors were the ultimate beneficiaries.

Customising the way banks interact with their customers is a step towards customer orientation (Prahalad and Ramaswamy 2004). To improve their interaction with customers, FinTechs initiated design thinking, which helps banks to embrace customer orientation by leveraging on data (Knight et al. 2020). "For all the products and services that must be created and launched, they do nothing but listen both to the internal customer, meaning the customer already in the bank, and above all to the non-customer, that is, the prospect" (FinTech E). We found that a specific feature of FinTechs, particularly FinTechs E and F, is to have a design team that operates transversely across the organisation, involving customers directly in their co-creation processes and/or giving them review systems, showing that they deploy advanced feedback collection mechanisms and design approaches (i.e. the use of personas, customer journeys and experience maps). FinTech G, with its team of 20 designers, is capable of instilling a customer orientation mindset throughout all its work methods. "We ran several focus groups even before we started designing and there were people in these focus groups who don't work at the bank, and we all discussed together, and we understood that we had to help customers build up their piggy banks" (FinTech G). "If I need to release a set of features in three days, I can't test them with users, so instead I arrange a whirlwind test session, where I ask colleagues who have not worked on the project what they think. So I go to another building, I grab three random colleagues and say: What do you think of this? What helps you understand and what don't you understand? And this is already the first testing stage" (FinTech G). The same bank representative reported that traditional banks usually outsource design, but the solutions are often quick and dirty and are unable to address the customers' problems or needs thoroughly and continuously, and so fall short of improving their experience incrementally. Account aggregation (offered by FinTechs E and G and by Bank B through its subsidiary) is another way of interacting with customers, by responding to customer needs in the area of Open Finance to simplify processes and reduce the customer's effort.

Iterating the design cycles in traditional banks was difficult because of the inflexibility of internal processes, and the need to gather feedback for co-creation or closed loop purposes in product development is often overlooked. "Listening to customers translates into surveys, all the famous surveys we send our customers. We basically use top-down and bottom-up surveys. The top-down ones involve listening to customers, and are therefore basically sample analyses, and we use them for pre-established targets. Bottom-up surveys are triggered by an event; for example, the customer goes to the branch and opens a current account, and within 24 h will receive a welcome email with a link to a questionnaire so we can gage their experience" (Bank B). Additionally, "we take complaints seriously, and complaints are typically spontaneous" (Bank B). Central office handles direct marketing, "mail, text messages, apps, home banking, ATMs, everything that makes customers happy straight away without having to go through that famous human channel" (Bank A).

Most of the cases analysed, as a consequence, turned their attention to marketing and marketing campaign management, which accounts for a substantial portion of the interactions between bank and customers. In the past, the banks used to run mass advertising campaigns, targeting all customers indistinctly or waiting until a customer explicitly asked for assistance. Banks now refrain from deploying this "spray and pray" approach, and have introduced segmentation techniques that can divide customers into clusters, enabling targeted marketing based on everyone's potential needs.

Regarding group structure, we analysed the advantages and disadvantages of having both a traditional bank and a FinTech in the same group. On the one hand, the FinTech acts as an innovation centre, as a test bench for new products and services or for testing the impact of new proposals in an environment that is highly responsive to change and is more flexible. On the other hand, the FinTech can also operate as an acquisition arm for new customers, leveraging on open banking. Many interviewees noted that this sort of relationship is important in large historical banks, since they can (and already do) import best practice from smaller digital banks, and can also spill over into generating a cultural shift. "People talk about their positive experiences within the group, and sometimes the group replicates, and that leads to other projects. Maybe they are more embryonic, more niche slower in getting off the ground for whatever reason, so you keep them in your drawer until the moment is right" (FinTech F).

