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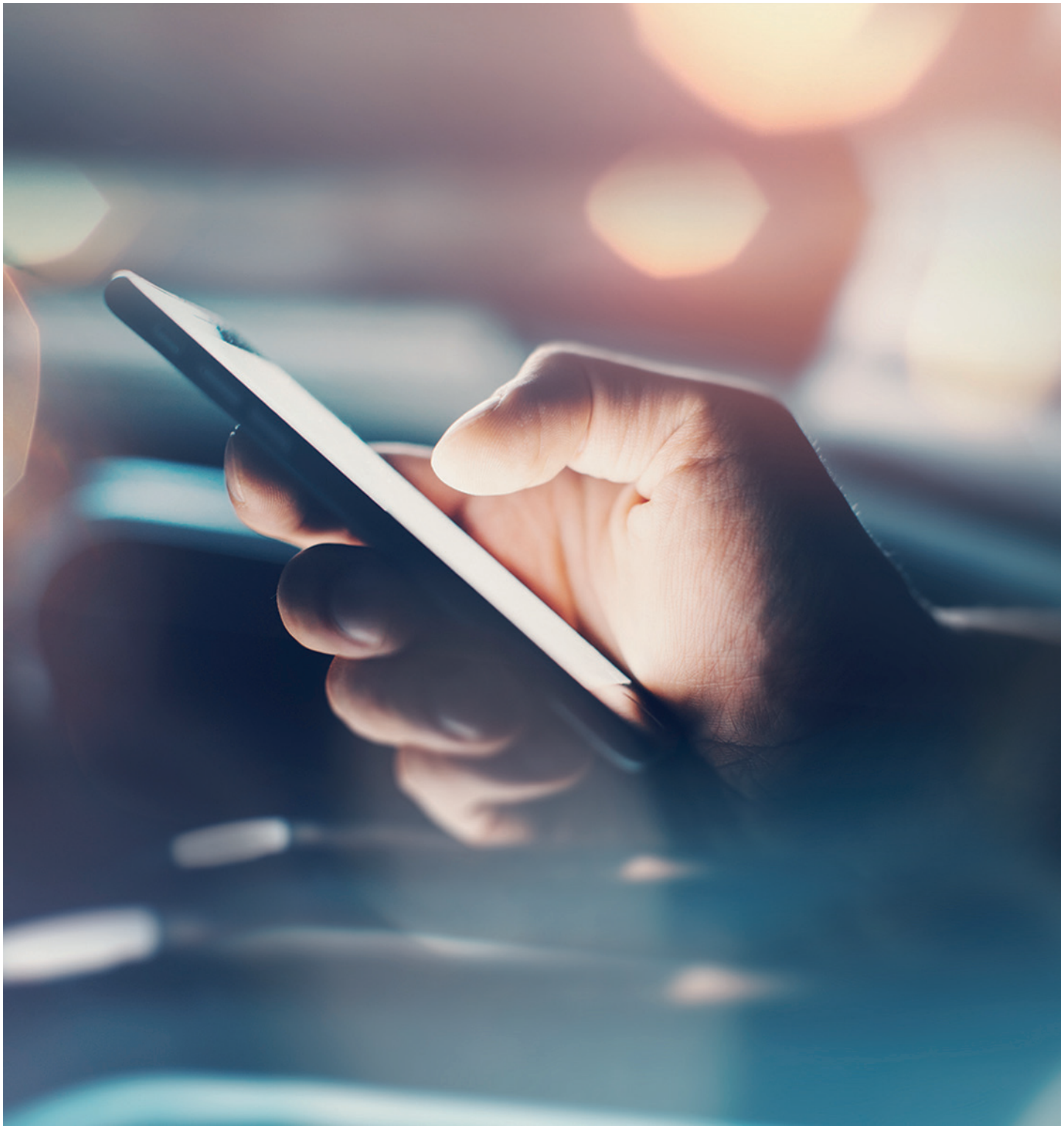
11th ADVANCED Payments Report 2017



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For more information contact

Samee Zafar, Director, +44(0) 207 283 1114 • samee.zafar@edgardunn.com
Kim Gerhardt, Director, +1 415 442 0544 • kim.gerhardt@edgardunn.com
Grégoire Toussaint, Principal, +33 6 7026 9925 • gregoire.toussaint@edgardunn.com
Tue To, Senior Consultant and Editor, +1 415 442 0548 • tue.to@edgardunn.com

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Advanced Payments Report 2017

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Contacts

Samee Zafar
Director, EDC London
samee.zafar@edgardunn.com
+44(0) 207 283 1114

Kim Gerhardt
Director, EDC San Francisco
kim.gerhardt@edgardunn.com
+1 415 442 0544

Grégoire Toussaint
Principal, EDC Paris
gregoire.toussaint@edgardunn.com
+33 6 7026 9925

Tue To
Senior Consultant and Editor
tue.to@edgardunn.com
+1 415 442 0548

Edgar, Dunn & Company
@edgardunn
www.edgardunn.com

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Foreword

These days, digital transformation is far from being only a term that is on everyone's lips, but it is something very concrete and tangible that happens before our eyes – and it is changing our world.

In the payments and banking industry in particular, digital transformation not only challenges providers and retailers but also offers completely new and exciting opportunities. This Advanced Payments Report you are now reading bears witness to this revolution and gives many illuminating insights about the key developments in payments.

Just to name a few key facts found by this report: Around 83% of the survey respondents believe Open APIs hold the key to the future of banking and payments. They indicate that fintechs and new classes of payment service providers are expected to drive payments innovation. 75% of the respondents believe in-app payments in-store will have an impact on the retail industry; and as many as 60% say real-time payments will have an impact. This shows that more and more customers demand a smooth shopping experience with an uncomplicated, fast and secure payment process. Internet technology at the point of sale is the enabler here.

Talking about digitalization, a key upcoming trend that will play a crucial role in the future of payments is Artificial Intelligence (AI) and extended Data Analytics. Only by intelligently interpreting the data streams for cashless payment transactions, big data will turn into smart data. This not only provides retailers with invaluable insights of their customers' needs and preferences but also helps them improve targeted offers and reduce churn rates. In addition to that, AI enables powerful risk management tools to detect and proactively prevent fraud.

Digitalization has been the DNA of Wirecard ever since. Every day, we develop and design technology-driven solutions that enable cashless payments, and assist our customers and partners in the best possible way to become successful in the digitally transforming world.

We are pleased to sponsor the Advanced Payments Report this year and like last year, it is packed with insights, information and analyses which we hope will make for interesting reading.

Markus Eichinger, Executive Vice President Global Product Strategy at Wirecard

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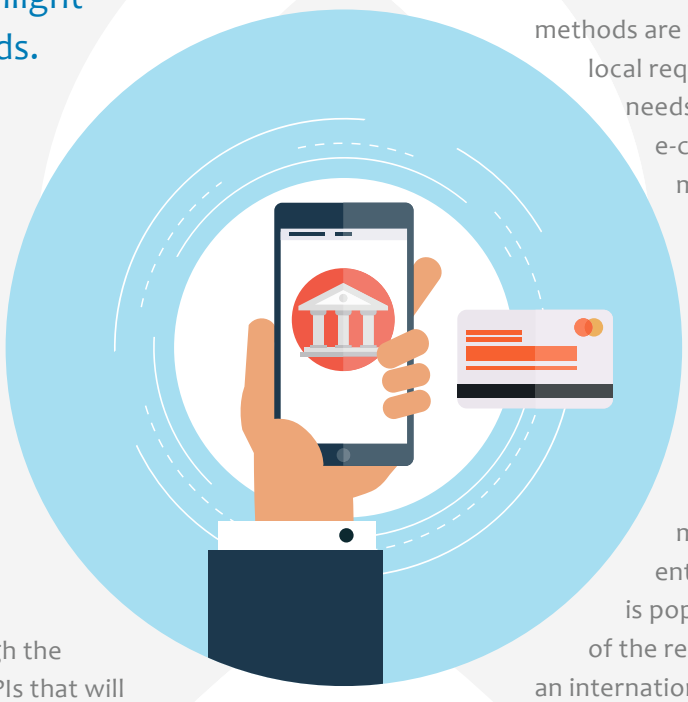
Overview
Digital transformation

This is the 11th year of the Advanced Payments Report and while many things have changed we have retained the original format of the report. Every year we undertake a survey of industry experts – not consumers – but senior executives directly or indirectly associated with the payments industry. The survey results and our extensive research and experience advising clients on payments across the globe provide perspectives, reveal insights and highlight strategic industry trends.



A key topic that this report highlights is the emergence of "Open Banking" APIs (Application Programming Interfaces). Fintech start-ups have been using this technology for some time but now regulators, particularly in Europe, are mandating the deployment of such APIs for banks through the second Payment Services Directive (PSD2). Initiatives are pushing industry reform through the introduction of standardised APIs that will enable third parties to access bank accounts and payments data on behalf of the customer. To ensure that appropriate levels of security are in place for open banking access, industry stakeholders are working to develop more robust security standards. Even in markets where there are no such regulatory changes, banks are taking the initiative and providing greater customer choice.

Of immediate interest to the industry and investors are real-time payments, and our report carries a separate section that discusses the benefits and challenges of systems that can complete payment transactions in very short timeframes. For many markets, this is old news. These countries have operated such payment systems for quite some time now. But others, including the world's most sophisticated digital commerce and payments market, the US, have lagged behind. By providing sellers with immediate access to funds, real-time payments between bank accounts will provide competition to card-based payments especially for online transactions.

While card payments dominate online commerce in many markets, others have developed their own local payment solutions. These local or "alternative" payment methods are widely used because they suit local requirements and meet consumer needs. In the Netherlands, most e-commerce payments are made via bank transfers on the iDEAL payment service. Boleto, Portuguese for "ticket", is a widely popular payment mechanism in Brazil and is managed by the Brazilian Federation of Banks. It can be described as a "push" payment usually made in cash. It is slow and not entirely digital, but it works and is popular. This is a key message of the report. A payment user, say an international merchant, should not only accept credit cards but also encompass local payment methods like Boleto if the merchant intends to be successful in a particular market.

One service that has been around for decades but is now finding a new beginning in the digital world is lending at the point of sale or at the point of checkout. It offers customers greater flexibility and empowers

them to decide how they pay for their purchases. We cover alternative lending approaches and developments in our report.

Blockchain and its applications in payments using cryptocurrencies such as Bitcoin have the potential of radically reshaping the payments industry. But there is little mainstream demand or acceptance yet except for speculative purposes or in certain niche payment use cases.

As the internet grows and connects not just computers but machines and peripherals, we find ourselves in a highly-connected world that puts additional demands on people and opens up new opportunities for innovation and invention. Connected clothes, connected cars, and even connected cities will require digital payments to keep up with the complex web of people and machines. While blockchain-based systems will help us transact anonymously with each other, existing payment systems will increasingly depend on better and more sophisticated forms of identity management.

> “Initiatives are pushing industry reform through the introduction of standardised APIs”

Digital identity will allow access to services over digital channels and facilitate the faster settlement of payments and other transactions. Digital identity, its management and control, will provide the cornerstone of our interactions with other parties and link to the connected world. This report discusses digital identity ecosystems and identifies the entities our survey respondents regard as best positioned to act as digital identity providers.

API Banking
Towards a new role for banks

The structure of the payments and retail banking market is breaking up. New players are building on top of existing bank infrastructure to create exciting new digital products and services. An entirely new set of activities in the banking value chain has emerged between banks and customers. Jörn Leogrande, Executive Vice President Mobile Services at Wirecard, indicates that "Open Source Banking as a Service driving interactions between consumers and many financial suppliers is a key trend driven by future PSD2 adoption."

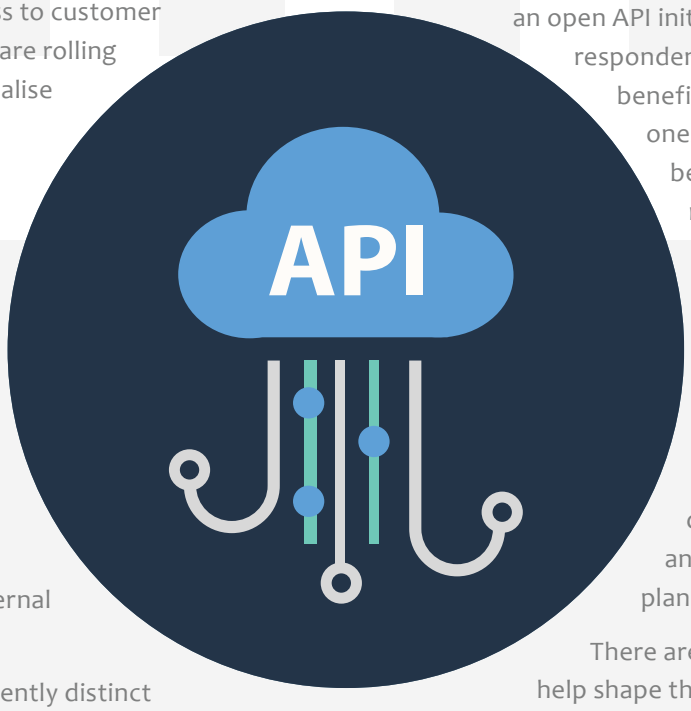
APIs lie at the heart of this explosion of digital innovation in banking and payments. Banks will be required to provide third parties with access to customer data via Open APIs. Regulators are rolling out new rules designed to formalise and encourage these new activities.

APIs are consequently set to change the banking landscape and redefine the role banks play in a value chain that is no longer entirely under their control. In the new era of API banking, forward thinking banks will identify new opportunities and execute strategies based on newly acquired competencies and internal structures.

Opportunities fall into two currently distinct areas that will, over time, naturally converge. First, banks as API platforms will supply enhanced data-driven services via APIs based largely on internally derived data. This business model focuses on supplying third-party businesses. This is an indirect customer relationship model but the bank is not entirely invisible to the end customer. Second, banks as third-party service providers offering products and services that integrate information derived from multiple external sources via APIs. This is a direct customer relationship model.

Ultimately, to stay relevant and provide more than basic utility services, banks and other financial institutions are embarking on a journey of transformation. A bank's new role will be defined by its ability to successfully become integrated in a programmable value chain enabled by Open APIs.

83% of our survey respondents believe Open APIs hold the key to the future of banking and payments, enhancing the development of different applications including account aggregation and payment initiation. Yet, 80% indicated that compliance is a major challenge for the adoption of an open API initiative. A similar proportion of respondents (78%) believe APIs provide benefits for all involved but the key ones for banks are providing a better service and opening new revenue streams.

