The Fintech 2.0 Paper:
rebooting financial services

Santander InnoVentures | OLIVER WYMAN | anthemis group

Why a paper for Fintech 2.0?

This paper for Fintech 2.0 has been created by Santander InnoVentures, in collaboration with its partners Oliver Wyman and Anthemis Group.

The purpose of Santander InnoVentures is to help Santander deliver better services to our customers through innovation, and to support a new generation of fintech start-ups on their growth journey. We believe these goals are inextricably intertwined.

Oliver Wyman's Innovation Platform has been established to advise both its traditional client base and fast growth fintech firms on the transformational change that is currently underway in the financial services industry.

Many fintechs have succeeded but today they are still operating only at the edges of banking. To help engineer more fundamental improvements to the banking industry, they must now be invited inside, to contribute to reinventing our industry's core infrastructure and processes. That can succeed only as a collaborative endeavour, with banks and fintechs working together as partners.

This paper highlights the benefits of collaboration and identifies some of the opportunities for profitable change in realising Fintech 2.0. We hope the whole industry – both banks and fintechs – recognise the value of this approach and join us in this collaborative journey to Fintech 2.0.

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1. Fintech 2.0

Banks can boast of some important innovations. ATMs, credit cards, securitisation, swaps and mobile banking are now taken for granted, but each was ground-breaking when first launched.

Over the last decade, however, a new source of innovation in financial services has emerged from financial technology start-ups ("fintechs") and technology companies ("techos"). These new firms have been quicker than banks to take advantage of advances in digital technology, developing banking products that are more user-friendly, cost less to deliver and are optimised for digital channels.

This relative success is unsurprising. These new players are less burdened by the demands of regulatory compliance which banks are subject to. They are unencumbered by complex and costly to maintain legacy systems. They can focus on creating single-purpose solutions, designed to offer an improved experience within just one product or service. They are more in tune with the peer-to-peer (P2P) culture engendered by the explosion of social media. And they are smaller organisations, designed for the purpose of innovation.

Capital has flowed into the fintech sector: $23.5 billion[1] of venture capital investment in 2013/14. Of this investment, 27% has been in consumer lending, 23% in payments and 16% in business lending. Fintechs have two unique selling points: better use of data and frictionless customer experience. But to date these have been limited to relatively simple propositions such as e-wallets and P2P lending.

The impact of fintechs to date

After a slow start, fintechs are now capturing a growing market share in these areas. Yet their overall effect on the banking market has been minor. Banks have not crumbled in the face of this new competition. We characterise this first phase of fintech as Fintech 1.0.

Yet the conditions for significant change are present: policy shifts towards open data and APIs[2], the emergence of enhanced technologies such as cloud computing, changing customer dynamics and intense pressure to cut costs in banking.

We believe that by extending the use of data and frictionless processes Fintechs can and will expand well beyond the confines of payments and consumer credit. It will move deeper into middle and back office processes providing new, richer propositions for end customers.

Fintech 2.0 is just around the corner. It will deliver fundamental changes to the infrastructure and processes at the core of the financial services industry. In this report we consider some important banking innovations based on the "Internet of Things" (IoT), smart data, distributed ledgers and frictionless processes beyond payments and consumer credit.

Fintech 2.0 will cause a major disruption of the banking market, as digital technology has in other markets, such as travel and entertainment. Pre-digital business models and processes will be rendered obsolete, and billions of dollars of value will shift to "new model" suppliers.

Banks are aware of these changes and the opportunities they present. Many have decided they need to participate in this disruptive trend by actively supporting fintechs – the list includes Citi, Santander, UBS, BBVA, Barclays, NAB and Capital One, among others. They have launched incubation and acceleration initiatives, and created investment vehicles to harness, foster and scale up innovation.

While banks have disadvantages relative to start-ups, they also have advantages. Being regulated is a burden in many ways, but it creates consumer confidence. A long history brings legacy systems with it, but it also builds trusted brands (albeit tested by the global financial crisis) and provides rich historic data, not to mention a banking licence and a sizable head start in compliance initiatives. And, of course, banks understand banking; especially the risks involved, which new entrants often do not.

Collaboration is the key

The strengths and weaknesses of both banks and fintechs mean that both will often do better by cooperating rather than by competing. New digital businesses must either grow quickly or die. Banks can offer fintechs immediate scale and critical mass through access to demand.

While some fintechs are today focused on the race to build standalone "Unicorns" (a company with a $1 billion valuation), we believe Fintech 2.0 represents a far broader opportunity to re-engineer the infrastructure and processes of the global financial services industry, in which the top 300 banks command a revenue pool worth $3.8 trillion[3].

This is the central premise of this report: that, to realise the opportunity of Fintech 2.0, banks and fintechs will need to collaborate, each providing the other with what it now lacks, be that data, brand, distribution or technical and regulatory expertise.

Only by collaborating will the opportunity of Fintech 2.0 be realised.