Configuration elements, such as the organisational structure in these innovative players, stimulate the parent banks to move away from enrooted practices. Conversely, having a digital bank means introducing higher complexity to management, requiring large investments and with a doubtful impact on the brand image, hindering the traditional bank's performance. A direct bank with a parent institution will need to invest much less in developing all its back-end systems, as these are shared with its traditional parent (albeit the direct bank will also be taking on a legacy). The direct bank will also improve its ability to offer more complex products, which are backed up by stable financial institutions that can hedge some risks (the parent bank is similar to a "safety net"), help to fund new initiatives or cover potential mistakes. It is also important to mention the benefits of knowledge spillover, marketing improvements caused by connections with an established bank, its physical branches and even its digital-branch data integration. Digital banks can match their customer insights with insights from the parent banks' branch network. "Our FinTech clearly has some holes in its coverage, what I mean is that they know it and keep on trying to understand why, and talk about it with their colleagues in the brick-and-mortar branch, to see how to tackle and solve certain problems" (Bank D).

However, parent institutions can also introduce constraints. The digital bank could be bound to the siloed-architecture of the old bank, it could have imbued a level of inflexibility determined by the parent bank's intricate procedures, back-end systems may prove to be legacy technology, and there could be negative culture echoes from the well-established product-centric mindset of traditional banks. "Being part of the group, all the back-end part is within the group, so we were created as a proprietary front-end, all the back-end part belongs to our parent company" (FinTech E).

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Table 2 Details on sales-oriented and customer-oriented metrics (Performance Management)

	Traditional Bank	Traditional Bank (FinTech)			FinTech (traditional bank)		FinTech
	A	B	C	D	E	F	G
Sales-oriented metrics	Cross-selling, up-selling	Profitability, product sold	Cost-to-serve, expected margins	Cross-selling, up-selling	Cross-selling, up-selling, campaign redemption, conversion rate	Customer acquisition	Cross-selling, up-selling, marginality, redemption
Customer-oriented metrics	NPS	Customer satisfaction questionnaires	Customer satisfaction index	CLV, RACE	NPS, rating system (reviews)	Churn, RFM, satisfaction	NPS, churn, loyalty rate, satisfaction, CLV, digital maturity

FinTech G showed its independence by not having the constraint of a parent bank, but it also had no safety net, which meant that it had to resort to many partnerships in order to offer more complex products.

Performance management

The results (see Table 2) show the inclusion of both sales- and customer-oriented evaluation metrics to measure the impact of customer-oriented decisions.

FinTechs E and F are owned by traditional banks and some of their objectives are connected to the group's overall profitability (i.e. customer acquisition, FinTech F). Nevertheless, their usage of customer-oriented metrics is advanced and widespread, with about 700 KPIs in FinTech E, and these processes are backed by mechanisms to gather customer feedback. FinTech F's parent company adopted the churn rate developed by its FinTech, using the formula to evaluate the FinTech itself. FinTech G uses customer-oriented metrics intensively throughout the organisation (e.g. NPS), matching them with sales-oriented indicators to maintain business sustainability. Looking at financial metrics (i.e. measuring the financial impact of customer-oriented decisions), FinTech players are confident that customer orientation can lead to profitability.

Overall, performance management systems in traditional banks are guided by their focus on stability objectives that determine their systemic relevance, leaving little room to face residual risks, and on the centrality of profitability requirements, ahead of adopting a full customer-oriented model. In practice, profitability is a prerequisite for customer-centricity. The banks' performance management systems tended to exhibit high-level aggregated measures to evaluate customer satisfaction, measuring it for the entire retail bank business and thus not really putting customer-oriented approaches into operation at all levels. Currently, sales metrics still guide the objectives of the different functions. For instance, commercial units are evaluated on services sold, cross-selling and up-selling. Bank A, however, introduced NPS to measure loyalty by spotting promoters and detractors and defining how to manage these results, although it may not be enough to evaluate loyalty while overlooking many other aspects of the relationship between bank and customer (Fisher