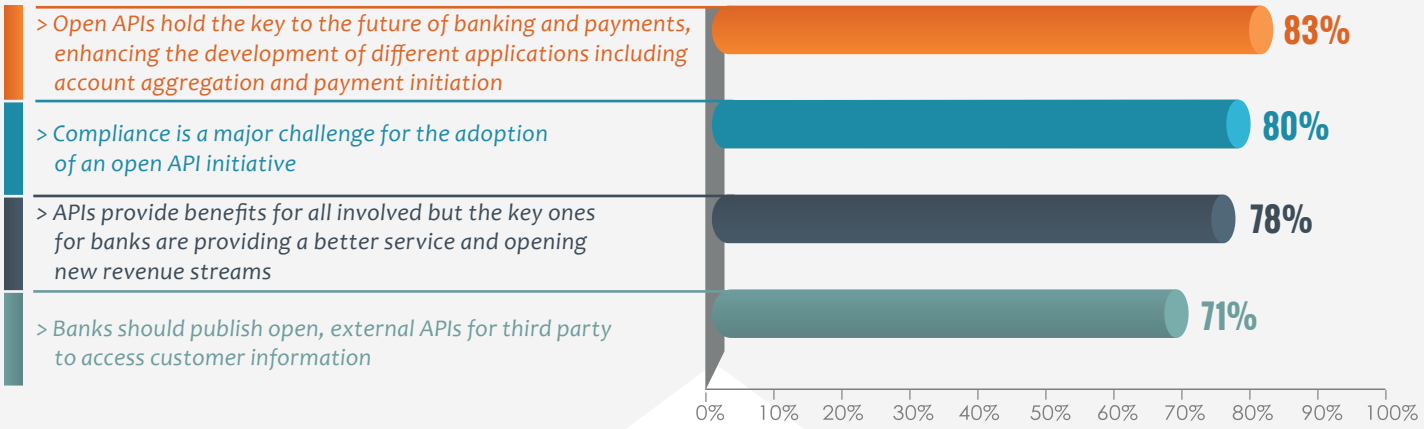


Shifting landscape

The payments industry is in the process of rapid and unprecedented change. The PSD2 implementation deadline is now clearly in view and on the horizon of most planning cycles.

There are three primary factors that help shape this change:

Views on Open APIs



➤ **Regulation** to date, has been a friend of incumbent banks and has served as a moat around the banking market. But now, regulators across markets are opening-up the banking industry enabling non-banks to enter the financial services industry to undertake specific activities

➤ **Consumer** behaviour and expectations are changing. Consumers expect a new level of ease of use, immediacy and personalisation which is leading to almost invisible payment experiences. While the pre-internet generation is tentatively embracing the digital age, a younger digitally native generation is setting a new pace for consumer facing businesses to keep up with. Consumer needs revolve around a digital lifestyle that is not going away

➤ **Technology** innovation is providing consumers with new services and is in turn being fed by massive new inflow of investment capital funding directed mainly at fintech start-ups entering and disrupting what has been a highly-regulated marketplace

But how real is the disruption cliché for banks?

Significance of APIs

APIs have been one of the most significant factors attributable to digital disruption in general.

DEFINITION

Application Programming Interfaces

The web is full of attempts to explain APIs in layman's terms. One of the best explanations is to think about an API as the software equivalent of a TV's rear panel full of ports and interfaces to plug other devices into. These connectors work for a TV pretty much the same way that an API works for software. They allow other appliances (DVD players, cable TV boxes, game consoles, etc.) to interact with the TV, pushing and pulling information (audio, video) to/from it, and hence delivering more functionality than a TV offers by itself.

APIs have journeyed from the IT department to the board room via the marketing team. For technologists, APIs are a key technology of the information age. In the board room, they represent a transformational business model opportunity. Regulators see them as a tool to achieve public policy objectives.

Evolution of APIs on the web

The idea behind APIs has existed since the beginning of computing. In the last 10 years, they have grown significantly not only in number, but also in sophistication.

➤ **1960-1980s** – Basic interoperability between computers based on sessions and simple network protocols

➤ **1980-1990** – Creation of interfaces with computing logic

➤ **1990-2000** – "Middleware" emerges to facilitate messaging

➤ **2000-today** – Explosion in computing integration via APIs service layers

Implicit in the design of APIs is the intention to standardise. A greater and greater level of standardisation has contributed to the growth of APIs. But how and in what areas has this been achieved?

From SOAP to REST - talking technical

The real explosion in API usage stems from standardisation in a subset of APIs, called Web Service, developed for the web. In the early days, nearly all Web Services run on the internet's HTTP/HTTPS transport layer protocol. Later, the data formats used in Web Services converged around the use of XML. This led to a common Web Service access protocol developed by Microsoft called Simple Object Access Protocol or SOAP. But many developers found SOAP cumbersome and hard to use. As the mobile internet developed and more and more data driven mobile applications needed to communicate with remote services, an alternative lighter weight approach emerged. First, a lightweight data format derived from JavaScript called JavaScript Object Notation or JSON in most cases replaced XML. Second, an alternative protocol for Web Services access called Representational State Transfer or REST emerged. Originally defined in a PhD thesis by Ron Fielding in 2000, REST provides a lighter weight alternative to SOAP. At the very basic level where SOAP requires using long lines of XML code to make a simple API request, REST allows developers to make the same request using a simple web address. While SOAP web services using XML formatted code continue to be used, for the most part, REST web services containing JSON formatted data packets are now driving the usage of APIs. Compared to SOAP, REST is easier to program and faster to process.

Another important evolution in APIs are the standards around authorisation protocols controlling data access. Somewhat further behind than data formats and general access protocols, technical standards around the usage of authorisation protocols are following the same trajectory. The "OAuth" authorisation framework enables applications to obtain limited access to user accounts on an HTTP service, such as Facebook. It works by delegating user authentication to the service that hosts the user account, and authorising third-party applications to access the user account.

What's wrong with banking?

What all the above standardisations have in common is that they were developed as open and non-proprietary standards and are not owned by anyone. Instead they were developed through transparent collaboration relying on a bottom-up consensus-building process to develop the final standards. This spirit of openness and collaboration is part of the DNA of the web community.

An API is considered open if it can be freely adopted, implemented and extended. The internet has proven that openness can drive value creation from both economic and social perspectives. Over the last decade, countless internet success stories have harnessed the power of Open APIs. Comparison websites are a great example of new business models made possible by Open APIs.

> "the emergence of Open APIs in financial services has lagged behind other sectors"

Compared to the wider economy, the emergence of Open APIs in financial services has lagged behind other sectors. As a highly-regulated market, financial services has developed a notoriously risk averse culture. In particular, conventional banking strategy is primarily steered by regulatory compliance. Regulations define a narrow path that banks can follow. Managing operational risk and guaranteeing deposit security quite naturally inhibits growth or significant deviation from the existing path.

Moreover, the predominance of the universal bank model has led to large vertically integrated organisations with very clear boundaries that define the limit of what is permitted. Banks are very clear about what they do and do not do and whatever they do will be defined by the need to maintain tight control over operations. In most instances, this means that banks will seek to be self-sufficient, developing proprietary technologies and systems themselves. As a consequence, a community minded culture of openness and collaboration between banks and other external third parties have never existed in the banking community.

In this context, the adoption of APIs in the banking industry has a completely different set of drivers. Banks have for many years used 'private APIs' to make the internal deployment of technology faster and more efficient. These are proprietary APIs for in-house use only.

Nonetheless, according to Alexander von Knoop, Member of the Management Board Wirecard Bank, their "experience shows that APIs in Banking can lead to success and can fulfil a whole business model. The Wirecard Bank, for example, offers its APIs to fintech companies so that they can use external banking functionalities for their innovative business model."

Banks may develop specific 'partner APIs' which are shared with external 'preferred' partners based on a bilateral agreement. An example would be APIs developed to share specific type of bank data with an Enterprise Resource Planning (ERP) software provider.

Banks may also develop 'partner APIs' which are distributed to multiple external partners that comply with a predefined set of requirements. An example would be providing merchants with access to POS terminal APIs. Again, usage of the API is subject to a bilateral agreement.

However, only a few banks have so far shown much interest in embracing the mindset of openness that has proven so successful at creating value on the web.

The fintech fix

Fintechs have rushed to fill the void that this has created. In the absence of formal APIs, fintechs have, for example, used basic screen-scraping technologies to port customer bank data directly from online banking web pages as a feed for innovative new digital services. Often these informal bank data feeds are then combined with non-bank Open APIs. The resulting integrated digital customer experience is a demonstration of rapid value creation on the web which was, until recently, entirely absent from the financial services sector. And these use cases are occurring outside of any regulatory framework or oversight.

The push and pull of digital overlay services

Start-ups are already offering data driven services without APIs. Most of the personal financial management or PFM solutions have focused on developing budgeting tools, or some variant thereof, based on tracking and analysing users daily spending from single or multiple payment accounts.

As customer transaction data has not been available directly from banks, new players have typically started off by requiring customers to share their online banking login details to enable algorithms to access data using a method called screen scraping – which effectively collects data directly from the code used to display content on the screen.

Companies such as Moneydashboard, Ontrees (acquired by Moneysupermarket in 2014) and Centralway Numbrs are good examples.

Various start-ups are already providing payment services. They are best understood as either 'pull' payments - once given a mandate by their customer it is the merchant who initiates payments, or 'push' payments where the customer initiates a payment to a merchant.

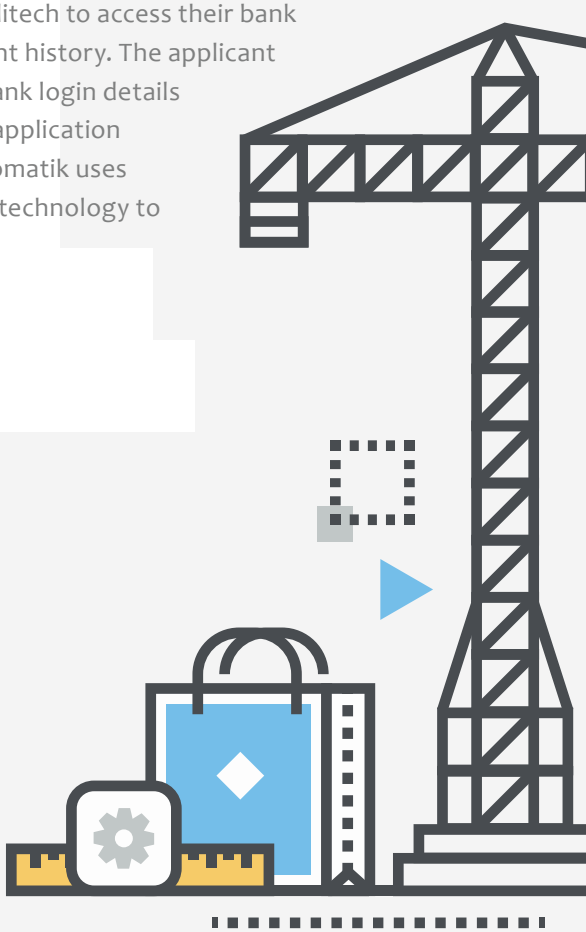
European companies such as GoCardless, Nuapay and others fall into the 'pull' category. Their service leverages the SEPA direct debit scheme that has now been implemented in all Eurozone states and works alongside national schemes in non-Eurozone markets and focus on collecting recurring payments.

Sofort and Trustly and others fall into 'push' category. Having selected to check out with Trustly, a consumer selects their bank and logs in as normal via a secure encrypted connection to their bank. They choose an account, initiate and authenticate their payment to the merchant.

These services are 'overlay' services that sit between consumers and their bank and bypass traditional card schemes. The cost of payment acceptance is typically lower than conventional bank direct debit services or card scheme alternatives.

The European marketplace is thin by comparison - to say the least. One European example is Poland based Kontomatik, which was acquired by German challenger bank Kreditech in 2015. Contrary to US banks, European banks have taken a very dim view of account aggregation services. Many have prohibited their use in customer T & Cs and warned customers that they could offer no protection or recourse against fraud and identity theft.

Besides PFM solutions, one of the benefits of account aggregation is in consumer loan application workflow in terms of verifying identities and checking credit worthiness. Various challenger banks are already using payment and other bank data to check credit worthiness. Loan applicants at Germany's Kreditech bank can, for example, elect to obtain a faster credit decision by authorising Kreditech to access their bank data and payment history. The applicant provides their bank login details during the loan application workflow. Kontomatik uses screen-scraping technology to



obtain the applicants' payment history which, in combination with other data sources, allows Kreditech to make real-time decisions on the applicants' credit worthiness.

All these were predated by US based Mint (acquired by Intuit in 2009).

Aggregating information

What all these services have in common is that they acquire their data from third-party banking data aggregators. In the US, it's a highly competitive space with numerous well-established players.

The pioneer is Silicon Valley based Yodlee. Established in 1999, Yodlee is now very much at the heart of the digital finance ecosystem. Its cloud-based platform, which customers connect with via paid-for APIs, is powered by over 14,000 data sources ranging from screen scraping to formal data supply agreements with banks globally. It powers many of the PFM start-ups.

Other equally well established US players include those owned by larger corporations like Cashedge (owned by Fiserv), Digital Insight (owned by NCR), as well as independent players like Finicity and Plaid. ByAllAccounts (owned by Morningstar) is also worth mentioning as an aggregator focusing on wealth management.