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2. Applications for the Internet of Things

The "Internet of Things" (IoT) describes the widespread embedding of sensory and wireless technology within objects, giving them the ability to transmit data about themselves: their identity, condition and environment.
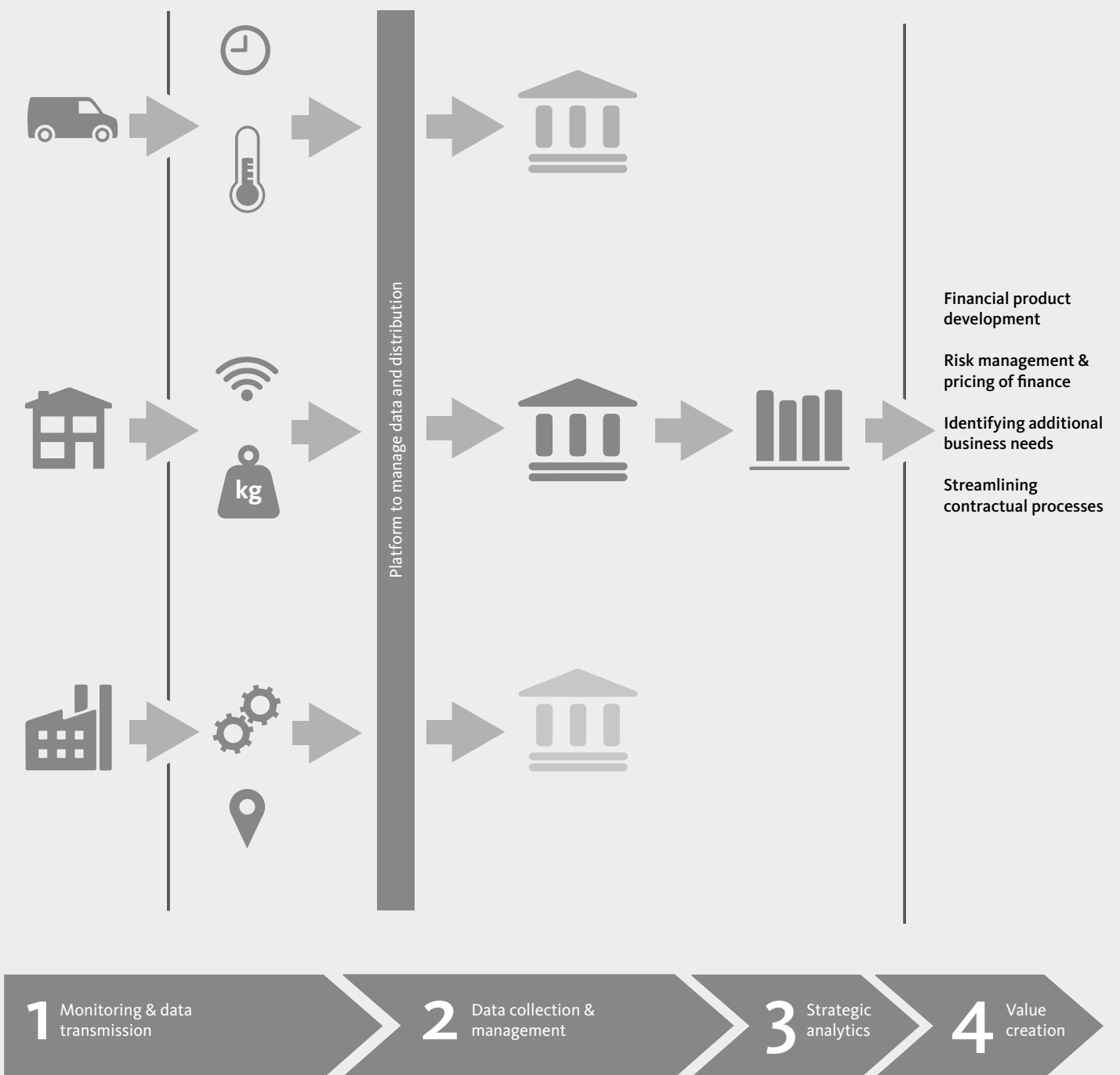
The number of objects able to record and transmit data to other objects is continually rising. 50 billion objects are expected to be linked to the internet by 2020.[4] This network of connected devices creates continuous streams of data which can increase efficiency across a wide range of business practices.

Many applications already exist: in transport, tracking when a bus will arrive; in pharmaceuticals, monitoring temperature-sensitive products; and in insurance, monitoring the driving style of car owners to preferentially price premiums for safer drivers. As the cost of sensors and data transmission continues to reduce, we are reaching a tipping point where commercial use of the IoT will take off.

In financial services, compelling uses have not yet emerged into the marketplace. But the IoT could have many valuable applications (see Figure 1), including:

- Product design: Asset financing, for example, could be based on parameters such as kilometres driven or load carried rather than simply the period of time for which the asset is leased, as with traditional models.

- Risk management and pricing: Collateral management is a key element of risk management. Better data on the quality and condition of collateral provides more accurate assessment and pricing of risk.

- Understanding customer needs: Tracking a business's activity could indicate when it may have additional growth financing needs, for example, by revealing when leased machinery is working at full capacity.

- Streamlining contractual processes: IoT devices will be able to capture data and feed it into digital platforms that govern and verify "smart contracts" (computer protocols that verify or enforce contracts). The collation of real-time data on these platforms can facilitate efficient covenant monitoring, automatic disbursement of assets and automatic release of liens or goods.

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4 Source: Cisco.