Table 3 Details on type of data collected

| | Traditional Bank | Traditional Bank (FinTech) | | | FinTech (traditional bank) | | FinTech |
	A	B	C	D	E	F	G
Transactional	Demographics, assets, income, transactions, product usage, channel usage	Demographics, assets, income, transactions, product usage, channel usage	Demographics, assets, income, transactions, product usage, channel usage	Demographics, assets, income, transactions, product usage, channel usage	Demographics, income, transactions, product usage, channel usage	Demographics, income, transactions, product usage	Demographics, income, transactions, product usage, channel usage
Relational	Not disclosed	Not disclosed	Lifestyle, habits, preferences	Lifecycle stage, future spending objectives	Lifestyle, habits, preferences	Lifestyle, lifecycle stage, habits, preferences, future spending objectives, extra-financial needs	Lifestyle, lifecycle stage, habits, preferences, future spending objectives, extra-financial needs
Alternative	Website, e-mails, mortgage simulators	Website, in-app behaviour, third party data	Website, e-mails, other navigation data (cookies), third party data	E-mails, social networks, third party data	E-mails, account aggregation, mobile app, geolocation, other navigation data (cookies), third party data	E-mails, in-app behaviour, in-chat behaviour, other navigation data (cookies), third party data	Account aggregation, e-mails, website, in-app behaviour, in-chat behaviour, other navigation data (Google Analytics), third party data

and Kordupleski 2019). Bank D opted for CLV and Reach-Act-Convert-Engage (RACE) metrics, which indicate the bank's high commitment to adapt to customer orientation.

Data strategy

Data

"A bank is full of data" (Bank A). While the dataset of traditional banks today relies on larger volumes of data (because of the larger period of collection), FinTechs stand out for seeing the bigger picture.

Transactional data, i.e. demographics, income, number of transactions, product usage and channel data, are almost the same for any bank (see Table 3). The demographics and income data were retrieved from the banks' account services, while the transaction data were extrapolated from their payment services. Product usage data (i.e. number of products owned by a customer) are typically exploited for cross- and up-selling purposes. The banks also collect data on their service channels, and some gather data about channel usage. Not all the banks routinely gather information on asset ownership (i.e. non-financial assets such as real estate): this practice is followed in traditional banks, while Fintechs apparently do not collect this type of data. One interpretation is that, as FinTechs do not offer asset management services and mortgages, it is less likely that they need their customers' assets as collateral, or to have a complete overview of their customers' entire portfolio.

Significant patterns emerged in the relational data. Overall, the variables collected relate to lifestyle, habits and preferences, but the banks also gather data on their customers' lifecycle stage (e.g. how long their customers have been with them) and their future spending predictions and extra-financial needs. These datapoints are extremely relevant for building a more "human" profile of the customer, switching from the old-fashioned "target" approach to the more design-oriented "personas" model, and abandoning the traditional private-to-mass segmentation cluster approach. It is worth noting that, while Banks A and B do not collect relational data, FinTechs F and G have a large set of variables.

Regarding alternative data, the range of variables is broad, with a trend signalling a high level of alternative data within FinTechs. All the banks exploit data on website navigation, e-mail traffic and third-party data. FinTechs E, F and G also collect navigation data through cookies or Google Analytics, allowing them to track the navigation behaviour of customers outside their own digital domains. Banks integrate PSD2 transaction data through innovative interaction features, such as account aggregators, they map in-app and in-chat behaviour to improve the user experience in the features enabled by their mobile and online channels, and utilise geolocation and third-party data, including data from public authorities (e.g. Banks B and D). Additionally, FinTech G offers personal finance management services, helping customers to manage their savings while enabling the bank to gather extremely detailed information on their habits and future projects. These variables can provide valuable information for building more precise customer profiles, and can help in the customer orientation process (Hershey et al. 2007).

Regulation is confirmed to "give us a great opportunity, if used well, to collect a series of data, always within the regulatory framework, and can really help us improve how we profile our customers" (Bank C).

Data value

The findings from the case analysis highlight that FinTechs have a higher propensity for setting data-driven strategies than traditional banks. Their typically smaller size allows them to shift their strategy quickly according to what emerges from the data (as reported by interviewees in FinTechs). However, there is the question of whether such data is of real value.