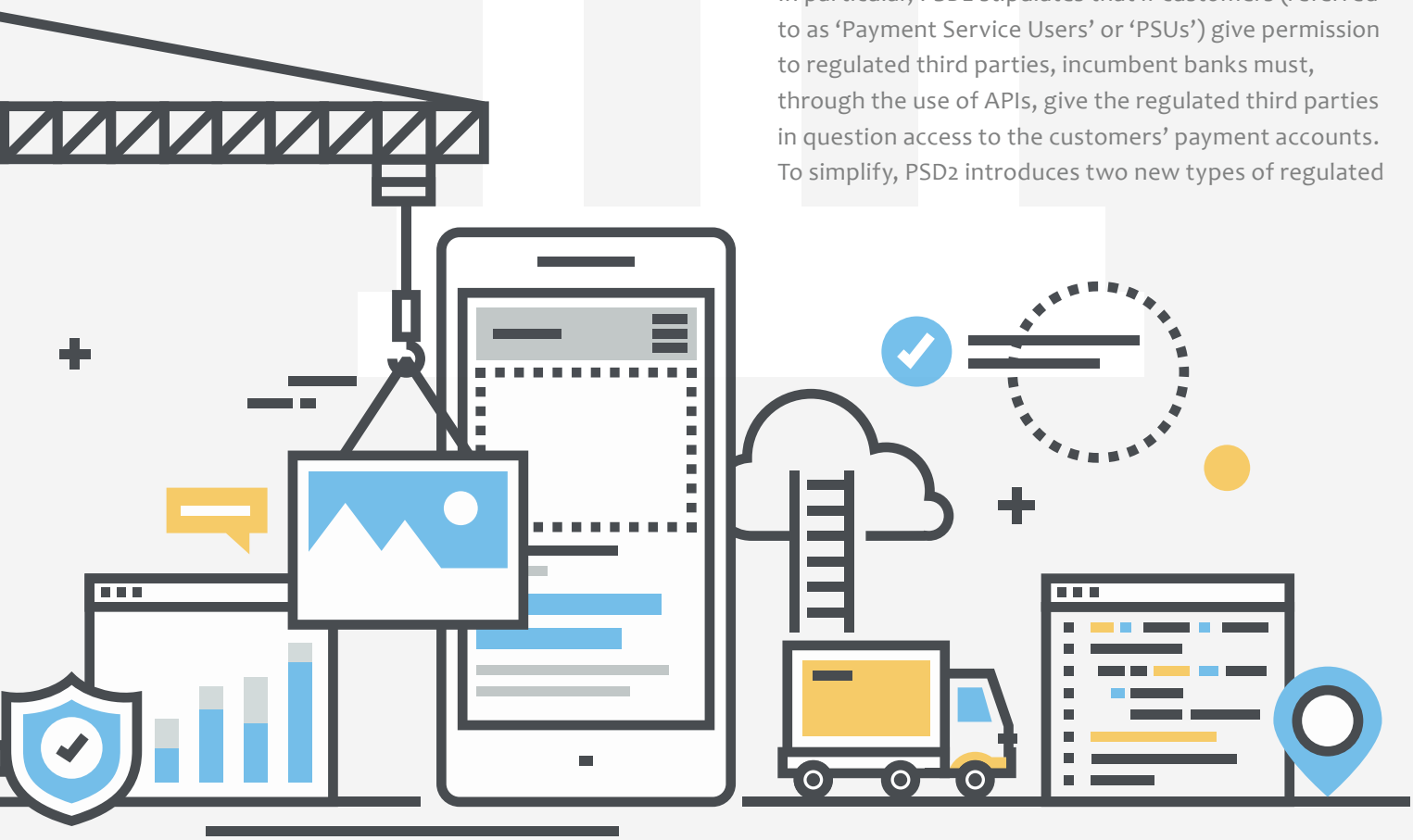
Regulation is catching up

Europe – PSD2

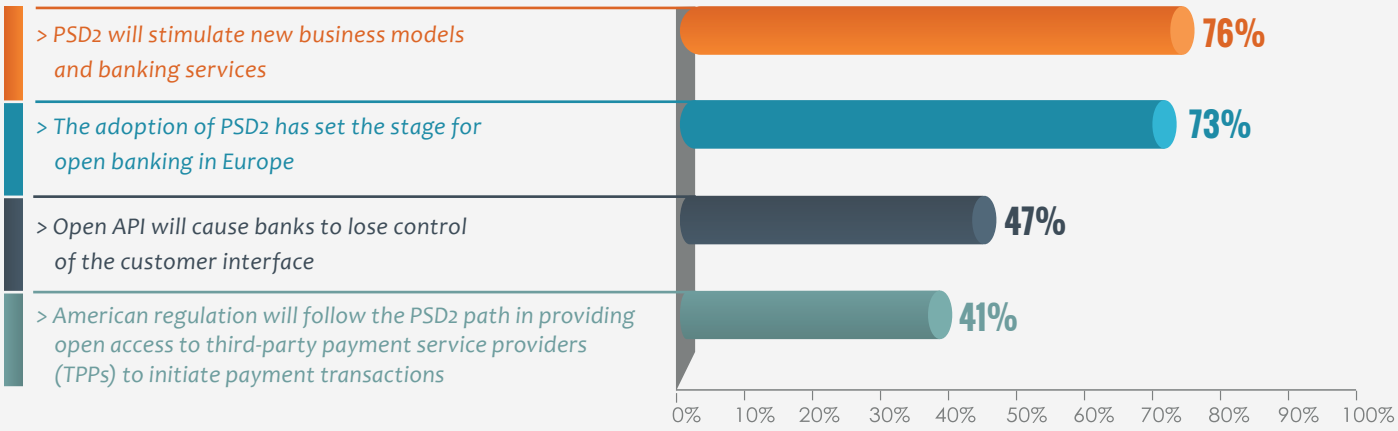
PSD2 is often cited as the primary example of policy makers using legislation to force banks to publish Open APIs.

The focus of the original PSD of 2007 was an initial attempt to level the playing field for new entrants into the banking sector. This was achieved in two main steps. Firstly, creating a set of Europe-wide standards to enable the formation of a single market for payment services. And secondly, it also created a new regulated non-bank entity called an authorised Payment Institution known as PIs. It granted PIs permission to carry out various payment activities without the need to obtain a full banking licence.

PSD2 attempts to level the playing field for new players still further by bringing incumbent banks into sharp focus. In particular, PSD2 stipulates that if customers (referred to as 'Payment Service Users' or 'PSUs') give permission to regulated third parties, incumbent banks must, through the use of APIs, give the regulated third parties in question access to the customers' payment accounts. To simplify, PSD2 introduces two new types of regulated



The impact of PSD2



third Party Providers (TPPs) that will, with customer's permission, be able to access the customer's bank account data in order to perform specific actions.

➤ **An Account Information Services** (AIS) PSP will be able to read customer data to provide new service offerings including retrieving selected account data points for further analysis like address verification, credit worthiness, aggregating multiple accounts into one view

➤ **A Payment Initiation Services** (PIS) PSP will be able to initiate a credit transfer payment directly from their account to another bank account. The latter would allow merchants to receive account to account payments thus avoiding card payments

PSD2 sees Open APIs to be the mechanism through which TPPs gain access to bank accounts.

One of the mandates PSD2 has conferred on the European Banking Authority (EBA) is to develop a draft Regulatory Technical Standards (RTS) on strong customer authentication (SCA) and secure common communications (Article 98 of the PSD2). The final version provides guidelines on how banks should develop and make their Open APIs available to TPPs.

What EU policy makers are attempting to shape is a shift or transformation in the banking mindset towards a new 'Open banking' paradigm. The desired social policy objectives are characterised by more competition leading to greater customer choice and customer control over personal data. The key to reaching this goal is for banks to embrace 'Open APIs' as a safe and secure mechanism to grant regulated third parties access to customer accounts and control over their personal data.

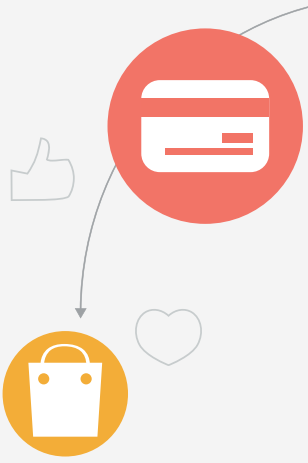
However, the two concepts of Open APIs and Open Banking should not be confused. It is important to note that PSD2 is less about setting specific technical and functional requirements. Rather it defines operational and legal standards that banks need to comply with. It does not define APIs for specific use cases and leaves this aspect open for banks and industry to work through.

Our survey indicated that 76% of respondents believe PDS2 will stimulate new business models and banking services. However, while 73% believe the adoption of PDS2 has set the stage for open banking in Europe, only 41% believe American regulation will follow the PDS2 path in providing open access to TPPs to initiate payment transactions.

Taking it a step further

The UK's Open Banking Working Group (OBWG) was set up in September 2015 at the request of the UK Government with the objective of opening up access to bank data via APIs.

The objective of the working group, consisting of a wide spectrum of industry stakeholders, was to produce a detailed framework for how an Open Banking Standard could be designed and delivered. The OBWG comprised industry experts from banking, open data, and consumer and business communities.



In many respects, the OBWG's framework starts where PSD2 stops. It aims to get down to the individual use case level and specify the technical and functional requirements for each associated API.

In a report published in February 2016, the OBWG set out an Open Banking Standard Framework. The key recommendations included:

- **API for bank information** deemed as 'open data'. This is freely available data that, for example, could result in a basic use case such as a fintech calling multiple bank APIs to develop a product comparison service
- **API for customer data** deemed as 'shared data'. This is data about bank transactions that individuals or businesses can choose to share themselves. An example use case would be an account aggregation service that combines customer 'shared data' and bank 'open data'

Besides the technical considerations of developing the Open APIs, other issues associated with implementing a complete framework have been addressed by the OBWG including governance, security, liability, standards, communications, regulation and legal.

The time table set by the report includes:

- **Release 1** during February 2017 – tightly scoped Open Banking API as a 'minimum viable product' (MVP) enabling basic 'open data' use cases
- **Release 2** by end of Q1 2017 – extension of MVP to include 'shared data' such as customer transaction data
- **Release 3** by end of Q1 2018 – APIs to cover the majority of use cases supported by 'open data' and anonymised and aggregated data
- **Release 4** by end of Q1 2019 – extension to include APIs enabling full read and write functionality

Separately and in parallel, the UK's Competition and Markets Authority (CMA) has investigated the state of competition in UK retail banking. Its remedies, published as an order-enforcing competition and consumer law, effectively requires UK banks to adopt the OBWG proposals.

The CMA has ordered the setup of an 'Implementation Entity' (IE) that will "undertake the work necessary for the adoption of common and open data, API and security standards." The IE is made up of a formal Steering Group (or Board) with an Executive leader based on the nine main retail banks.

In contrast to the approach taken by the PSD2, this approach may in the end achieve the level of interoperability that in turn encourages competition, stimulates innovation and delivers customer choice.

CMA's scope is, however, limited to bank accounts and does not include payment card accounts.

New opportunities for banks

Repositioning

Technological trends such as APIs have already caused a shift in financial services. Regulation is now set to accelerate the industry's transformation. APIs are consequently set to change the banking landscape and redefine the role banks play in a value chain no longer entirely under their control.

The adoption of Open APIs by the banking sector will accelerate the decline of fully integrated universal banks. The traditional banking strategy of aiming to offer a full range of products and services (from retail to wholesale) to a wide range of clients with all the required infrastructure and back office support under one roof is naturally coming to an end.

Open APIs encourage the process of unpicking of the value chain. By opening up and unbundling the banking process, a new value chain is emerging that will yield a very different financial services landscape.

Banks can choose whether to treat new regulations as merely a compliance exercise or recognise that something more fundamental is playing out in the market value chain.

The worst-case scenario for a compliance only strategy may lead to the bank becoming disintermediated by new TPPs and risk losing contact with their customers. Continuing down this path risks the bank being permanently pushed back in the value chain. Their brand may become less evident in the marketplace. Their new status may be that of utility provider of basic account services.

Banks will naturally attempt at some point to regain their value chain position. However, there will be a tipping point beyond which it will become increasingly difficult for the bank to adjust.

Case studies from other industry verticals show time and time again that a wait-and-see strategy is a highly risky approach to dealing with the threat of digital disruption. It is in effect an attempt to 'time' the market. It is a dangerous approach given the speed at which markets evolve and the number of players now entering the financial services market.

In a new era of API banking, forward thinking banks will identify new opportunities and execute strategies based on newly acquired competencies and internal structures.

Banks can view new regulations as a starting gun for a transformational journey.

Banks as API platforms

New opportunities for banks boil down to a fundamental choice of where in the value chain a bank wants to be. The first option is for banks to position themselves as API platforms and focus on providing services to TPPs. The product roadmap starts with banks leveraging the need to build APIs to comply with regulations as an initial trigger to resource allocation. The first APIs will provide for basic access to customer accounts. These 'regulatory financial' APIs are expected to be made openly available to TPPs.

Next are enhanced non-regulatory financial APIs. These represent a natural product extension from regulated APIs and provide enhanced access to customer accounts beyond what is required by the regulations. These APIs will not be free to TPPs and offer a bank an initial opportunity to generate revenues on API platform. A bank may provide a TPP with complete transaction history whereas the regulatory requirement may require only that last four weeks' worth of transactions be provided. These commercially available data driven services typically fall into three categories:

> The product roadmap starts with banks leveraging the need to build APIs to comply with regulations

- **On boarding and Know Your Customer (KYC) services** that would include attribute verification with the bank acting as a trusted identity provider. This covers a bank providing APIs that allow a TPP to verify applicants age, address, citizenship, employment status etc.
- **Risk and credit scoring services** that would involve the bank combining analytical services with customer account data to provide TPPs with credit scoring services. This activity is currently dominated by a few credit bureaus that rely on less accurate and real time data compared to the data banks could leverage
- **Marketing and insight services** that would also involve the bank combining analytical services with customer account data to provide TPPs with actionable data insight services enabling TPPs to target specific customers with personalised offers. Complying with data privacy laws, such as General Data Protection Regulation (GDRP), is a prerequisite here

Banks as third parties

The second option is for banks to continue competing to serve the end customer. As competition intensifies and being able to offer payment initiation services becomes a key competitive requirement, banks choosing this option will invariably need to become TPP themselves.

If the bank can move fast, this "attacking" strategy enables it to pre-empt the threat from disintermediation. By offering account aggregation service to its existing client base as soon as the regulatory window opens, the bank will be able to mitigate the threat from others. This threat may not necessarily come only from start-ups. Other banks may also choose to become TPPs and use account aggregation services as a new customer acquisition tool.

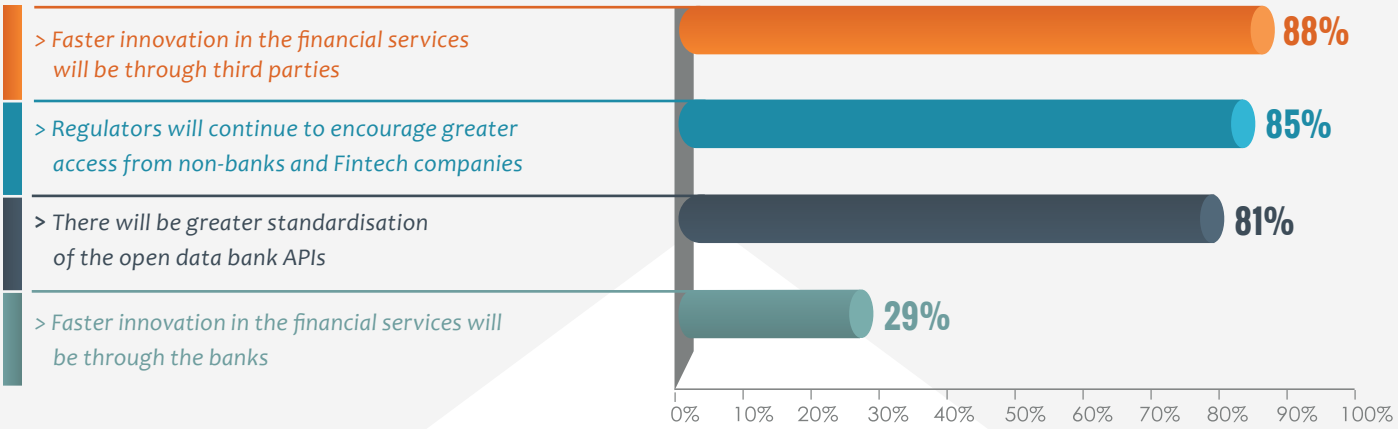
An obvious strategy would be to offer an account aggregation service to get closer to new customers and then use instant KYC APIs to fast track their on boarding. This kind of approach may be very effective in the SME banking market for where pre-approval of credit lines and loans could be offered to clients on case-by-case basis.

The impact and fit of such a strategy will depend on the banks existing business model. The impact and risk of disintermediation may be greater for private banks where close client contact is central to strategy, compared to a digital bank where customer relationships are already remote.

What becomes evident is that at some point both strategies become intertwined and support each other. As banks' API platforms mature, they can develop a sort of app store approach to supporting and accrediting third party developed APIs and applications on their platform. Or, they can start building products and services based on the integration of their own data with data derived from multiple external sources.

Banks may, of course, decide to pursue all of these options. Organisationally this makes sense. The majority of bank product teams will continue to develop digital

The outlook for API banking over the next five years



propositions to serve the existing client base. Becoming a TPP to be able to offer competitive services will become the new normal. New competencies will most likely be added to existing teams.

In parallel, an entirely new business unit might be built around the API platform opportunity. While it may start out as a cost centre for banks to build and maintain the free Open APIs, it could turn into a profit centre as APIs for enhanced data services begin to be offered on a commercial basis.

A bank might view the API platform as a 3-year business case with positive cash flow from paid for services in years 2 and 3 eventually off setting negative cash flow in year 1.

For larger banks with multiple subsidiary banks, the API platform could be developed at a group level. Hence, subsidiary banks would themselves plug into a single platform to gain access to enhanced data services. These might be advanced analytical services based on big data sets from across the entire bank. This would become the natural home for advanced AI services. In this model, subsidiary banks would then be freed to focus on serving their specific consumer segment.