Platform to manage data and distribution

Financial product development

Risk management & pricing of finance

Identifying additional business needs

Streamlining contractual processes

1 Monitoring & data transmission

2 Data collection & management

3 Strategic analytics

4 Value creation

Figure 1: Application of the Internet of Things in Financial Services

2.1 Cutting costs in trade finance

Global trade finance is a complex process. A dizzying number of manual checks must be carried out to verify the legitimacy of a client, its trading partners and the goods that change hands. Most checks require the physical presence of a person, and the administrative work conducted by bank middle offices is overwhelmingly paper-based. The high cost of this process restricts access to trade finance for smaller businesses and especially those in developing economies whose credit-worthiness is difficult to establish (see Figure 2A).

We expect the IoT, combined with the distributed ledger and smart contracts, to dramatically reduce these costs. Specifically, we expect the IoT to streamline the trade finance process as follows:
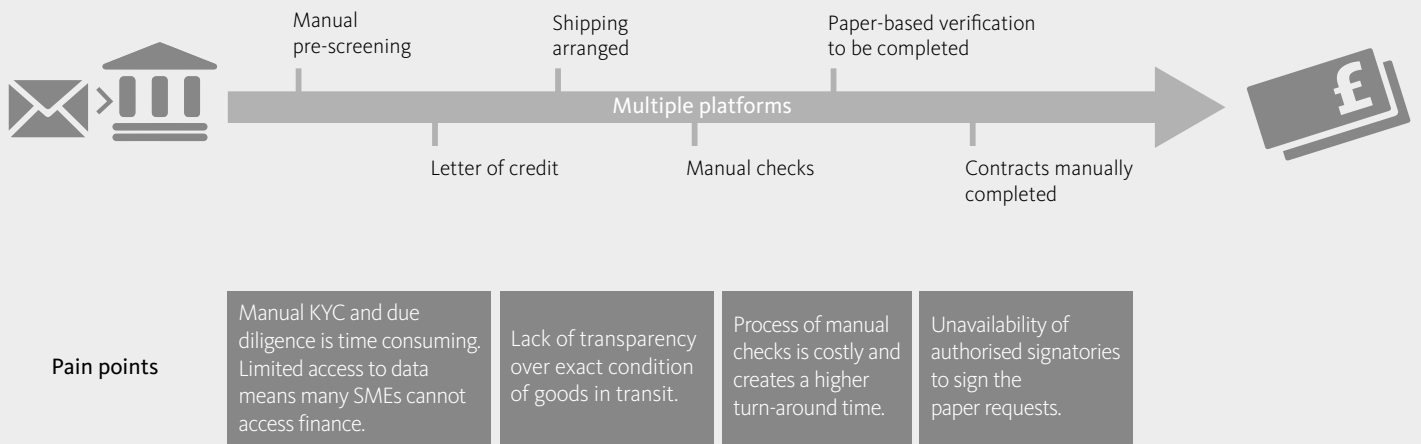
- IoT technology will provide banks with real-time access to trade data, eliminating the need for manual checks and paper documentation such as bills of lading. For example, GPS data would automatically alert the issuing bank once a shipment arrives at a port, and sensory technology would provide information on the condition of delivered objects. The IoT could give sellers and their banks access to real-time information they need regarding goods in transit.

- Access to real-time trade details would enable digitised smart contracts to be verified instantaneously, assuming pre-defined conditions are met. This would allow a letter of credit to be issued more efficiently than in today's trade finance process.

- By providing accurate, real-time data on trade flows, trade relationships and performance, the IoT can provide information required to underwrite trade finance. This transparency will make trade finance available to SMEs that would otherwise find it difficult to obtain credit approval. Storing this information on a platform will assist in due diligence of new customers. Such platforms will also help smaller suppliers of trade finance identify opportunities where they enjoy a competitive advantage, such as local knowledge or a better understanding of specific risks.
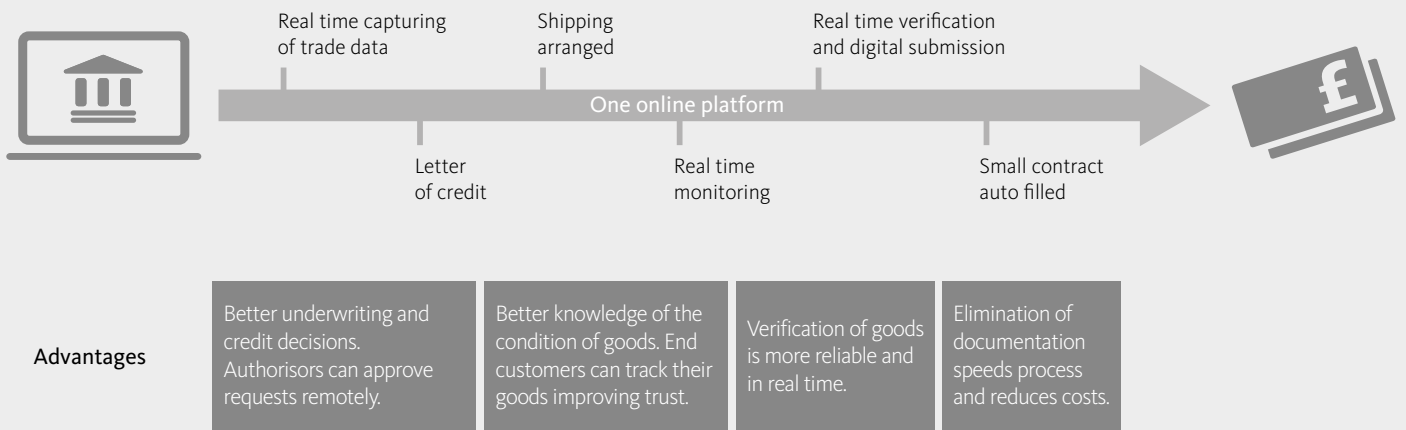
This is illustrated in Figure 2B.