All interviewees stated that cross-selling and up-selling by leveraging on data is at the core of the banking industry, in order to turn a client into a cash flow. Citing Bank C, it is not possible for a bank to survive solely on new bank accounts, as they are only entry-level products, similarly to "loss-leader" products in the retail industry. "Upselling and cross-selling, thence an increase in customer value. So, if the customer wasn't at the centre, it would be very hard to achieve these two concepts today" (FinTech F). Designing new tailored products, customising their pricing, offering them through the right channels and targeting their promotion are data-driven initiatives that stem from their cross- or up-selling potential. Relevant findings in the literature support the idea that these forms of data exploitation are compliant with customer orientation (Chan 2005; Hassan and Tabasum 2018; Loshin and Reifer 2013). Additionally, cross-selling and up-selling go hand-in-hand with the level of customisation enabled by the data. Most of the banks analysed emphasised that all these factors represent a competitive advantage in an industry aflush with almost standardised products and services that differ mainly in their pricing schemes. "Listening to the customer, in a world where the offer has flattened out [is] the only way to win the competition, playing everything on relationships, creates relationships" (Bank B).

Loyalty and retention emerged as well (Bank B and FinTechs E, F and G). "The important thing is that this personalisation is not used only to push the commercial side, but also for loyalty schemes and for loyalty to my brand" (FinTech G) as "trying to sell something is the worst way to heal a relationship" (Bank A). Bank D also mentioned that they continuously monitor their customer base by simulating future scenarios based on past data, in order to set their strategic goals.

Each case deemed it important to extrapolate the right data for anticipating customer needs. In order to implement these initiatives, it is fundamental for banks to have sufficient knowledge about their customers, their needs and future spending predictions, and it may help to have a wide range of relational and alternative data at their fingertips. The examples are consistent with proactively identifying their customers aspirations and dreams, or proposing targeted services that satisfy the customers' very specific needs (such as proposing discounted loans or advantageous joint accounts to recently married couples).

Hughes et al. (2014) and Kshetri (2014) note that customer-oriented firms should not only focus on anticipating their customers' needs and on cross-selling tailored products, but also on the timing of such proposals. Within the banking industry, the trade-off is between how often and how quickly a bank communicates with its customers and how
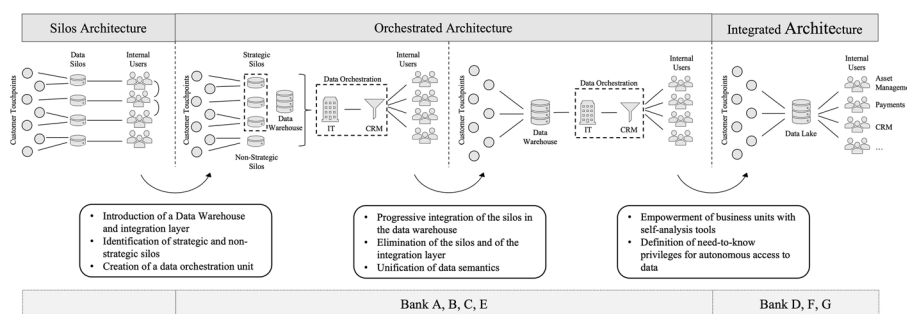
Fig. 3 Representation of the technological architecture configuration from a silo to an integrated architecture. Internal users are the different internal units that consume the data (e.g. lending, asset management, compliance and risk management). Banks A, B, C and FinTech E have an orchestrated architecture, while Bank D and FinTechs F and G have an integrated architecture

much of a nuisance it is willing to be. Banks C and D and the FinTechs reported that their data systems are updated in real time for customer actions, hinting at the possibility of sending their customers real-time offers and thus decreasing the time-to-market for cross-selling initiatives. However, these banks (especially Bank D and FinTechs F and G) also reported that they willingly hamper the time-to-market timing. The interviewees explained that time-related offers are now more likely to generate a sense of being controlled in their customers, rather than a feeling of satisfaction. "There are times when it's better not to do things in real time, but to be a little bit softer in how you implement things, because otherwise you're saying: I'm tracking you, I'm following you and I'm doing it to make money" (FinTech G). FinTech G set internal limits on the amount and frequency of push marketing communications targeted at customers, with the objective of surprising the customer positively. Counterintuitively, this procedure improved the bank's cross- and up-selling capacity, as well as its customers' level of satisfaction (although this was expected). Finally, it is worth mentioning that some banks in the more traditional clusters (Banks A and B) update their systems on a batch basis, and so cannot reach the customer in real-time.