The programmable banking enterprise

In the end, the API driven approach described above naturally leads banks to embark on a transformational journey. The end result will be a very different looking bank. It's a cliché to say that they will be open banks, so let's use another turn of phrase to describe the new digitalised bank. The bank as a programmable enterprise possibly better describes the new role for banks in a financial value chain dominated by APIs.

There should be no surprise that APIs are set to change the banking landscape and redefine the role banks play. The majority of our respondents (88%) believe faster innovation in the financial services will be through third parties over the next five years. Only 29% believe faster innovation in the financial services will be through the banks. 85% think regulators will continue to encourage greater access from non-banks and fintech companies, and 81% think there will be greater standardisation for open data bank APIs.

Ambitious banks will be keen to be seen as first movers. Ultimately the difference between being a first mover or strong follower may not be significant, but a bank needs to make sure it is not left too far behind, standing still, but then forever trying to play catch up.

MOBILE BANKING

Faster Payments
The long journey

In the early days of banking, cheques were the only alternative to cash for moving funds from one account to another; eventually, electronic payments and funds transfers via card networks payments or bank accounts and electronic bank transfers grew mainstream. Bank transfers or electronic funds transfers from one bank account to another are often referred to as "wires" for larger value transactions or "automated clearing house" or ACH for smaller transfers.

Card networks and inter-bank transfer platforms represent the two primary rails over which a majority of the world's payments operate.

In recent years, new types of payment rails have emerged. These range from fast closed-loop platforms (e.g. PayPal) to a new generation of real-time or near real-time payment schemes that bring an updated value proposition, robust functionality and promising support for distributed ledger technologies (DLTs) and are challenging traditional models.

In the past, the payment systems were predominantly under the control of banks and had no need to be connected to other platforms. Today, banks have lost significant influence over the global payments infrastructure for several reasons. The international card networks, such as Visa and Mastercard, previously owned by banks, are now independent entities; new players have emerged offering payment services in competition with the banks; and the impact of regulatory intervention, such as the second PSD2 in Europe, which aims to mandate openness of banking and payment platforms.

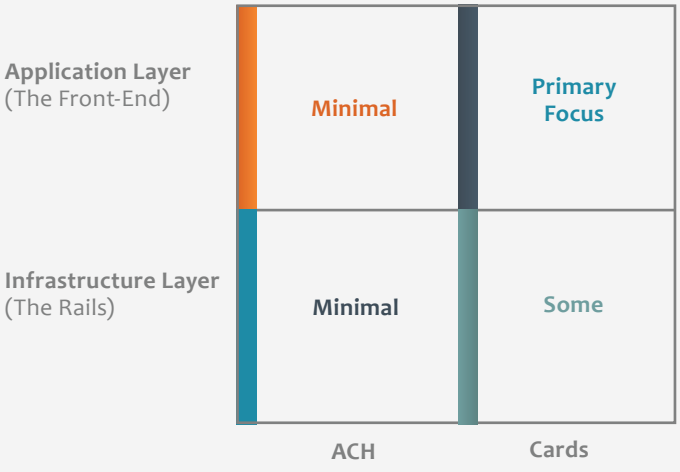
The implications of this transformation are profound for financial institutions, payment service providers, regulators and users. On the surface, the new infrastructure enables enhanced capabilities and improved user experiences, but underneath lies a vigorous demand for service and business model innovation.

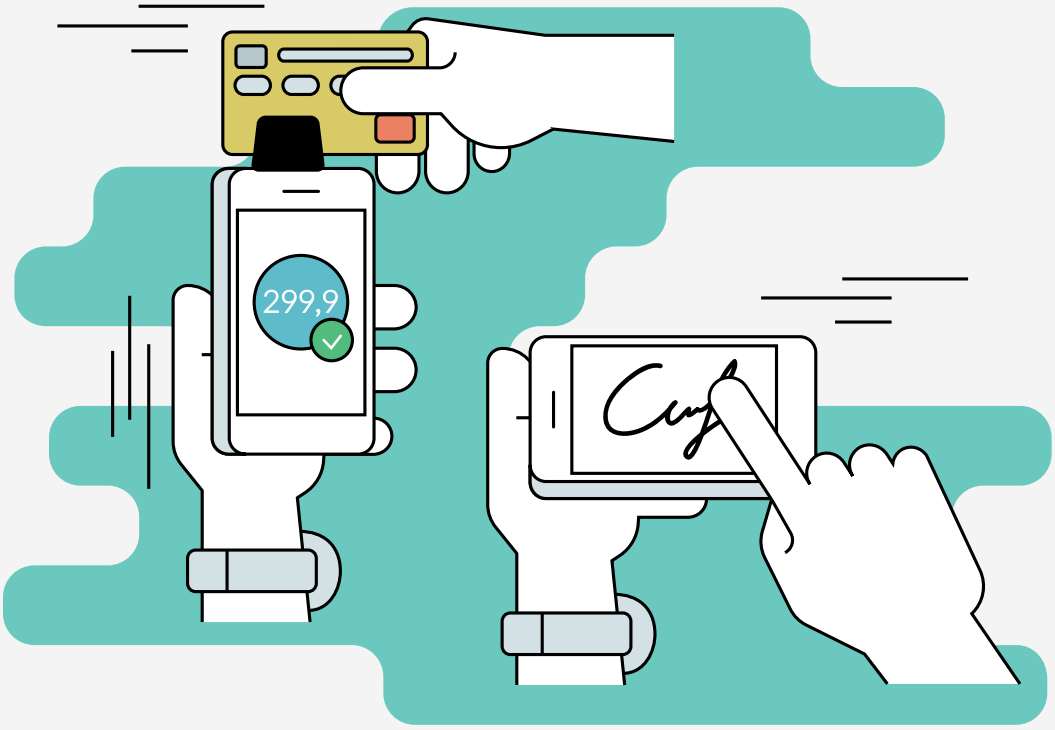
In the long run, stagnation is the perfect recipe for failure. Each player must continuously renew how they contribute, compete and collaborate in an increasingly complex payments industry ecosystem.

A look at past payments innovation

Over the last two decades, the advent of the internet, smartphones and other technologies has brought an enormous amount of change to the payments industry, and with it, lower friction solutions for a myriad of use cases.

Historical focus of payments innovation





Most innovation has taken place at the front-ends of the payment systems, also known as the application layer. In other words, the focus has been on developing solutions that excel at originating and receiving transactions while leveraging existing payments infrastructure such as the card or ACH networks to complete the transfer of funds. Examples of this application layer of innovation include new form factors (e.g. EMV, NFC cards, virtual cards, mobile payments), or new acceptance methods (mPOS, online & mobile payments, etc.).

Interestingly, innovation has primarily leveraged the cards rails rather than the ACH rails. Examining the origins and value proposition of each infrastructure is crucial to understand the drivers of the cards rails success.

The first ACH systems were developed in the early '70s when mainframes computing power was expensive and ran in batches; they were designed to move funds from one bank account to another and features that were not essential were not included. The internet did not exist, thus concerns about interconnectivity, cyber-security or user privacy were not as significant as they are today.

ACH transactions improved in efficiency and clearing houses around the world typically operated as bank-owned utilities providing good value, but transaction speeds remained slow which was inadequate for many use cases. Over time, user expectations expanded and the systems evolved, but the basic design and functionality remained the same.

> "Innovation has primarily leveraged the cards rails rather than the ACH rails"

Meanwhile, the card networks provided several advantages to stakeholders. Their authorisation processes provided a guarantee of payment in real time and a physical form factor – the plastic card – that facilitated its use. Transactions generated revenues for both card acquirers and issuers. And for customers, credit cards provided dispute management facilities and refunds in case they did not receive what they purchased.

ACH payments lacked these features.

Real time payments

Over time, the limitations of the ACH infrastructure became more evident, and markets have one-by-one been realising the need to replace their aging infrastructure. This modernisation has taken the shape of Real-Time Payments (RTPs), sometimes called Instant Payments or Faster Payments. The trend is not new and many countries have operated these systems for some time including Japan (Zengin, '73), Switzerland (SIX, '87), Brazil (SITRAF, '02), Mexico (SPEI, '04), UK (FPS, '08), and Singapore (FAST, '14). Other markets are in different stages of implementation, such as the US with the Fed's faster-payments task force spearheading multiple efforts, Europe with SEPA's cross-border instant payments, Australia with its New Payments Platform, while others are still in evaluating or planning stages.

The speed of payments has been by far the most discussed feature, but next generation payment infrastructures promise a lot more than just speed and include meaningful improvements to other critical features such as richer information, enhanced security, improved end-user experience and network interoperability.

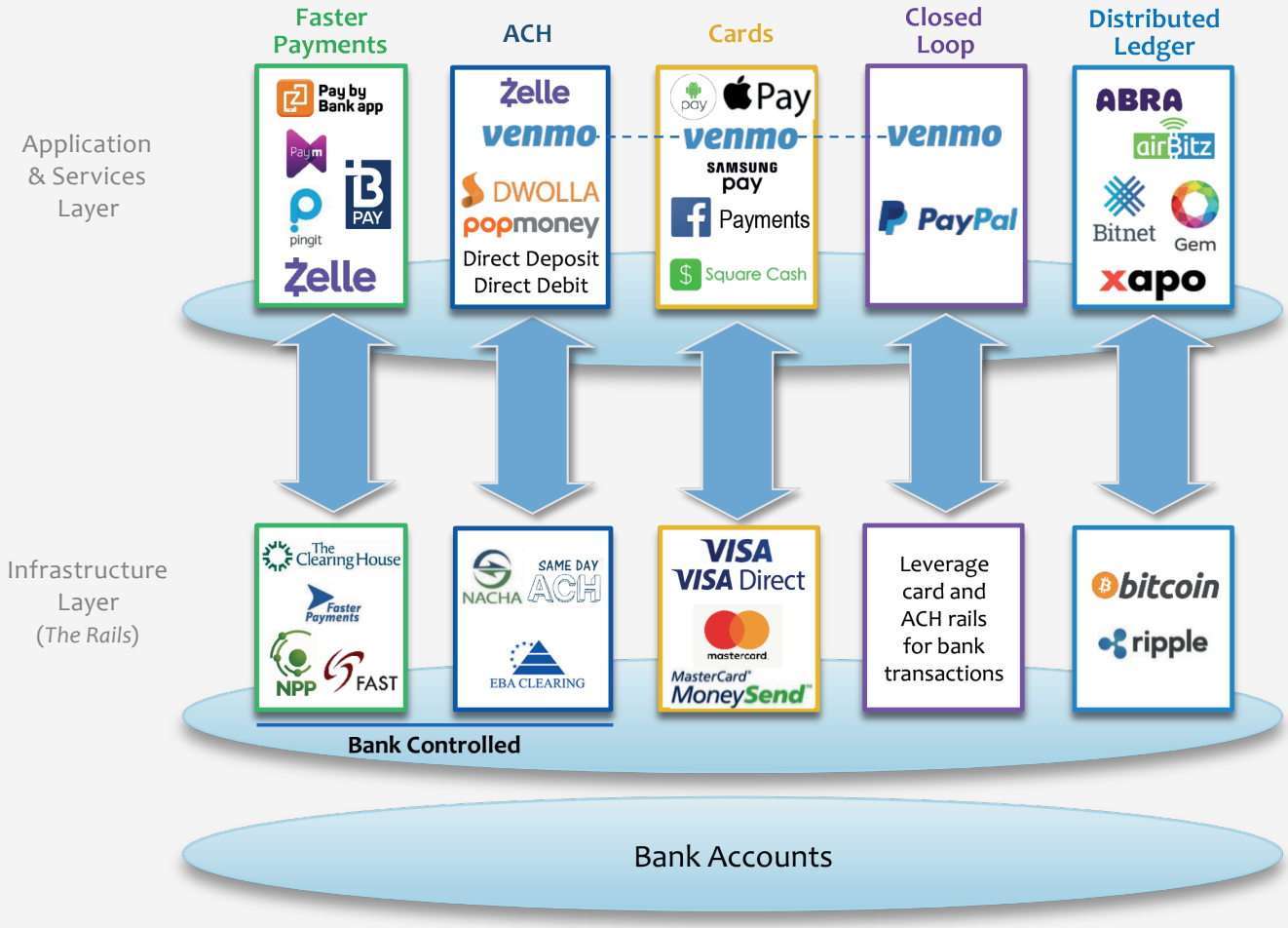
But, what is driving these trends? The old saying goes "if it's not broken, don't fix it", so if the current payment rails are still working, why replace them? Each market has its factors and nuances, let's examine some primary drivers:

➤ First, technology comes to mind. Computer power is now abundant and affordable, many other every-day tasks that are technologically more complicated already work in real-time, like streaming the latest movie or calculating how long it will take your Uber driver to pick you up. Also, payment transaction standards are now mature, and that facilitates the clearing and settlement between financial institutions.

Beyond speed - RTPs offer a rich value proposition

Source: EDC

Current payments ecosystem



Source: EDC

➤ Second, both consumers and businesses demand it. There is an extensive list of use cases where immediate payments will provide a tangible benefit: a late payroll, an overdue payment that will re-establish heating during winter time, the payment for a rush order that will prevent a production line from stopping, the distribution of emergency relief funds, etc.

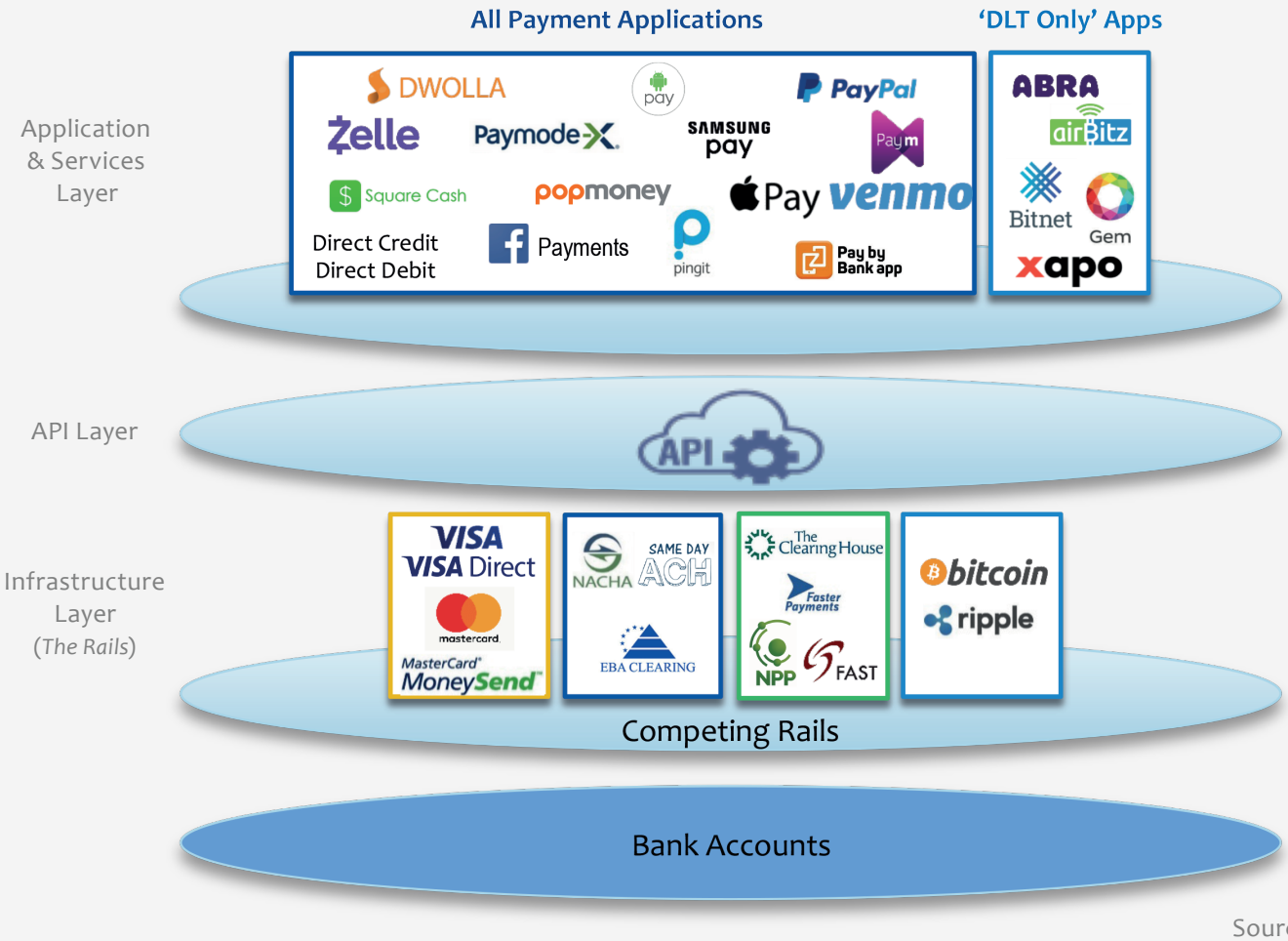
➤ Lastly, regulators have many motives to promote the adoption of faster payments. They recognise the importance of future-proofing their national payment systems; they have a mandate as consumers advocates, and they are concerned about interbank settlement risks and understand accelerating settlements is an effective mitigation.