International trade is expected to grow by 8% per annum until 2020, with associated trade finance revenues growing to $70 billion.[5] This represents a massive opportunity for both banks and fintech start-ups to partner and streamline trade finance processes in the ways described. In doing so, they will achieve more than cut operating costs. Improved data and analysis of exposures will also reduce losses and, by increasing the scope of potential clients, increase revenues.

A: Pre-IoT trade finance

	Manual pre-screening		Shipping arranged		Paper-based verification to be completed	
		Letter of credit		Manual checks		Contracts manually completed

Multiple platforms

Pain points

Manual KYC and due diligence is time consuming. Limited access to data means many SMEs cannot access finance.	Lack of transparency over exact condition of goods in transit.	Process of manual checks is costly and creates a higher turn-around time.	Unavailability of authorised signatories to sign the paper requests.

B: Post-IoT trade finance

	Real time capturing of trade data		Shipping arranged		Real time verification and digital submission	
		Letter of credit		Real time monitoring		Small contract auto filled

One online platform

Advantages

Better underwriting and credit decisions. Authorisors can approve requests remotely.	Better knowledge of the condition of goods. End customers can track their goods improving trust.	Verification of goods is more reliable and in real time.	Elimination of documentation speeds process and reduces costs.

▌ Figure 2: Diagram of pre- and post-IoT trade finance highlighting advantages of the IoT

2.2 Improving valuation accuracy of real assets in leasing and asset financing

Monitoring and valuing collateral leased or financed by banks is made inefficient by the cost of getting detailed information about the asset concerned.

IoT technologies can help banks overcome this problem, allowing them to monitor the condition, environment and location of collateral assets without needing to send someone to assess them. They can provide something close to the accuracy of an in-person assessment at a fraction of the cost. Such technology could be applied across a wide range of collateral as illustrated in Figure 3.

Inefficiencies in the global collateral management market are estimated to cost banks up to $4 billion annually.[6] Adopting IoT technology could significantly reduce this figure as real-time monitoring technology will improve valuation accuracy and render more assets eligible for collateral financing.

Asset	Data Capture	Application in financing
Fleet vehicle leasing	■ Hours in operation ■ Distance covered ■ Engine diagnostics ■ Driving behaviour ■ Weight of load ■ Terrain driven on	Flag when vehicles require maintenance and also allow financers to have a better understanding of a vehicle's present value
Real Estate (mortgage)	■ Environmental factors – pollution, temperature, flooding, general weather patterns ■ Water damage/ damp ■ Interior decay ■ Local economic trends, observable, for example, in local transport usage and shopping patterns	Provides information on the current condition of the house for valuation and insurance purposes
Commodities	■ Temperature and moisture level exposure ■ Weight ■ Vibrations ■ Exposure to chemicals ■ Location ■ Speed of travel	Monitoring the condition of commodities during transit allows financers to know if the condition of goods delivered meets contractual specifications
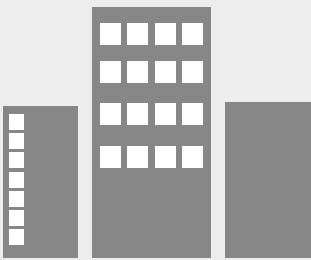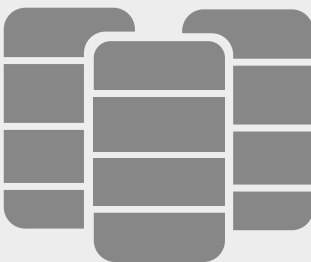
Figure 3: Applications of IoT technology in asset financing

6 Source: Collateral Management – Unlocking the Potential in Collateral, Accenture and Clearstream, 2011.

3. Being smarter with smart data

Digital technology has greatly increased the volume of data available. However, the banks have found it difficult to use this new data to create value for their customers and themselves. In contrast, online retailers and social media firms have found ways to create value from data.

Some of the ways in which online retailers create value from data:

- **Customer transaction behaviour** is used to inform product suggestions, increasing sales and customer loyalty.

- **Viewing and listening behaviour** is monitored to give appropriate advice about new products and services, or to serve third-party advertisements.

- **Real-time or contextual satisfaction surveying** is used to flag when a customer is dissatisfied and to inform appropriate actions to retain them.

- **Location data** is used for security and fraud checks or to offer suggestions, advertisements and offers that depend on the customer's location.

Despite substantial investment in data management, financial institutions lag behind firms in other industries. It is not unusual for large banks to spend upwards of $500 million[7] on programmes to address the challenges related to data, yet it is widely acknowledged that these investments have not been translated to increased profits. Banks are not nearly creative or enterprising enough in their attempts to use data to offer better products or cut operating costs.