Technological architecture

Three main configurations relating to technological architecture emerged from the cases. While the banks reported on silos, departmental isolation and, in general, fragmented decision making (Velayati 2020), our results show no persistence of traditional legacy systems, whereby customers interact with a business unit via touchpoints and each touchpoint is associated with a single database (silo) (Fig. 3—Silos architecture). These historical configurations caused customer profiles to become fragmented across several databases, hindering the efficiency of internal procedures and the effectiveness of decisions. According to the interviewees, sometimes the CRM unit had to cancel campaigns because the marketing people could not see credit history data, causing loan promotions to reach people with bad credit scores, proposing loans to people with money laundering issues, or investments to customers with low liquidity or investment potential.

The evidence we collected suggests that traditional banks are undergoing an integration process which is moving them from their legacy systems to newer and more integrated configurations. Today, banks A, B, C and FinTech E have data warehouses that serve the data integration purpose of aggregating the various data marts (silos, databases) that have been deemed strategic by the bank. Banks had to introduce an integration layer (Fig. 3—Orchestrated architecture, a) to deal with the fact that the data semantics are not unified, and also to integrate the data (from the non-strategic silos) left outside the data warehouse. Furthermore, they had to put in place a data orchestration unit. Coherently with the data semantics configuration in these banks, the CRM unit acts as a central hub managing both independent analyses and data-processing requests, where these requests are managed through the previously described multi-step authorisation process, and could involve the IT and compliance units.

As a next step, the elimination of the integration layer and underlying silos (Fig. 3—Orchestrated architecture, b). This stage was designed to remove all the disparities in functions, processes and channels. CRM still plays a central role in the data orchestration unit, as all the other units still need the orchestration unit to elaborate data, meaning that operational disparities continue to persist (Chan 2005).

Data lakes (Fig. 3—Integrated architecture) are sophisticated data management platforms that offer intelligence features and can be used to integrate unstructured data. An interesting point is that, although FinTech F exploits the data infrastructure of its parent company, this parent bank has invested substantially in digitisation, effectively eliminating possible technological barriers for its subsidiary.

In this configuration, which applies to Bank D, and FinTechs F and G, each of the bank's business units have independent access to the data, without any central controlling entity. This implied developing a need-to-know information policy, educating employees on tools for self-consuming data and teaching them to use both data processing and programming tools (Python, PySpark, Power BI and Microsoft Dynamics were cited). As a consequence, information travels quickly and freely within the bank, with people being given access to the information they need at the time they need it. The data architecture in FinTech E, along with those in Banks A, B and C, are still tied to the past silo configuration, requiring them to define data diffusion procedures that determine the level of information visibility throughout the organisation. The CRM unit still plays a central role here, as it is the only unit capable of accessing and processing the data. "Our channels are integrated in an omnichannel way, so they always talk to each other through the CRM unit" (Bank A). In order to retrieve information and take decisions, the business units in these banks must either wait for the CRM unit to publish periodic reports and dashboards (in Banks A and D) or submit a request for specific reports (the most common option), entailing a multi-step procedure and involving several actors. The request must first be submitted to the CRM unit, CRM then asks the compliance department for authorisation and, lastly, the IT department extracts the data and sends them to CRM to be processed and distributed.

Given the fast advancement in technology, we noticed a fluid approach to the configuration. FinTechs, having been generated more recently in a digital native environment, were able to overcome the more inflexible structure, while traditional banks had to invest and evolve. In both cases, the current configuration will result in new legacy,

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Table 4 Approaches to Open Finance