The creation of a new payments ecosystem

The cards and ACH rails have different value propositions and serve different use cases. Each network used to work as a silo and there was limited interaction and competition between them. Banks in most markets owned and controlled both payment rails. They also owned the two major global card schemes. But this situation changed with both Mastercard and Visa going public.

With the independence of the card networks, the payments ecosystem became more open and competitive. Closed-loop players have gained meaningful market share in certain niches, and there is a nascent competition from DLT disruptors like Ripple. The increased accessibility via APIs to the payment rails has led to an explosion of new applications developed primarily by fintechs that ride over the existing payment rails.

Tomorrow, payments applications may ride multiple rails



Source: EDC

Going forward, it is not difficult to imagine a future where the cards and faster payment rails are robust enough to carry even the most demanding and sophisticated transaction types. Also, given the ongoing level of attention that most stakeholders are placing in DLTs, it is reasonable to expect regulation will adapt, and capabilities will mature to the point where today's concerns are no longer an issue. DLTs may soon successfully compete with other rails, and may even have an advantage with use cases where the dependence on a single central operator may not be in the best interest of all parties, such as cross-border transactions.

If these scenarios materialise, payment applications may have multiple payment rails to choose from. Connectivity will be easily achieved through open APIs and they may even be able to dynamically route transactions to the rail that best optimises a particular need, like cost, speed, security, messaging, etc.

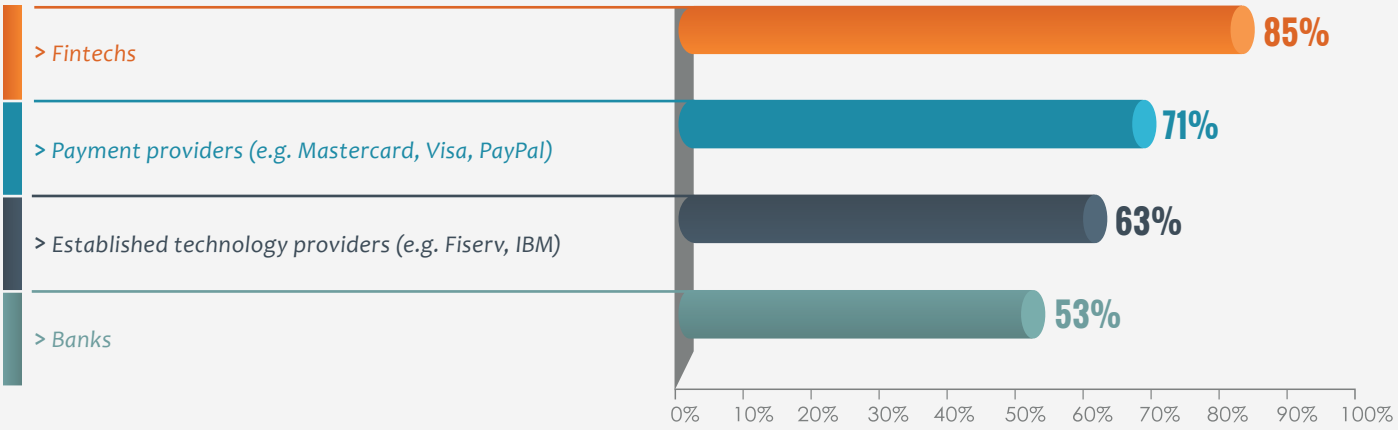
The importance of RTPs for banks and fintechs

Today, the aging ACH rails are the only payments infrastructure still primarily owned by banks, and thus the new RTP rails represent a critical opportunity to take the lead on payments innovation and regain some of the lost influence and control.

In contrast to the ACH or cards rails that have evolved their capabilities over time, today's RTP rails are designed to meet current requirements and be better prepared to address future needs. They match or improve on the functionality, security and user experience provided by any of the other rails and with the advantage of having lower per transaction processing costs.

Will RTPs enable banks to regain a centre-stage role in payments? What kind of competition will RTPs represent for other rails? Will RTP rails become the preferred infrastructure for the new applications? On paper, RTPs seem to have the upper-hand in cost and technical

Where will innovation come from?



capabilities, but, will that be enough to attract and propel the development of new applications?

Our survey respondents indicated that fintechs and other payment service providers are expected to drive payments innovation, and that banks and established technology providers are expected to play a secondary role.

Nonetheless, a critical factor for answering the above questions is the regulatory environment, and the terms of access different players will have for building applications over the RTP rails.

The impact of European regulation

The PSD2 creates the figure of Payment Initiation Service Providers (PISPs) and mandates banks to open their clients' bank accounts and develop APIs that enable these PISPs to initiate payment transactions on behalf of users. As mentioned in the previous section of this report, this regulation will change banking as we know it, opening the door for fintechs to play a major role in conducting day-to-day payment transactions, and forcing banks to rethink their business model and the way they interact with their customers.

> "...fintechs and other payment service providers are expected to drive payments innovation"

The relative simultaneous arrival of PSD2 and SEPA's cross-border instant payments creates an enormous challenge for European banks, as they will no longer only compete in developing instant payment applications with other banks, but with fintechs who threaten to disintermediate them by handling and branding most day-to-day transactions with their customers.

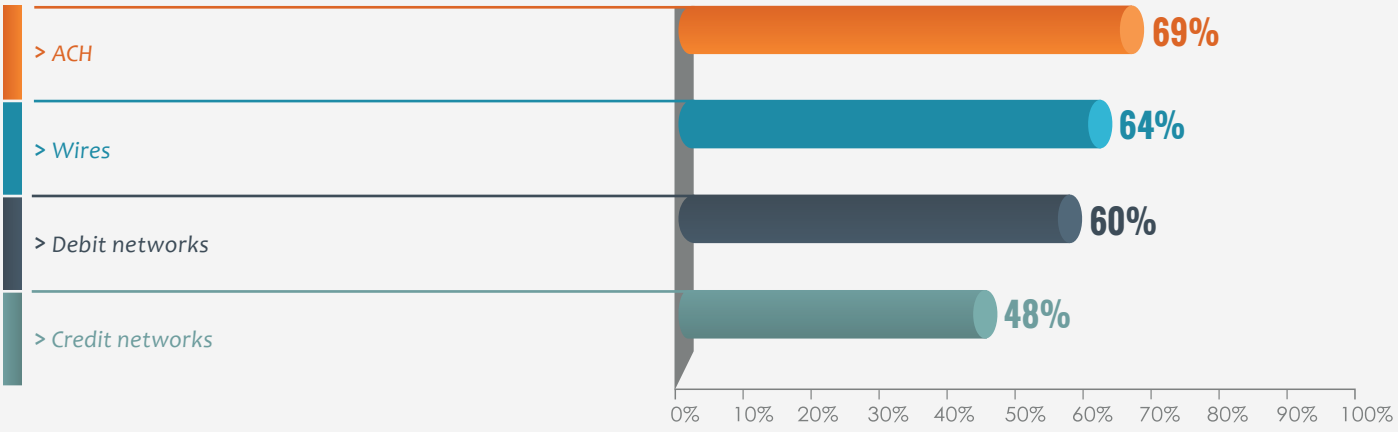
After Brexit, the implementation of PSD2 in the UK faces some uncertainties, although many predict it will still go ahead with some delays. In the meantime, the origination of Faster Payment transactions, as in other markets with live RTPs, is controlled by the banks (e.g. PingIt, Paym, Zapp's Pay by Bank app).

The competitive market in the US

In the US, real-time payment rails offer banks significant opportunity to regain some of the ground lost to the fintechs. However, with almost 13,000 banks and credit unions in the US, the financial attractiveness of RTPs for each bank depends on whether they generate new revenue streams or threaten existing ones.

Corporations and large businesses are expected to have a higher willingness to pay for faster payment services than consumers and thus, in the absence of interbank fees or other revenue transfer mechanisms, wholesale banks will be better positioned to profit from faster payments than retail banks. Also, the possible intrusion of faster payments on all forms of Consumer-to-Business payments will present a challenging business case to financial institutions with issuing and acquiring businesses.

Rails that will see the most disruption from RTPs



From an innovation perspective, fintechs will need to collaborate rather than compete with banks, as partnerships will most likely be required to either embed its functionality within or enable interaction with the banking apps, potentially following a similar model to ZAPP's "Pay by Bank app" in the UK.

Competition of RTPs with other payment rails

In the early days, the most important challenge for RTPs is the need to reach the much-desired ubiquity, especially in markets like the US where there is no regulatory mandate, there are multiple competing solutions, and interoperability between them is still in the works. This means each of the RTP solutions needs to convince as many financial institutions as possible to join the new scheme, and each bank needs to reach the conclusion that it is in its own best interest to offer the service.

ACH

At the outset, the fact that every single bank is well equipped to originate and receive ACH transactions presents an enormous advantage, but once RTPs services reach reasonable ubiquity, generating adoption will become easier and the migration of ACH transactions to the new platform will accelerate.

Initially, these transactions will be credit-push payments for which the speed, enhanced information or some other capability makes a meaningful difference; but as the RTPs infrastructure matures, there will be less incentive to stay on the traditional ACH rails.

There will be challenges along the way, for example: bill payments in the US will need to be converted from debit-pulls into a credit-push model; but as ACH volumes decline, per transaction costs will rise, and while this happens the opposite will be true in the RTP case, as transaction volume increases, per transaction costs will drop. Gradually, as the RTPs become viable solutions for all stakeholders, the value of maintaining the old platform will diminish and some markets may sooner or later decide to pull the plug on the old ACH infrastructure.

Wires

Similarly, Real Time Gross Settlement (RTGS) platforms (e.g. FedWire in the US or CHAPS in the UK) may suffer meaningful volume declines as RTPs gain popularity. The main value proposition of wires is its 'speed' and ability to complete 'high value' transactions.

Speed is no problem for RTPs, but when new faster payment systems are launched, transaction value limits are typically set relatively low; for example, SEPA's instant payment will have an initial per transaction limit of €15,000. As risk management and fraud detection systems are tested and early security issues are addressed, these per transaction value limits are expected to increase, further cannibalising wires volumes.

Debit and credit networks

We have already established that the latest generation of RTP rails can enable almost any use case, and although they do not have a plastic card for use at POS, mobile phones are one of several work-around options that make this issue less critical. Also, while RTPs don't have native credit capabilities, it would not be too difficult for financial institutions to link a credit line to them. In other words, RTPs can play in the same space as debit and credit cards, and are consequently attracting the attention of merchants interested in lowering their payments acceptance cost while improving the consumer's experience.

This does not mean, however, that banks will be eager to price and position RTPs solutions in direct competition with their card issuing and merchant services businesses. In markets like the US where interchange is relatively high, merchants and solution providers may aggressively seek access to the RTP rails with the objective of lowering payments acceptance costs. Hence, the terms of this access or lack thereof will be a critical factor determining the level of competition, speed of change and outcome of this battle.

In the meantime, debit and credit networks are not standing still, they are expanding their non-POS payments capabilities with push payments solutions such as Visa Direct and Mastercard Send. These services are aiming at broadening the battleground to other use cases like B2B, B2C, P2P and cross-border, making the overall competition much more attractive.

Distributed Ledger Technologies (DLTs)

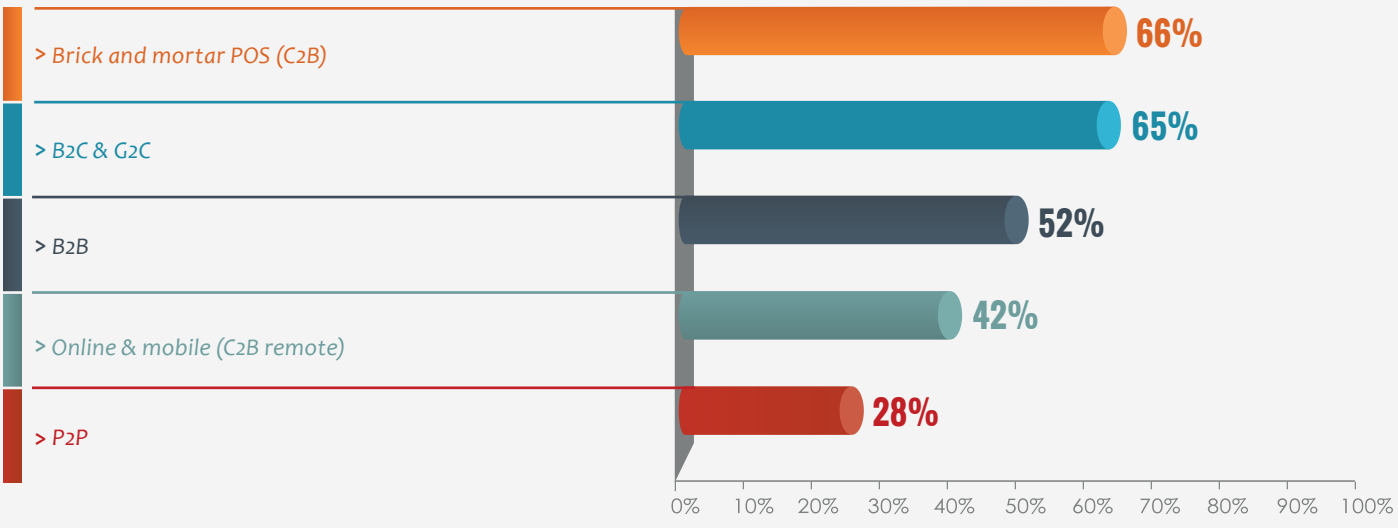
Much has happened since the early days when libertarians viewed Bitcoin as an alternative currency that would liberate consumers from the evil of central banks. Since then, DLTs have attracted a tremendous amount of attention and resources from a diverse set of stakeholders including financial institutions and regulators, and now their potential and drawbacks are better understood.