The sheer variety of problems which data can address calls for specialised capabilities which banks often lack. Banks could take advantage of the specialised expertise at fintech companies by engaging these firms to perform the required work or by acquiring them. Partnerships between banks and fintechs would create a powerful combination of information, supplied by the bank, and innovative analytical tools, supplied by the fintech. The kind of problems that might be addressed are illustrated in figure 4.

Identifying problems that can be solved by data is the first step to its smarter use. Assuming banks make their data readily accessible to those who need it, specialised teams can be assigned to problems such as these and create algorithms that uncover trends, patterns and anomalies. Then banks will be able to extract value from their ever-increasing supply of data.


"Right time and channel to contact"	A blend of transactional, locational, communications and social media data can indicate times when customers are likely to be available. This has applications in marketing, customer engagement and collections.
Fraud and market manipulation	Some fintechs, such as Red Owl Analytics and Pentaho have developed software that helps banks to visually track who has influenced content in their data networks. This allows banks to "connect the dots" across a wide variety of data sources such as transactions, communications, physical access and digital data, and flags any unusual patterns between them. Understanding patterns that might constitute fraudulent behaviour and combining this with post-incident analysis helps banks to uncover fraud. Similarly, "know your customer" (KYC) checks could be helped by verifying the link between income and spending habits, location and stated occupation.
SME Credit	By utilising customer spending behaviour and supplier performance data, banks could help SMEs manage their cashflow and credit line requirements. Access to regular trade data, via the Internet of Things and point-of-sale systems, could help banks with credit scoring for growth capital and working capital needs. This would allow them to pre-empt SME financing requests so that they can provide real-time credit to match their clients' needs.
Budgeting	Historical account data can give banks a granular view of customer spending and income patterns. By coupling these observed patterns with customer saving goals and aspiration, banks could offer budgeting advice. This would also help consumers and business clients understand the long-term budgeting implications of potential decisions. Fitechs such as Personetic and Geezo now use banks' data and external sources to provide a more holistic and personal experience to customers.

Figure 4: Applications of smart data

4. Embedding distributed ledger technology

A distributed ledger is a network that records ownership through a shared registry (see Figure 5).
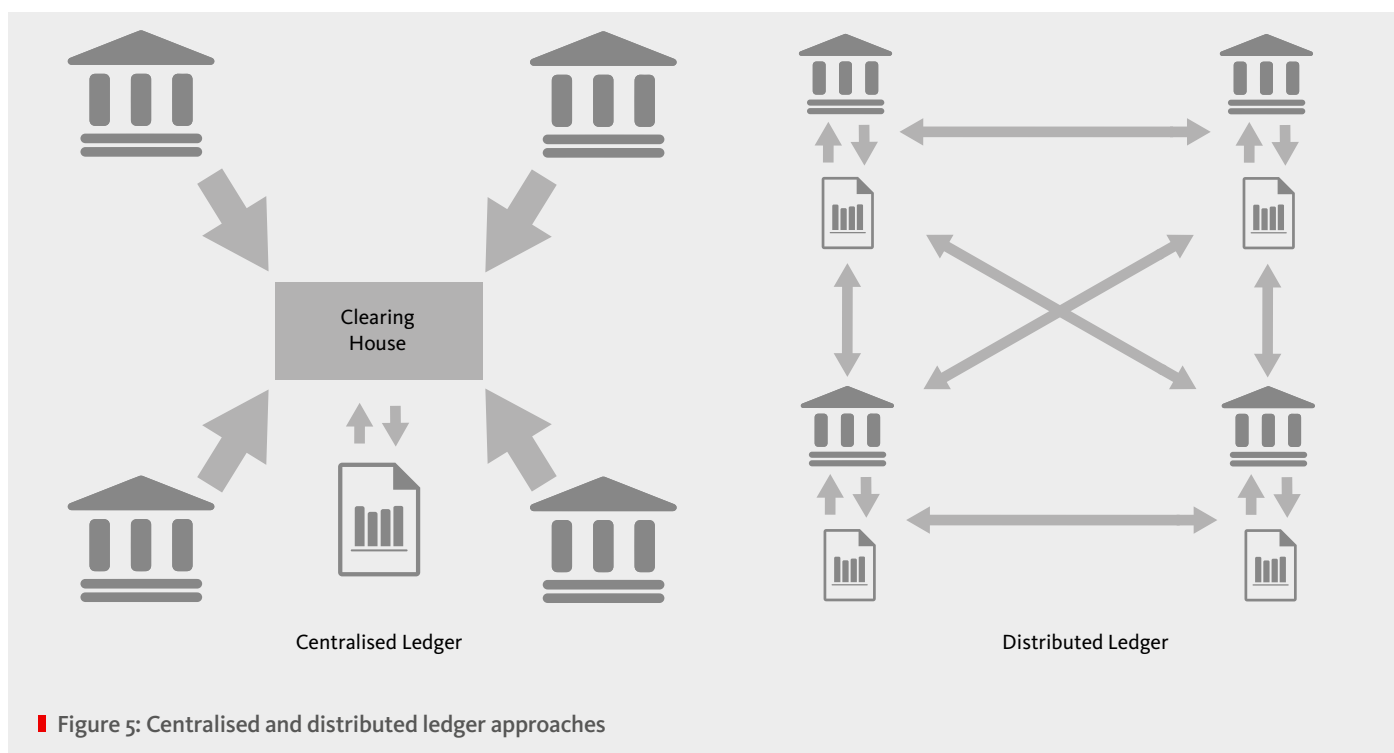
Figure 5: Centralised and distributed ledger approaches

In contrast to today's transaction networks, distributed ledgers eliminate the need for central authorities to certify ownership and clear transactions. Distributed ledgers can be open, verifying anonymous actors in the network, or they can be closed and require actors in the network to be already identified. The best known existing use for the distributed ledger is the cryptocurrency Bitcoin.