	Cautious (Organisation-driven) A, B	Considered (Customer-driven) C, D, E	Committed (Customer data-driven) F, G
Culture	Product-oriented	Customer-oriented	Co-design
Organisation	Branch and Digital	Branch, Digital and Humans	Digital
	Hierarchical structure, departmental isolation	Cross-functional integration, laboratories/innovation hub, technologically enabled flexibility	Flexibility, small and heterogeneous teams
Performance management	Mainly sales-oriented metrics	Sales- and customer-oriented metrics	Advanced customer- and sales-oriented metrics
Data	Large data collection over years, but limited in terms of type of data and semantics	Large data collection, advanced in terms of type of data and semantics	Limited data collection (due to being a young outfit), but advanced in terms of type of data, semantics and potential
	No data visibility and no self-consumption	Limited data visibility and initial self-consumption	High data visibility and diffused self-consumption
Data Value	Initial exploitation of data value	Advanced exploitation of data value	Proactive exploitation of data value
	Advanced tools, but limited current applications	Advanced tools, growing applications	Enabled advanced tools, not always applied at the moment
Technological architecture	Orchestrated architecture	Orchestrated architecture—advanced	Integrated architecture
Overall remarks	• Old memories of product-orientation • Organisation under evolution • Technology under evolution • Uncircumscribed role of the branch	• Customer orientation, everything else as enabler • 360° approach • Inclusivity at organisational level • Integration digital and human, channels coherence	• Not just customer oriented but customer allied • Data driven • Digital focused, human interaction coherence
Improvement direction	• Data collection, consumption and value	• Leverage on data quality to push forward the strategy	• Integration of advanced tech-tools e.g. AI
	• Channel (digital vs physical, multichannel)	• Channel (digital vs. physical, multichannel)	• Continuous innovation and investments

underlying the continuous need to invest in the area, not just in IT, but overall, as the bank's data strategy of the company. In Case Y,[4] "the silo wasn't there, but now it is […], as the structures we set up are now outdated. Data lakes didn't exist then. […] Think of a 10-year-old smartphone, it wouldn't be that good today. […] Rest assured that […] equipment and technological innovation in these banking hardware worlds is much faster than innovation in the world of smartphones" (Bank A).

Three different approaches to Open Finance

Three main approaches to Open Finance emerge (Table 4). The first is a "cautious" approach, showing progress in the traditional siloed product-oriented culture and technological architecture, but limitations in terms of kind of data collected and, above all,

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[4] Case Y concerns a FinTech related to a traditional bank (FinTech (traditional bank)), where an informant had worked previously.

the value extracted from those data (Banks A and B). The banks in this cluster will need to work more intensely on their data, on collecting the data, on the data's potential and on the value that can be extracted for the customer and for the bank. Some banks in this cluster do not offer digital channels. While banks in the other cluster offer the full set, it is left to the final customer to decide which to use. The banks must work on this indistinct approach to the multichannel experience to become truly customer-centric and have a proper data strategy. They need to understand whether the bank's physical branch can remain its predominant service model and what role and potential exists for the digital channel (e.g. Bank B).

The second approach "considered" places emphasis on data, data collection and data quality and value (Banks C and D and FinTech E). The banks in this cluster use light approaches, such as in Bank C, and other approaches where the banks are more proactive, including at the organisational level (laboratories, cross-projects). Their common trait is a concordance between the development of technological architecture and their actions for spreading culture internally, enabling the valorisation of data for the customer and the company, as well as data centrality. These players have the advantage of being able to use data of high quality and an extensive historical series to push forward their strategy, but must work to put it into effect.

The third approach relates to the cluster of "committed" banks (FinTechs F and G). It shows extreme consistency between the technological choices and corporate culture, giving them the foundations for strong further potential, in some cases postponing their push towards analytics and sophisticated analysis models to a time when more data are available. Their performance management also evolves transversally, evolving their approach towards an increasing emphasis on customer-oriented metrics. The challenge for these players is now related to their ability to innovate and invest continuously, and to leverage on the data to undertake further advanced analyses.

It also emerged that it is not enough for a bank to be a FinTech (FinTechs E, F and G) to gain a better position and exploit the market to its advantage. While some FinTechs apply both the more considered and committed approaches, some traditional banks use the considered approach more associated to a FinTech (e.g. Banks C and D to FinTech E). Similarly, while it emerged that the positioning of Banks A and B is not yet in line with market development, it is not enough to be traditional to be labelled as cautious, as shown by the aforementioned case of traditional banks that share the same approach as some FinTechs.

Main contributions

Adopting a value proposition centred on customers and value for customers is a must, but it is also rather complex for any firm (Weinstein 2020), especially in a sector that has been lagging for decades. While customer value has been studied extensively in previous literature, the role of technology as an enabler of customer value has received little attention so far. The financial industry was a suitable context for this investigation, having changed radically over the last few years through technological developments and shifts in consumer needs and perceptions (Chen et al. 2021; Ferm and Thaichon 2021; Pousttchi and Dehnert 2018; Xu et al. 2021), as well as being pushed towards the new frontiers of Open Finance by the European Commission (2020).