An important value proposition of DLT systems is their potential to work as a democratised trusted network. This is an advantage for certain use cases, like cross-border bank-to-bank payments, where a central operator may not be fully supported by all interested parties.

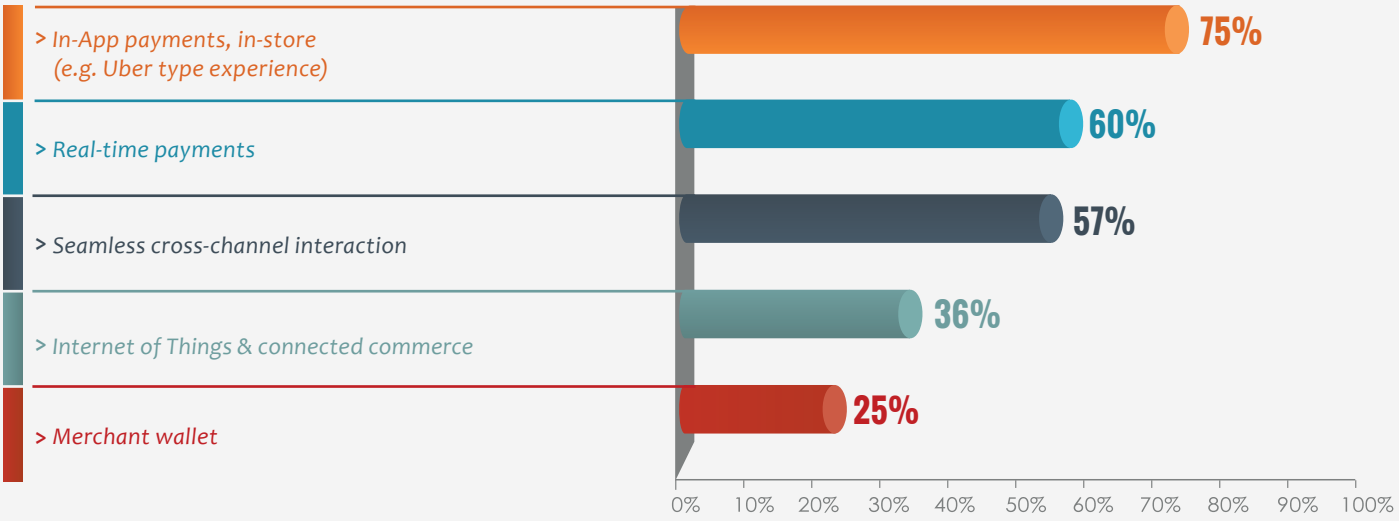
This space is being pursued by new DLT players such as Ripple, which offers a faster and more transparent and efficient value proposition than the correspondent bank model.

While the degree of adoption of DLTs in the future is still uncertain, we must anticipate at least some level of convergence and competition with other payment infrastructures like RTPs.

Use cases with most compelling value proposition



Expected impact on the retail industry



Which use cases offer the most viability for RTPs?

Our survey respondents indicated RTPs would provide the most compelling value proposition for brick and mortar POS payments (C2B) and B2C distributions, followed by B2B payments. They also expect a less attractive value proposition for online and mobile payments (C2B remote) and P2P.

However, the value proposition of RTPs may not be telling the whole story regarding which use cases will reach earlier adoption, as some are better candidates than others to be migrated on the early days. Banks and other service providers are eager to recover their investments and are likely to prioritise use cases that offer the most attractive business cases.

Based on these criteria, Business-to-Business (B2B) and Business to Consumer (B2C) RTPs will probably be at the top of the list, as the benefits are the most tangible and economically quantifiable and hence, offer the banks the best opportunity to monetise them. Examples of these use cases include payment for just-in-time delivery of goods or services; immediate payouts for hourly, irregular or terminated staff; urgent tax and treasury department payments, e-invoicing and Straight Through Processing (STP) with immediate availability of sales receipts; immediate B2P distributions for purposes such as disaster relief, expense advances, loans, gambling winnings and others.

Additional factors playing in favor of B2B payments is that availability of RTP services is expected sooner at larger FIs who serve corporations and large businesses, as they have the resources for early implementation. In contrast, adoption of use cases where consumers are involved, covering all types of B2c, C2B and P2P transactions may take longer as usage among smaller FIs increases.

Although P2P payments are hard to monetise, they are an important use case for RTPs, first, because they offer banks the opportunity to compete with services like Venmo and Square Cash, both currently powered by card push payments, but more importantly because it will generate awareness and adoption from a large consumer base.

Finally, C2B payments in all its forms is a critically, but controversial use case for RTPs because merchants see them as an opportunity to lower their payments acceptance costs and as a tool to improve the consumer's experience, while some banks may fear a gradual impact on their issuing and acquiring businesses.

In markets with high interchange rates, merchants have been looking for ways to decrease payment acceptance costs. But the extent to which RTPs will help them achieve this goal is still unclear, as pricing will likely be determined at a bank-by-bank level. However, RTPs may enable merchants to enhance their customer experience by increasing the speed and security of their payment transactions. Markus Eichinger, Executive Vice President

Global Product Strategy at Wirecard, appropriately points out "Customers demand a smooth shopping experience with an uncomplicated, fast and secure payment process. Technology at the Point of Sales acts as an enabler here."

Besides, merchants may find attractive an expected decrease in fraud, no need for PCI-DSS, and the fact RTPs do not have loyalty programs attached (as cards do), which may make it easier to integrate their own loyalty solutions.

Journey ahead

The launch of SEPA's instant cross-border payments in Europe and the implementation of multiple RTP solutions in the US will impact almost half of the global economy by GDP.

Although hard to determine a specific value, the macro-economic benefits of faster payments to end-users will be clear and significant. Among other benefits, RTP will eliminate the wait for payments to clear and settle, reduce the float, add transparency, improve operational efficiencies and enable better decision making by improving businesses' and consumers' understandings of their cash positions, etc.

For financial institutions, the story of RTP is a bit different and represents both challenges and opportunities. Its implementation will require competing for limited funds and resources, will likely represent multiple technical, strategic and competitive headaches, and may not necessarily translate into an attractive business case. However, the primary value of RTP resides on the strategic value of providing excellent customer experience to the end-customer.

As modern RTP platforms gain global adoption, the payments industry ecosystem will see a gradual but deep transformation. Billions of consumers and businesses will find the wait and friction associated with their daily transactions removed. Undoubtedly the journey to faster payments resembles a long, twisty and complicated road, but there is no reason to slow down.

The Disruption Of Alternative Lending - Fact or fiction?

What is "alternative lending"?

Banks have played an important and integral role in financial services for consumers and businesses alike for hundreds of years. In its simplest form, banks obtain funds such as deposits from consumers/businesses, pay them interest, and then lend these funds out at a higher rate as loans – with banks making money on the interest rate spread. Overseeing this model are government regulations that ensure customer deposits are safe and available.

Banks have traditionally been the primary source of loans and financing. In developed markets, the notion of access to credit to pay for purchases, capital to create businesses or buy a home are well understood by consumers and businesses. In markets such as the US and UK, bank issued credit cards have been the golden and primary purchase financing vehicle for decades.

In recent years, however, according to Thorsten Holten, Executive Vice President Sales Financial Institution

> "The classical lending business as done by banks for centuries is phasing out more and more"

and fintech Europe at Wirecard, "the classical lending business as done by banks for centuries is phasing out more and more. New business models are emerging such as peer-to-peer lending, crowdfunding and factoring platforms, providing alternative and more contemporary solutions to meet the demand of the digital era. There is a lot of movement that supports some promising fintech start-ups who have smart offers for precise target groups such as students, small companies or founders." These "alternative lenders" are non-bank players that compete on the use of technology and data - they are fast innovators and are rethinking the lending process to offer financing options that better suit customer needs. This occurs across many aspects of lending – unsecured personal loans, debt consolidation, mortgages, student lending, checkout lending for purchases at the point of sale, and other financial services (e.g., insurance, wealth management). Some alternative lending businesses have been supported by some giant mobile wallets such as Alipay and PayPal. Some newcomers who started solely as alternative lenders, such as Klarna in Europe and SoFi in the US, have lucrative valuations of over 2 billion USD.

Why has this happened? What products and services are they able to provide and how do these compare to more traditional lending products offered by banks? Although these players have garnered much attention in the media, what kind of traction have they achieved? Have they truly "disrupted" traditional financial services? Do they have

competitive advantages over traditional lenders and if so, are these sustainable over time? We will discuss the future outlook for these "alternative lenders" and the products they provide, compared to the well-established ecosystem of more traditional lenders.

The rise of alternative lending

In many major markets, banks were used to dominating the financial services market and providing services to consumers for years, and they have developed their own infrastructure for payments, lending, and other types of financial products. However, in the past decade, a number of key events and trends have disrupted the industry, created some noise in the financial services market and encouraged fintech innovation. The financial crisis in 2008 has changed the mindset of banks as well as the entire banking ecosystem. Recent technology advancement has also played a major role in creating competitive advantages for fintech start-ups that are able to adopt new technologies in a much quicker way than traditional banks. Because of the technology advancement, consumers have different and higher expectations for financial services providers to market and deliver financial products.

Heightened regulatory environment hampered bank innovation

Regulation in financial services is needed for safety, stability, as well as consumer and financial institution confidence. However, regulation has a direct impact on the supply and demand of financial products, and therefore, there has to be a balance between regulation and innovation. For example, in the US there are a myriad of regulatory bodies including the Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), Federal Reserve System, individual state regulators and most recently the Consumer Financial Protection Bureau (CFPB). Working within the regulated construct is not new to traditional banks – however in the aftermath of the financial crisis, regulations created internal challenges for banks as they reconciled sometimes perceived conflicting regulations and diverted internal resources to manage regulatory efforts and increase number of examinations. At that point in time, the focus was not on how to innovate financial services, but rather how to navigate and adhere to the complex and fast-moving regulatory environment with the various regulators "jockeying" for position. Any appetite to innovate by a bank was significantly impeded within this regulatory environment. Traditional banks were crippled with internal layers of resources and bureaucracy in dealing with regulators, with very little appetite to drive innovation within their products and markets.

Advancement in technology created opportunities for new entrants to innovate

In most developed markets, mobile device penetration such as smartphones and tablets has climbed to a very high level, which created a new sales and marketing channel for financial services providers. Mobile devices allowed financial products to be processed and delivered in a fast and "on-demand" fashion, compared to the physical and traditional online channels. This shift presented opportunities for financial service providers.

In addition, advances in technology and storage of information enabled more advanced processing of "big data". The development of cloud computing and APIs have enabled different software platforms to be connected and communicate in real-time. These new technologies allow the capture and manipulation of large volumes of data at a low cost which not only lowers the barrier of entry for new entrants, but also creates competitive advantages over traditional banks that tend to react slowly due to their complicated organisational structure.

The capture and analysis of enormous amounts of data is one piece of the puzzle. How this data is used is a much bigger question. Because of these new technologies and non-bank's willingness to innovate, they are rethinking

the conventional approach of financial services and credit scoring algorithms based on broader types of data which could be predictive of credit behaviour. This is most widely evidenced in emerging markets with lighter regulatory challenges. For example, in China, the fintech innovation may focus on credit scoring technology and create a new credit infrastructure. The digital wallet giant in China - Alipay leverages Sesame Credit, the credit scoring technology from Ant Financial, that is also a subsidiary of Alibaba, to offer short-term loan service to Chinese customers shopping on Alibaba's e-commerce platforms such as Tmall and Taobao. On the other hand, JD Finance, the financial arm of JD.com, has been partnering with the US-based alternative credit scoring innovator - ZestFinance to create new scoring technologies. ZestFinance is known for leveraging up to 10,000 data points to determine a credit decision. Through this partnership, JD Finance will continue to innovate in the credit scoring arena and offer a range of consumer financial products leveraging the JD.com e-commerce platform.

Consumer preferences and expectations shifted

Because of these technological advancements, consumer expectations shifted especially for the "digital-native" and tech savvy generations such the Millennials and the future Gen Z. Similar to many consumers' real-time and instant experiences in other aspects of their mobile lives, these consumers of financial services to a large extent expect that financial products should be processed and delivered in an instantaneous, slick and easy way. They also expect financial services providers to provide the best-in-class apps to facilitate sales and servicing, similar to Uber, Amazon or any of the other apps with great user experience.

Millennials do not yet have deep relationships with banks, and some do not see banks as a necessity. In the US, Millennials prefer alternative financial products such as prepaid cards over bank accounts with traditional banks. The credit card penetration for this generation is much

lower compared to the older generations.

In China, the financial services market is not driven by traditional banks but by several giant e-commerce and technology companies with massive active user base, including AliPay (a subsidiary of Alibaba), JD Finance (the financing arm of JD.com), WeChat wallet (Tencent), etc. In addition, alternative lenders in China such as the financing companies are generally targeting college students and young workers to buy consumer products that they cannot afford with a one-time payment, primarily electronics. Some offer financing for fashion goods, sports gear and equipment, travel packages and other high-ticket items.

In Europe, checkout lending giant Klarna has been very successful in offering a "buy now, pay later" mentality to the younger consumers.

Changing competitive landscape of lending

Traditionally, financing products are provided by banks, credit card issuers, merchants, and some third-party financing companies with offline application processes, unclear lending criteria and lack of transparency in fees and charges. There is also an argument that restrictions and safeguards from regulatory entities further added complexity to the bureaucratic and often document-ridden application process.

Credit underwriting has been traditionally based on data provided by credit bureaus and risk scores, and analysed by bank lenders with infrastructure with limited data fields and/or capacity to handle much more. These factors have created delays in underwriting decisions and funding to customers, despite existing customer relationships.

> "The competitive advantages of alternative lenders relate to the technology they have developed"

The competitive advantages of alternative lenders relate to the technology they have developed to harness and process data, while providing a superior customer experience. With cloud computing and APIs, alternative lenders are able to innovate and facilitate superior, frictionless user experiences with a simple digital application process and near real-time credit decisions especially on the online and mobile channels. Their use of additional non-credit bureau data sources and new scoring algorithms are allowing them to provide credit to the "least risky high-risk customers ". Alternative lenders' ability to more swiftly recognise and respond to changes in the regulatory environment also strengthens their ability to compete.

The value proposition for checkout lending

Traditionally, merchants with limited involvement in the lending process and limited integration with the lenders often resulted in disjointed and manual purchase and financing experience with lots of paperwork. As e-commerce continues to evolve, there is a stronger emphasis on a seamless and frictionless user experience during the shopping as well as checkout process. With advances in technology and APIs, lenders can now more easily integrate with merchant websites as a checkout option or via e-commerce and m-commerce checkout cart solutions to provide a smooth checkout experience to the customers and offer flexible financing options. Instalment loans with near real-time approvals and transparent payment amounts are important for customers, compared to completing purchases with a credit card.

The value proposition is attractive for both merchants and their customers. Especially for the high-ticket items, checkout lending helps increase the affordability of customers, which then increase sale conversion for

these merchants. In fact, 60% of our survey respondents indicated that checkout lending has the potential to significantly increase merchant sales given the spend and ease of the extension of credit.