Distributed ledger technology has several attractive features:

- Transactions can be made to be irrevocable, and clearing and settlement can be programmed to be near-instantaneous, allowing distributed ledger operators to increase the accuracy of trade data and reduce settlement risk.

- Systems operate on a peer-to-peer basis and transactions are near-certain to be correctly executed, allowing distributed ledger operators to eliminate supervision and IT infrastructure, and their associated costs.

- Each transaction in the ledger is openly verified by a community of networked users rather than by a central authority, making the distributed ledger tamper-resistant; and each transaction is automatically administered in such a way as to render the transaction history difficult to reverse.

- Almost any intangible document or asset can be expressed in code which can be programmed into or referenced by a distributed ledger.

- A publicly accessible historical record of all transactions is created, enabling effective monitoring and auditing by participants, supervisors and regulators.

Commercial banks, central banks, stock exchanges and major technology providers, such as IBM and Samsung, are all exploring the potential uses of distributed ledgers. Fintechs, such as Ripple, Ethereum, Eris Industries[10] and HyperLedger, are also developing new ways to exchange data and assets enabled by the technology. It is only a matter of time before distributed ledgers become a trusted alternative for managing large volumes of transactions.

The first major application is being seen in payments, especially across borders. International payments remain slow and expensive and significant savings can be made by banks and end-users bypassing existing international payment networks.

In time, distributed ledgers will support "smart contracts" – computer protocols that verify or enforce contracts. This will lead to a wide variety of potential uses in securities, syndicated lending, trade finance, swaps, derivatives or wherever counterparty risk arises. For example, smart contracts could automate pay-outs by the counterparties to swap contracts. Figure 6 examines how securities settlement could be transformed by distributed ledgers.

Cutting operational costs is not the only benefit in securities trading. Distributed ledgers can increase investor confidence in products whose underlying assets are now opaque (such as securitisations) or where property rights are made uncertain by the role of central authorities.

Our analysis suggests that distributed ledger technology could reduce banks' infrastructure costs attributable to cross-border payments, securities trading and regulatory compliance by between $15-20 billion[8] per annum by 2022.

Streamlining securities settlement

The post-trade, settlement process can be expensive and slow, commonly taking two days, and sometimes longer, to process through a number of intermediaries. Distributed ledger technology has the potential to overcome frictions in current post-trade processes, providing an alternative technology for clearing and settlement.

Post trade life cycle

Figure 6: Scope for distributed ledger technology in the post trade settlement process

5. Creating frictionless processes and products

Digital technology has taken the hassle out of shopping. Customers can now compare options, choose, pay and often receive the goods, such as an e-book or airline ticket, on any device with access to the internet. What might have taken hours of walking or driving around and talking to sales people can be done in minutes or even seconds without leaving home.

Banking is no exception. Not only can customers now shop for banking products online but the products themselves are being digitised. It is now possible to manage accounts and make payments to third parties without visiting branches, writing letters or signing and posting cheques. Digitisation is taking much of the pain out of banking.

This progress, however, has been limited mainly to transaction accounts and consumer lending. Mortgages and long-term savings products still involve processes that are expensive, time consuming and a source of customer dissatisfaction. Removing the "friction" from these products is where the greatest opportunity now lies.

5.1 Opportunities to reduce friction in the mortgage process

With over $25 trillion[9] in new mortgages issued annually across the globe the mortgage sector is a very big market. However, most mortgage markets still rely on a number of intermediaries to manage a predominantly paper-based process.

This provides opportunities to digitise the process, removing much of its current friction. We envisage a simple yet robust home purchase process based on an improved data environment. See Figure 7 for a description of

the Danish house purchasing process where much of the friction that exists in other markets has been removed.

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9 Source: Oliver Wyman analysis.

Buying a house in Denmark

- As a house becomes available for sale, a prospectus of the house is published on a real estate portal. The prospectus provides the public valuation, ownership, and financing details, energy rating, environmental issues and technical survey details. This collateral information will be available to prospective buyers and to all banks (through the electronic land registry) who can then immediately assess the value and the condition of the collateral.

- A prospective buyer searches for a house on the real estate portal and contacts the agent appointed by the seller. In a parallel process, the buyer engages a mortgage bank and gives them permission to access their financial records, including salary details that show that the borrower can afford to service the mortgage. Combined with the collateral valuation, this allows the bank to approve a mortgage.

- After contacting the agent and viewing the property (perhaps online), the buyer agrees a price with the seller. The buyer and seller electronically sign a standardised Purchase Agreement using their electronic ID.