Overall, it emerges that customisation enabled by data gives a competitive advantage in an industry flooded with nearly standardised products and services, which differ mainly in terms of pricing schemes. Designing new tailored products, customising their pricing, offering them through the right channels via targeted communication are data-driven initiatives that stem from a cross- or up-selling potential, core to the retail banking industry for turning a client into a cash flow. Loyalty and retention emerged as well, enabled by the banks proactively identifying their customers' aspirations and dreams. Real-time systems open up the possibility of sending customers offers in real time, but generate within the same customers a sense that they are being controlled, rather than giving them a feeling of satisfaction.

Value for customers has become increasingly subtle and fine-tuned, enabled by data and segmentation forms that overcome static dichotomies about demographics, income, transactions, product usage and channel data (transactional data). This wider scope extends towards relational data (lifestyle, habits, preferences, future spending objectives) and alternative data (PSD2 transactions, website navigation, e-mails, in-apps, in-chats, geolocation and third-party data), with a trend signalling a high level of alternative data within FinTechs. The information required by the Authorities presented a great opportunity to collect information that can improve the customer's profile significantly. Interestingly, the words used by our informants to refer to customers, and which are used in their own documentation, were varied, ranging from "counterpart", "number" and "vector" to "human", which already denotes the culture of the company. Omnichannel logics have introduced online and offline touchpoints with customers, with the added complexity of being consistent with the customer whatever the interaction interface, as well as anticipating channel management, in order to steer each customer towards the most correct channel.

Additionally, we found that a completely siloed architecture with customer profiles fragmented across several databases is no longer the dominant model in the industry. The evidence suggests that all banks, including the more traditional ones, are undergoing a process of integration which is moving them away from their legacy systems to data warehouses that serve a data integration purpose by aggregating multiple strategic silos. While FinTechs opted to eliminate the integration layer and its underlying silos, enabling them to combine unstructured data, the integration layer is still a part of the set up in traditional banks. While, in most cases, the CRM unit plays a central role in the data orchestration of data flows, we found cases where there was no central entity and the banks organised their access to data independently. Banks were thus developing a need-to-know policy for information, educating their employees on how to use tools to self-consume the data and giving them the skills and know-how for data processing as well as providing programming tools.

This study contributes to the literature on information asymmetry in banking, which currently is mainly concerned with financial inclusion and intermediation (Grassi et al. 2022; Baek et al. 2020; Demir et al. 2020; Feyen et al. 2021; Mhlanga 2020) or with the potential signals for success (Farag and Johan 2021; in ICO, Chen 2019, Chen and Chen 2020, Šapkauskienė and Višinskaitė 2020; in peer-to-peer funding and crowdfunding, Chava et al. 2021; Lin et al. 2013; Yeh and Chen 2020).

It emerged that the centricity of customer value and data strategy helps to reduce information asymmetry from the *external* and *internal* points of view, because of the increased amount and quality of information (Alford and Jones 1998) enabled through Open Finance. Customer orientation, effective processes and horizontal solutions where information can reach all the otherwise distinct teams smoothly and promptly (Moorman and Rust 1999) are ways to reduce this asymmetry, both internally and externally.

The concept of how information asymmetry is linked to Open Finance can be explored further through co-design experiences (culture), customer-oriented metrics (performance management), richer data collection (data) and the exploitation of data value (data value), all of which reduce *external* information asymmetry between customer and bank, injecting trust into the relationship, leading to greater inclusion and lowering the need for signals linked to trust (see, for example, in lending). Similarly, cross-functional integration and heterogeneous teams (organisation), data visibility and self-consumption (data), and integrated architecture (technological architecture) can all reduce *internal* asymmetry between the various bank departments, which arises because each will see a different set of information for the same customer. Internal asymmetry thus results in additional requests or less socially desirable outcomes for the cost and time to (re) acquire such information.