For checkout lending, the addressable opportunity is sizable in many major markets such as the US, Europe and China. Opportunities exist for checkout lenders in emerging markets with low credit card penetration, as well as developed markets with higher credit card penetration. More respondents disagree (46%) than agree (41%) with the statement that checkout lending is only relevant in markets with lower credit card penetration.

Traditional banks' advantages

Despite the technology advantage of alternative lenders, their ability to compete against traditional banks is formidable. Traditional banks' advantages are significant and include:

➤ **Low cost and stable funding source:** Banks have built their model on consistent, stable, and low-cost source of funds via their customers' deposits. Whereas alternative lenders seek funding sources through investors - either through "marketplace" models where they pass on the risk or through direct equity and/or debt investments where they retain the risk - these sources are less stable and at a higher cost compared to traditional banks

➤ **Existing customer relationship:** Many banks offer a fuller suite of products beyond loans to include transaction accounts and payments products, savings accounts, wealth management, insurance, and other services to create engagement, retain customers, and ultimately improve profitability. Transaction and behaviour data related to these customer relationships allows for banks to have a fuller view and picture of their borrowers

➤ **Experience and robust business practices:** lending standards, underwriting, risk management, collections, and other operational functions have been built and continuously tested by traditional banks

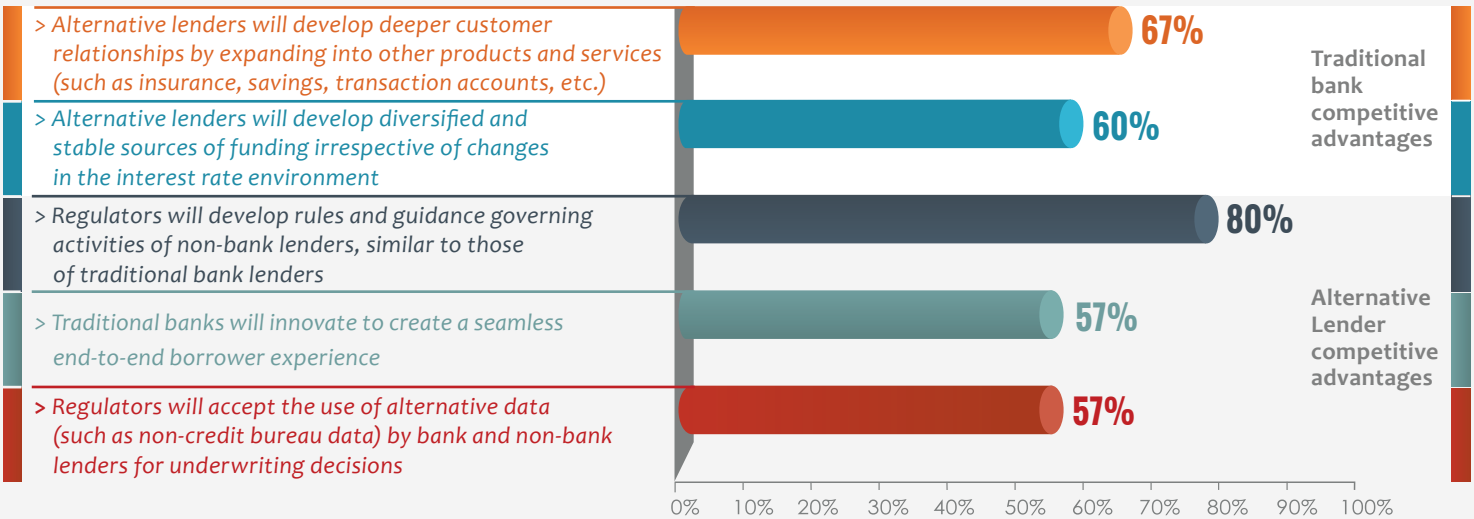
➤ **Brand:** Bank brands have been challenged particularly in the aftermath of the financial crisis. However, their length of time in-market and staying power helps to strengthen existing bank brands, stability, and trust – which are absolutely critical to vie for customer deposits and customer mind-share

➤ **Scale:** Aligned with deep customer relationships with multiple product offerings, traditional banks have also achieved economies of scale

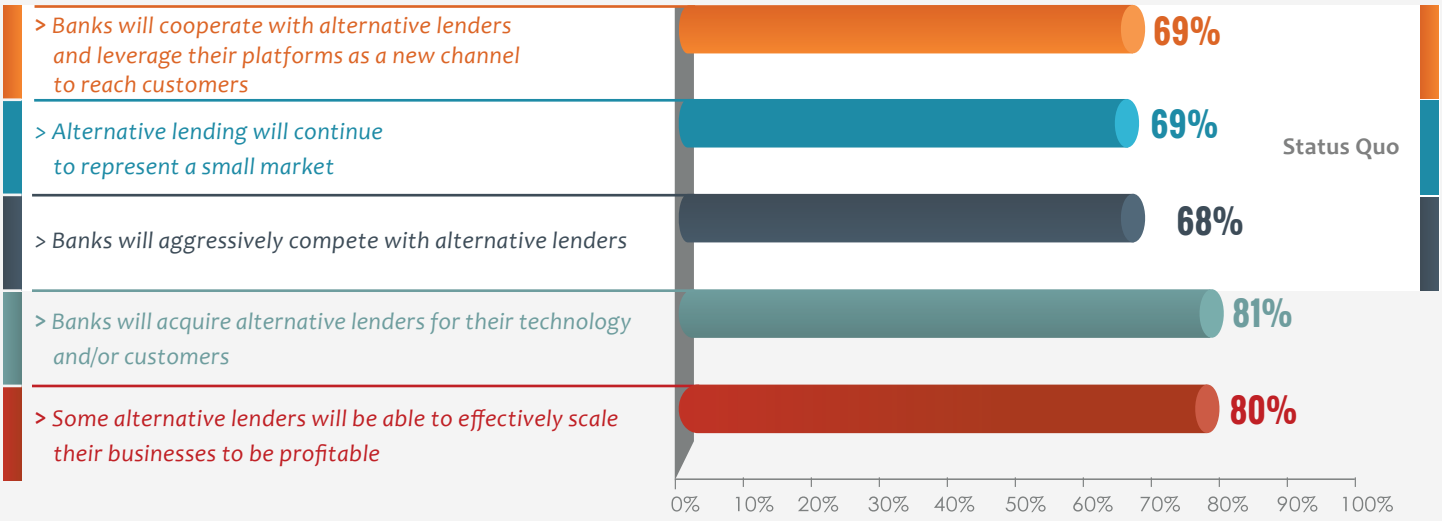
Sustainability of competitive advantages

However, how sustainable are these competitive advantages over time? Could these advantages erode? Is the emergence of alternative lenders a temporary market event or could their advantages change the game going

Regarding Alternative Lending, what are your views on the sustainability of competitive advantages over the next 3 years?



What are your views on the competitive scenario between traditional banks and alternative lenders in 3-5 years?



forward? Since the "technology gap" could realistically be closed over time, could alternative lenders be left with any other competitive-edge?

Our respondents appear lukewarm on many potential shifts in competitive advantages, with the notable exception of the regulatory framework that will govern all participants in the industry, bank and non-bank alike. Over 80% of our respondents believe that regulators will develop guidance over non-bank lenders. This is already being seen in the US, whereby regulations encapsulate non-bank lenders, particularly for those in relationships with banks for any portion of lending activities. In fact, non-bank lenders who partner with traditional banks must adhere to a "vendor management" process that ensures compliance with applicable regulation. It appears that the regulatory playing field is beginning to level – however one could argue that mind-share of regulators with the examination process is still geared towards banks, who have the majority of loans and customers.

67% of our respondents believe that alternative lenders will develop deeper relationships by expanding their product set, while 60% believe they develop a stable source of funding; this is a favourable outlook for alternative lenders, however these opinions are not widely held.

Lastly, respondents generally have mixed opinions on the traditional banks' ability to innovate a seamless borrower experience and the regulators (and market) widely adopting alternative data; both of these lacklustre points of view do not seem to fare well for the banks in the future.

From our experience, it appears that there are areas where the playing field is currently uneven – most notably technology and innovation. However, the technology gap could certainly be closed with select acquisitions (shorter term) and/or internal investments (longer term). Further it appears that the regulatory playing field is beginning to narrow. Given this, alternative lenders will need to harness financial services experience, create brands, achieve scale and "own" ongoing customer relationships – and do this in a way that is profitable and can compete against bank's low-cost source of funds. Any significant change in current economic conditions – including rising interest rates thus impacting cost of funds, changes in credit cycle and increased delinquencies, etc. – could drastically change the outlook for an alternative lender.

The future of alternative lending – changes in the supplier landscape are far from over

Over the last several years we have seen an emergence of a new set of players providing financial services and loans to customers, competing on innovation and addressing customer needs in a unique way. The staying-power of this new group of lenders will depend on continued borrower demand and the ability for these lenders to

effectively and profitably compete against traditional banks over time.

Whereas the future is yet to be seen, some industry dynamics and continued evolution are likely, including partnerships and market consolidation. There may also be some alternative lenders who are able to effectively scale and compete within their market segments.

Majority of our respondents believe that there will be significant developments in the next 3-5 years, beyond the "status quo" developments that we see today (partnerships, competition, market penetration). 81% of our respondents believe that banks will acquire alternative lenders for their technology and/or customers, and 80% believe that alternative lenders will scale to be profitable. While these seem to be conflicting, the survey respondents' future outlook on the market seems to include both bigger banks with acquired technology, and some remaining alternative lenders who are at scale and profitable.

Partnerships and cooperation to expand reach will continue

The market is beginning to recognise the strengths of the different parties and some are beginning to work together. Traditional players have broader and longer customer relationships while alternative lenders have innovative and home-grown products that offer compelling user experience with simplicity, ease and transparency. Partnerships and collaboration enable both traditional banks and the alternative lenders additional distribution channels for customers – while leveraging the technology of the alternative lender and the brand/trust of the traditional bank. For example, Regions Bank in the US has partnered with both Avant Credit (consumer loans) and Fundation (small business loans) to offer co-branded loans to their customers. Further, Chase has partnered with OnDeck to leverage OnDeck's technology to originate loans. Partnering opportunities also exist within alternative lenders – for example, loanDepot (a mortgage and personal loan lender) has partnered with Avant Credit to form a mutual referral-based arrangement. 69% of our respondents believe that banks will cooperate with alternative lenders as a channel to reach customers.

Despite the partnering and collaboration opportunities, 68% of our respondents also believe that banks will aggressively compete with alternative lenders, and 69% believe that ultimately the alternative lending will continue to represent a small market

Consolidation may occur given changes in the economic environment

Alternative lenders may get a "reality check" when/if economic conditions change. Many alternative lenders entered the market in a time of very low interest rates and low delinquency rates. Significant changes in interest rates could seriously impact funding sources if investors

seek investment opportunities elsewhere.

In addition, unlike traditional scoring mechanisms that banks currently deploy, alternative scoring algorithms by alternative lenders have been developed under pristine market/credit conditions and these lenders have not yet experienced credit cycles. An economic downturn and potential turn in the credit cycle would pose risk to the alternative lenders – particularly those who are "monoline" personal unsecured lenders, since borrowers might not prioritise the payment of these loans when under financial stress.

Some fintech players may scale and lead

Fintech lenders have to find ways to continue to grow their business. A challenge for many alternative lenders will be sustaining their growth and building credibility. Alternative lenders could leverage their existing technology and extend their business via product expansion and/or market expansion.

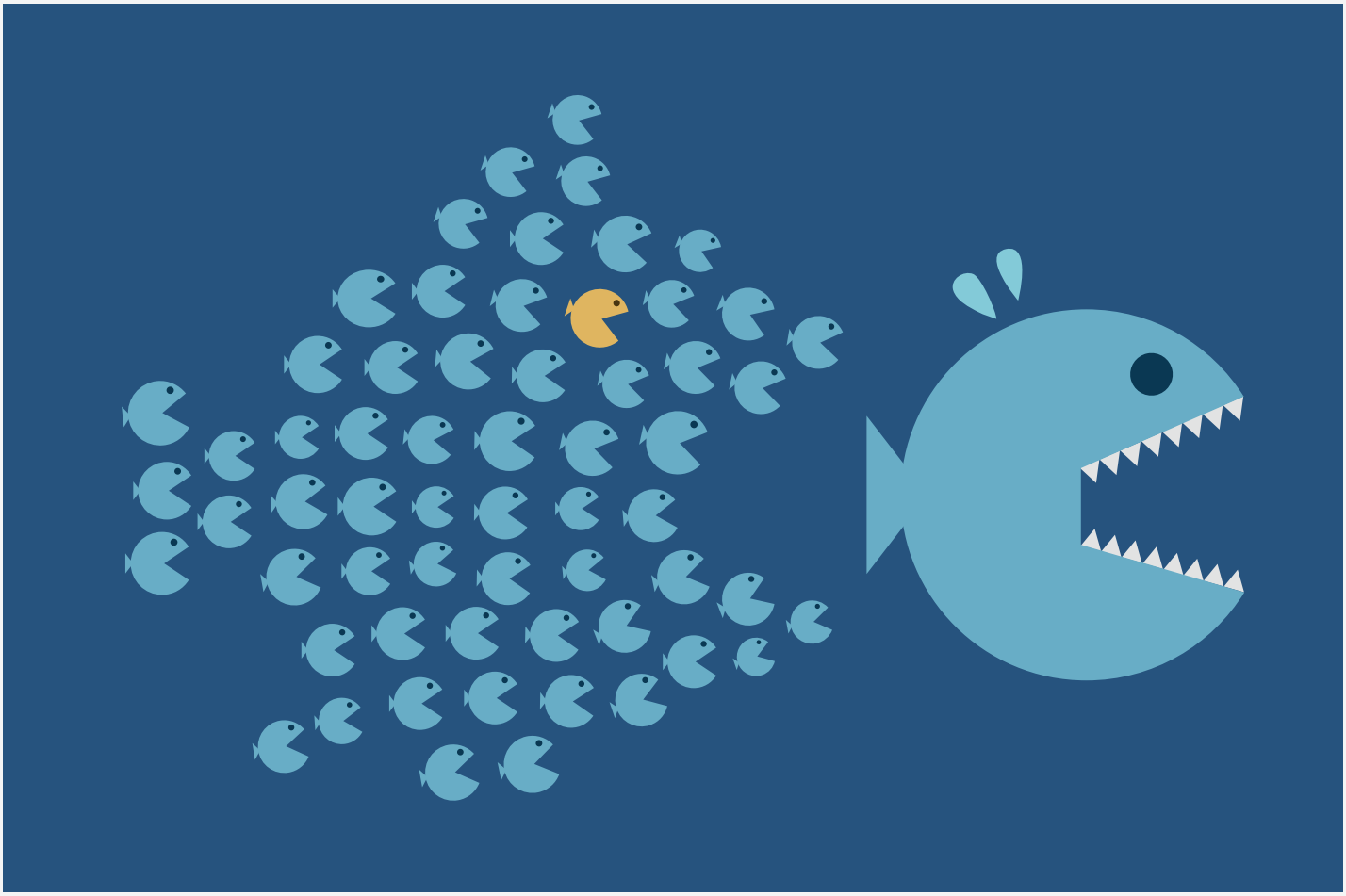
➤ **Product expansion** within the existing customer segment: For any sole lender, building brand is relatively difficult because lending itself is a low touch business with low frequency of customer contact. However, alternative lenders are beginning to expand into additional products to better serve their customers as well as diversify and grow their business.