- An authorisation is sent to the buyer's bank to transfer funds to the seller's bank. The funds are released to the seller once all final conditions are met on the agreed closing day.

- Once the funds have been transferred to the seller, the electronic land registry is updated to reflect the new owner's details, and the transaction details are made available as an input to property pricing in the local area.
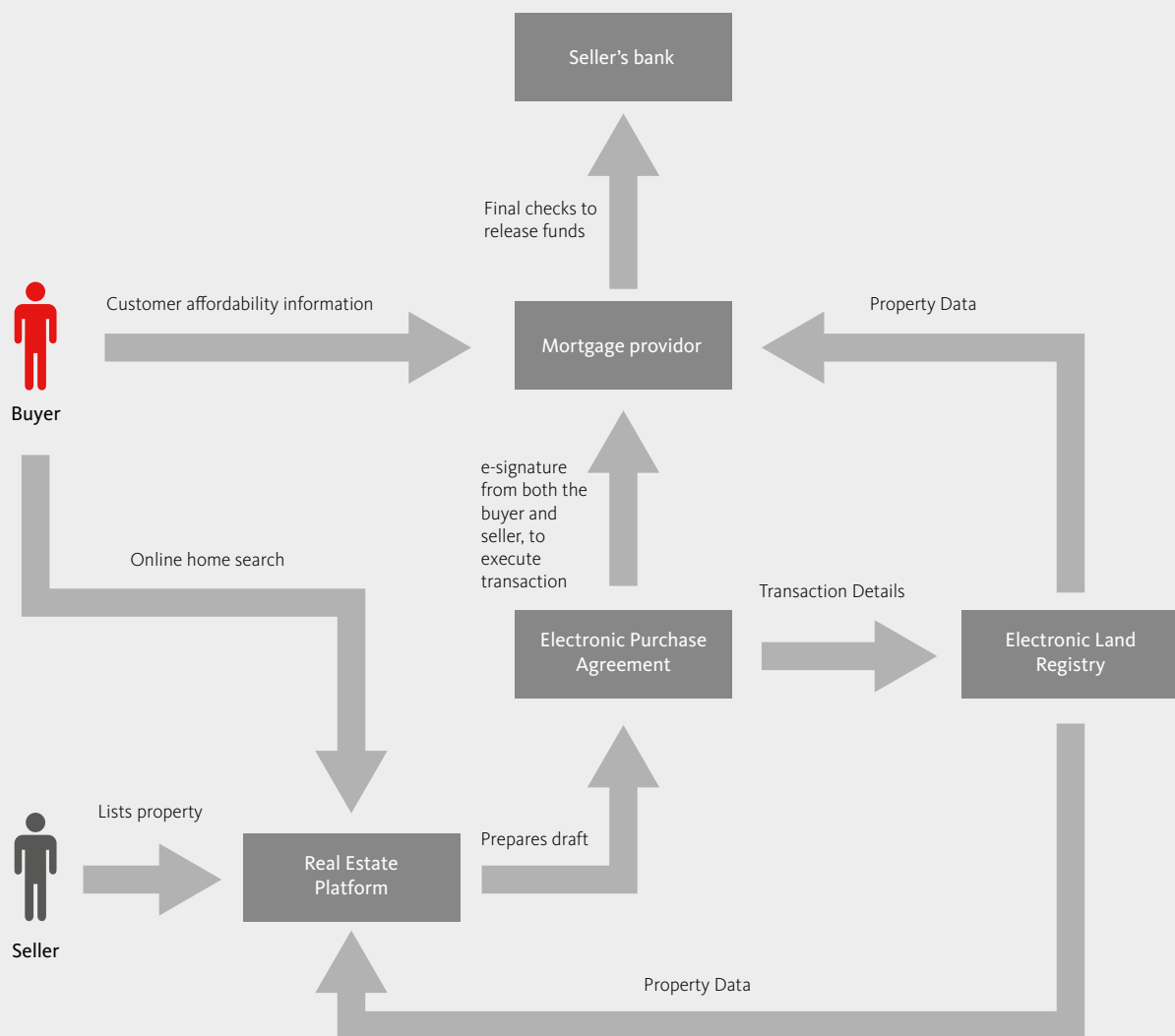
Figure 7: Danish house purchase process

After origination, mortgages have typically remained on bank balance sheets or been transferred to investors via securitisations. While investors are showing an appetite for direct exposure to whole-loan mortgages, the majority of equity stays in banks.

For institutional investors, whether they are looking for whole loans or participation via securitisation, gathering and providing the growing amount of granular information that is becoming available through seamless real-time reporting will be highly valuable. A mortgage platform providing regularly updated data on the condition and value of collateral and on the financial situation of the mortgagee will allow investors to manage their portfolios with far more precision (see Figure 8). The information available would include demographics (e.g. age), location, income and affordability profile, financing type (e.g. mortgage rate, duration, payment profile), risk profile (e.g. borrower's credit rating, behavioural information) and detailed collateral information (e.g. type of property, age of property, condition).