Conclusions

Data and technology, digital innovation and competition have opened the way for new business, ideas, innovation, where customers and their needs are placed at the centre of any decision and data can help to develop customer knowledge. In this study, we explored how a bank's data strategy for customer value is developed in the retail banking industry, paying particular attention to the heterogeneity of traditional banks and FinTechs.

What stands out is that the centricity of customer value and data strategy helps to reduce information asymmetry. While most literature on information asymmetry in banking relates to financial inclusion because access to credit signals success in the P2P, crowdfunding and ICO worlds, the outcome is a form of *external* information asymmetry between the customer and the bank, which makes the relationship less trusted, leading to inclusion issues or the need for signals. There is also an *internal* asymmetry between the various bank departments with different visibility on information for the same customer, resulting in additional requests or less socially desirable outcomes for the cost and time to (re)acquire such information. In an Open Finance framework, on the contrary, where the customers are given the proper value and there is the right data strategy, the spread of information opens new ways to create value.

Three main approaches to Open Finance emerged. The first approach involving the "cautious" banks shows progress in the traditional siloed product-oriented culture and in technological architecture, with limitations regarding of the kind of data collected and the value extracted from those data. A second "considered" approach (Table 4) places considerable emphasis on data, and the collection, quality and value of data. Within this cluster, there are two main approaches that vary within an organisation (laboratories, cross-projects). There is also a common concordance between the development of technological

architecture and the actions to spread a customer-oriented approach widely within the bank. The result is an enabling of the valorisation of data for both the customer and the bank, and data centrality, as well as the generation of high data quality and long historical data series. The third approach concerns the "committed" cluster, showing extreme consistency between technological choices and corporate culture, with foundations that enable further high potential, in some cases postponing the push towards analytics and sophisticated analysis models to times when more data are available.

What also emerged is that it is not enough to be a FinTech to be better positioned to exploit the market. Some traditional banks share the FinTech's approach towards Open Finance. Customer centrality is highly widespread in FinTechs, while it is more difficult to channel in the most traditional actors because of their legacy and their usual way of doing things, although every bank individually has undertaken strong development programmes, both culturally and from the perspective of technological and organisational renewal. Some traditional banks have experimented with their own FinTechs, to test the water or extrapolate best practice, but the downside is that traditional banks have sometimes replicated solutions in their FinTech that are no longer consistent with a customer-centric vision.

Limitations and future research

This work is not without limitations, thereby opening the way to several new research streams. First, it analyses how retail banks are tackling Open Finance, without so far exploring the customer perspective. It would be interesting to study how this paradigm is affecting customers, their satisfaction and their perception of the banks analysed through a separate work focusing on the client's perspective (i.e. through surveys). There are several possible research questions. For example, how much do retailers really know about digitally enabled financial services? How willing are they to share data that can lead to better products and services? What new services would they like to have? And also, what are the main drivers that guide them to choose between a traditional bank or a Fintech? Second, the context of the study is a European country, immersed in its historical development, with its banks and retail banking being key to its progress since the 1400s. The regulations in other countries and continents could open or close some of the potential paths that emerged in this work, or steer banks in other directions (e.g. not towards Open Finance). Other questions also arise. How do Open Finance approaches change as a consequence or with the help of regulations, financial or otherwise? Is any particular context or legal setting nurturing Fintech? It could be that the same approaches to Open Finance hold even in contexts where Open Finance has a different priority, or that they differ in some respects. Maybe additional approaches will come onto the scene, or we will simply have a time lag in countries where the "pressure" is not yet there. Moreover, emerging economies may start from a different point (e.g. no legacy IT architecture), resulting in a different perspective, a different framework and different approaches. Third, a bank's business strategy and focus may play a relevant part in determining the Open Finance approach taken by each, or, going the opposite way, a given Open Finance approach could engender a specific business strategy or focus. While this aspect was outside the objectives of our study, we clearly see the potential of research along these lines.

Nevertheless, the authors believe that the centricity of both data and customers will be the driver for the future of retail banking and of FinTechs.

"Amazon knows virtually nothing about its customers, much less than the bank" (Bank D).

"A bank is full of data" (Bank A).

Declarations

Competing interests
The authors declare that they have no competing interests.

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