Originating Strategy

Data and Analytics Layer
Rich layer of granular data and analytics

Investor Asset Selection

Front to Back Customer Management
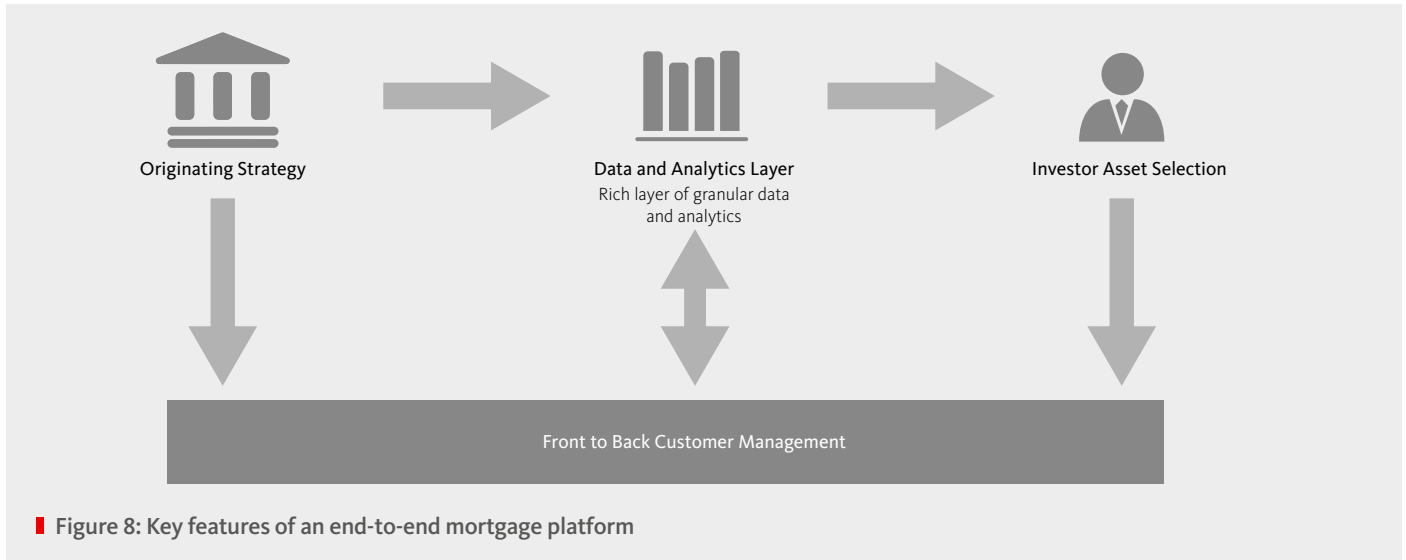
■ **Figure 8: Key features of an end-to-end mortgage platform**

5.2 Frictionless saving and investment

Many people seek help managing their personal finances and making investment decisions. This has traditionally been an area dominated by expensive face-to-face interactions with financial advisors. However, fintech alternatives have now emerged.

For example, new technology monitors customers' spending habits, allowing them to manage their money better (e.g. Mint, Yodlee, Blueleaf[10]). And algorithm-driven tools or "robo-advisors" provide investment recommendations based on stated investment goals (e.g. SigFig, FutureAdvisor, Betterment[10]).

This has helped reduce friction within some saving and investment activities, but we believe there are further opportunities:

■ Personal financial management (PFM) solutions typically help customers make better decisions about their spending habits but not about their savings and investments. New applications could unify investment, savings and current accounts, allocating funds according to user-defined triggers (e.g. a particular savings goal). This information could be linked to external data such as merchant offers. For example, a customer who wanted to buy a new phone could add the phone to a wish-list as part of their budgeting and savings goals.

■ Algorithm-driven investment platforms typically focus on just a few variables, such as asset diversification and risk tolerance, without taking account of other important variables, such as the customer's current investments, especially where these are not tradable securities. These platforms will be better able to compete with traditional financial advisory offerings if they take a comprehensive view of all the assets a client might invest in or already has, both real and financial.

■ Fintech players could automate several basic PFM services, such as estate planning (e.g. setting up trusts), life insurance and basic tax planning. Current robo-advisors can extend their offering up the wealth spectrum, for example, to include people worth $1 million, who are now served face-to-face at a cost that is often not commensurate with the upside.

10 Anthemis portfolio company.

Conclusion: achieving Fintech 2.0 together

Fintech 1.0 has brought only minor disruptions to the banking market, mainly in the areas of payments, credit and personal financial advice. But changes in customer preferences, advances in technology and growing investment in fintech set the scene for more radical change.

Fintech 2.0 could mean a "seamless specialisation" across core elements of the value chain whereby a variety of providers combine to deliver cheaper and easier-to-use propositions to end customers.

Banks must continue on their journeys of digitisation. But they need not travel alone. They should be clear about where their market advantages and institutional strengths lie. Where they fall short they should look to work with the start-ups who can provide what they need.

The same goes for the new fintechs. They may be entrepreneurial and ambitious but there is more required to achieve Fintech 2.0. Wisdom, market expertise, trusted brands and not least a banking licence may also be required.

The message to banks and to fintechs is the same: if you can't beat them, you should join them to achieve Fintech 2.0.

Contact us

Santander InnoVentures

The Santander InnoVentures Fund provides fintech companies with much needed finance, as well as supporting the digital revolution, to ensure Santander's customers worldwide benefit from the latest know-how and innovations.

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