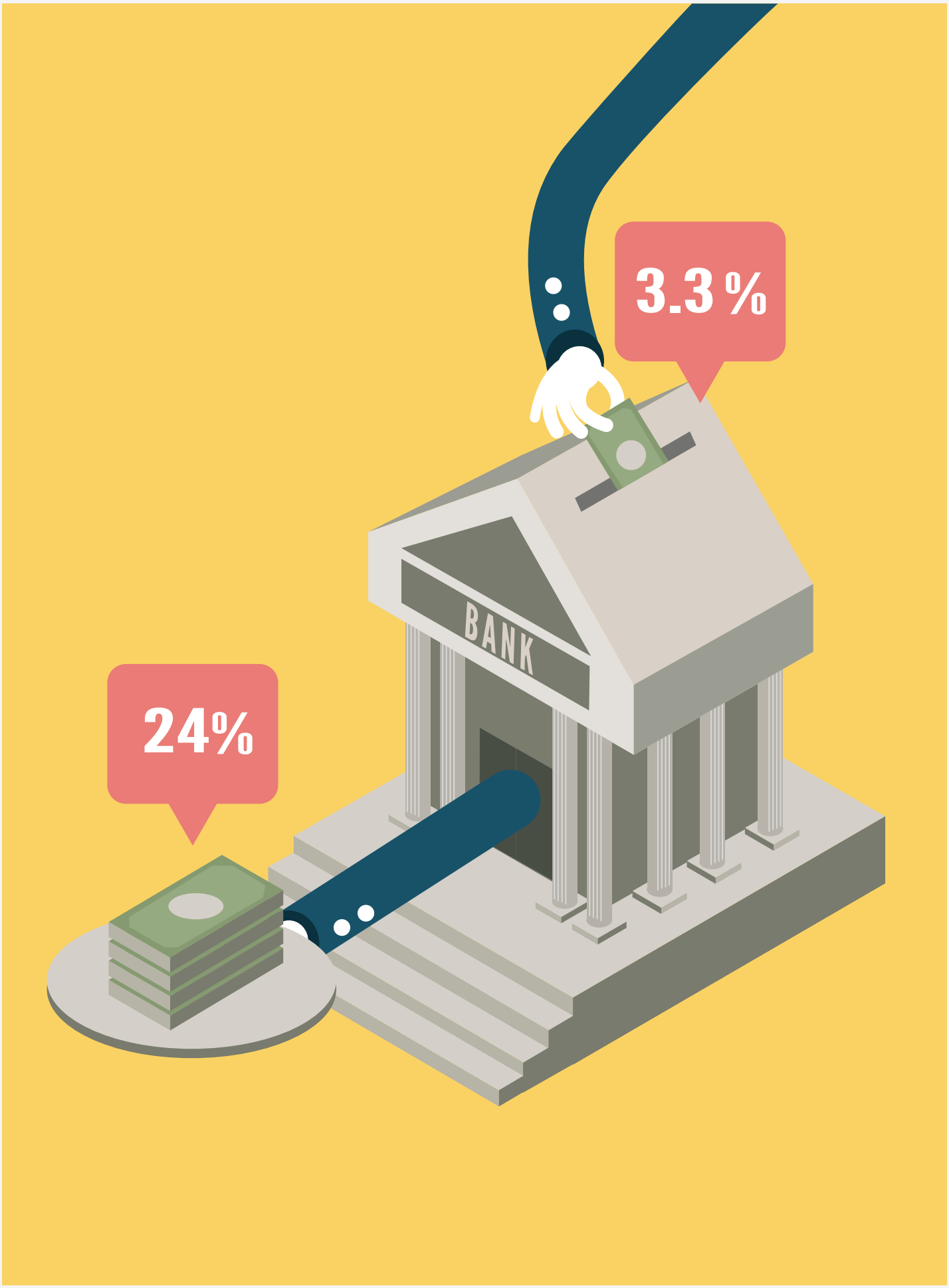
➤ Social Finance (SoFi) has since expanded its product suite for millennial customers from student loans to personal loans, mortgages and wealth management tools. Further, it organises social networking events for their customers to increase customer engagement. Through these activities, SoFi can maintain and engage with their existing customers in hopes of continuing and growing these relationship into the future

➤ LendUp provides an alternative to payday loans and is launching a credit card for its least risky customers

➤ Affirm has acquired a budgeting app to enter the personal financial management market

These growth developments not only help to scale the existing business, but also strengthen the provider's brand while creating a deeper level of customer engagement.

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➤ **Market expansion:** Lenders are also beginning to scale by leveraging their technology and replicating their model into other geographic markets. For example, Klarna started in Sweden but has expanded to other European countries including Germany, France, UK, Spain, Italy and many others. PayPal Credit launched in the UK in April 2016, which was its first international expansion. In 2015, European purchase financing giant Klarna expanded into the US market, and has struck several key partnerships including major US-based retailer Overstock.com and major card networks including Visa, Mastercard, and American Express. In the small business lending space, the UK-based Funding Circle acquired US-based Endurance Lending as a way to enter the US market.

Understanding local market conditions such as regulatory environment, consumer preferences and culture is critical for success. For example, while alternative lending may be an opportunity in many European countries, the learning curve for fintech lenders to succeed in Europe is steep as different countries have different customer behaviours and credit needs. To address the problem, we have started to see market consolidation in the European market. For example, after acquiring Germany-based e-commerce payment leader Sofort for around $150M in 2013, in February 2017, Klarna acquired BillPay from Wonga for $75M to strengthen its market position in Germany.

Apart from geographic market expansion, lenders could expand within their existing geography into different customer segments. Lending Club, known for its consumer loans via its marketplace, has small business lending within its reach. Kabbage, a well-known small business lender in the US, launched a consumer lending arm via its brand "Karrot". It is yet to be seen if these efforts will be successful.

Customers will benefit regardless of outcome

Forecasting by definition is fraught with uncertainty. Trying to fast-forward and assess the competitive performance of alternative lenders is difficult if not impossible. There will certainly be those that succeed and those that fail, but to what extent alternative lenders survive has yet to be seen. One can make bets on the winners and losers but the stock IPOs and valuations, developments that hit the news, could have severe and long lasting impact on specific lenders if not the bulk of the industry.

Despite this, one could argue that it will be the customers that win in the end, regardless of the evolution of the supplier landscape. The borrower experience will likely improve across the lending industry over time, as best practices of alternative lenders are adopted by traditional banks, and vice-versa. Borrowers will enjoy an improved user experience irrespective of the lender – with streamlined process, increased speed and transparency. As more customers go through this new lending process, their experiences will become normal and expected. Banks will have no choice but to adapt with their use of technology to compete with other lenders (both alternative and traditional bank lenders) and win customers who can choose between providers. Further, successful alternative lenders will likely have tested functional experience and customer relationship data – some will also have the ability to cross sell.

In the end, lending is still lending. Alternative lenders are not necessarily changing the game but they are changing the rules of the game. Some new players may prove strong and stay in the game and in any event, it will be the customers who benefit from all who are playing.

> "Alternative lenders are not necessarily changing the game but they are changing the rules of the game"

Concentrating on Customers In a connected world

It is important to distinguish between consumer expectations and consumer needs. Consumer trends in the payments space typically are not driven by what consumers expect but by what they need. Consumer habits are hard to change. Consumers will not switch from a familiar method of payment to something new unless it is advantageous for them such as greater ease of use, enhanced security or cheaper price.

Amazon and Uber, for example, help customers focus on what products they buy or services they use and not on how they pay for them. Every online buyer knows how easy it is to complete the checkout process and make a payment at Amazon. Uber and other popular app-driven taxi services make the payment process automatic or invisible by simply charging the payment to a customer's credit card or another payment instrument "on file". This takes out the time consuming processes of fishing for change, paying the driver or getting a receipt.

In other environments, the payment process is not rendered entirely irrelevant. In fact it is used to offer customers greater choice on how they pay for their purchases. Consumer checkout finance providers such as Klarna and Affirm offer customers with convenient payments - pay now, pay later, request an invoice, pay in instalments.

Regulators are working to change the dynamics of the payment industry, introducing new players in the payment value chain and providing consumers with greater control over their financial data and choice of payment instrument. They are also reducing the cost of payment acceptance for merchants by regulating interchange fees. Regulatory changes in Europe such as those contained in the PSD2 are discussed in greater detail elsewhere in the report.

Technical advances and growing connectivity are working together to shape the "Internet of Things" (IOT) in which machines and devices such as computers, cameras, household appliances, wearables, and even cars and homes will be interconnected. This will create opportunities for new services which will have to be paid for using the most suitable payment methods.

Mobile apps / wallets

Digital wallets have dominated the payments conversation for some time. In 2016 wallets featured in 75% of the 3.5 million payments-oriented conversations monitored on social media sites such as Twitter, Facebook, Instagram and Weibo. This suggests that digital wallets are more prevalent in consumers' minds when they communicate about payments.

Although there may only be a contextual connection between consumers discussing digital wallets and using them to make payments, recent usage levels of mobile digital wallets such as those provided by Apple and Samsung have increased significantly in the more mature markets since they were first introduced.

There were a total of 38 million digital wallet transactions conducted on smartphone devices in the UK in 2016, a year-over-year increase of 247% according to Finextra. Business Insider reports that Apple Pay transactions accounted for 75% of all contactless payments in the US in 2015

and estimates the total value of mobile wallet POS transactions to be $75B in 2016. Should growth in this segment continue, we may soon witness a significant migration from card to mobile "form factor" that has been heralded since the introduction of mobile wallet products to the market. In our survey, 60% of respondents stated that, in their opinion, mobile wallets will evolve to become the primary payment instrument for consumers.

> "Consumer trends in the payments space typically are not driven by what consumers expect but by what they need"

But will the digital wallet evolve to become more relevant to consumers and, if it does, in which direction will the next major evolutionary step occur? Will the range of features and functionality offered by digital / mobile wallets be extended to include more value-added services and / or technological applications? Will the range of possible form factors increase so that a given wallet account can be accessed via multiple and interlinked form factors?

Crypto – far out

Another important development in the digital / mobile wallet market could be the proliferation of crypto-currency digital wallet applications for use at POS. Circle already offers this functionality for consumers seeking to integrate their BitPay wallet within the Circle Android app. They can then pay at POS locations worldwide that accept Bitcoin payments. However, it is important to note that acceptance is still at a nascent stage of development for these products. Perhaps we should not expect many other such apps to be available in the market in the near future given the low levels of user awareness and the lack of maturity of cryptocurrencies at this stage.

Don't pay, walk out

Uber leads the market in contextual payments after the introduction of its 'order as authorisation' model. Other players in the payments space are now following suit. Amazon Go recently opened a physical store in Seattle, where "Computer vision, deep learning algorithms, and sensor fusion" are used to deliver "Just walk out technology." Amazon customers scan an app upon entering the store, pick up any sales item and exit the store without having to wait in line to pay. Amazon will then bill their Amazon account for payment of the item(s).

Although the introduction of Amazon Go could be interpreted as Amazon branching out into the physical retail environment, a more payments-oriented interpretation could be that Amazon is seeking to increase its influence in the payments space. Amazon launched its Amazon Payments Platform in 2013 and has since struggled to expand its customer base, especially among large retailers who see Amazon as a direct competitor. Amazon has recently been pushing its Global Partner Program (GPP) to on-board more merchants so that consumers can pay using their Amazon log-in details via the merchants' online retail locations. It is interesting to consider if Amazon intends to provide its 'Just walk out' technology for free to GPP members for use in their physical retail locations. Amazon would then control a large segment of the alternative payments market in both the online and physical retail environments.

Social commerce

The combination of e-commerce and social networks could, in theory, change the way we buy things online. Social media already plays a key role in the research and discovery process for products. More than half (56%) of consumers that follow brands on social media sites do so to view products, according to a survey by Aimia, a loyalty analytics company. Consumers are increasingly comfortable purchasing online. Worldwide retail e-commerce sales is expected to hit $2 trillion in 2017. Yet social media only accounts for around 3% of online and mobile traffic to e-commerce sites, and just 1% of orders.

There have been a number of attempts to harness the power of social networks for driving e-commerce. The beginnings of social commerce go back to 2005, when Yahoo! combined e-commerce and social functions via the Yahoo "Shoposphere". Users created "Pick Lists" of interesting products they found online which could then be rated and reviewed by other users.

But today, social commerce remains an unproven concept as retailer websites are still the key destination for online purchases. Nevertheless, the leaders in social media (Facebook, Pinterest, Instagram, Snap Inc. and Twitter) continue to experiment different ways to convert their vast audiences into prolific shoppers. The "buy button", rolled out a few years ago, aiming to create a seamless payment process on social media without requiring the consumer to be redirected to a third party site. There have been mixed reports on the success of these buttons but according to the 2016 Digital Commerce Survey conducted by SUMOHeavy, 73% of consumers who have used buy buttons would use them again.

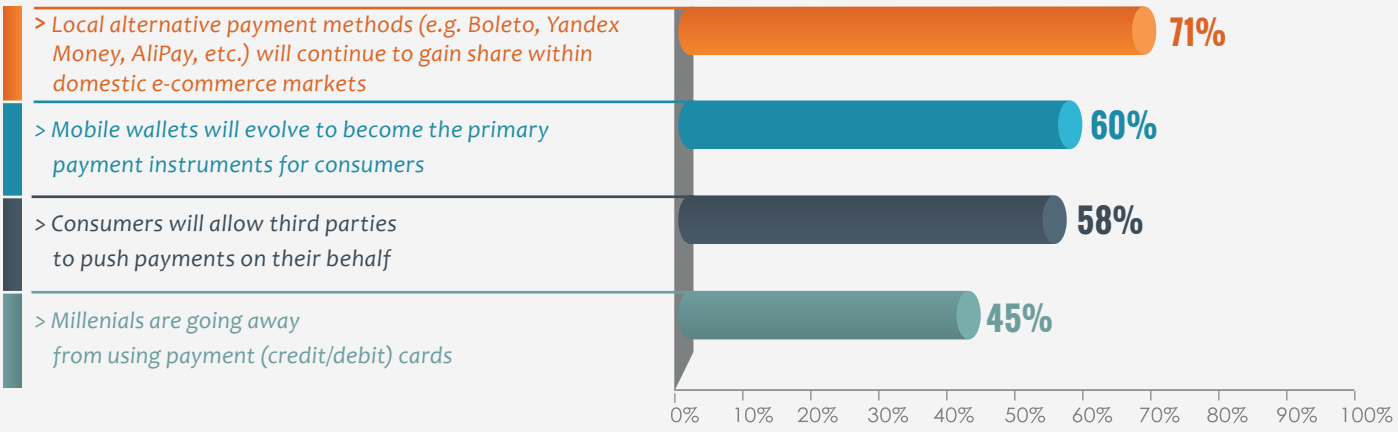
While this suggests the tool has a positive user experience, the mind-set of consumers on various social media platforms will ultimately determine the success of social commerce. According to a Cowen and Company survey, the most popular social media platforms for shopping are Pinterest, Facebook, Instagram, Twitter, LinkedIn and Snapchat (in that order). These platforms are great for discovery and inspiration, but when it comes to purchasing, consumers prefer to take their business elsewhere. Pinterest is one of the leading contenders for making social commerce a success as 75% of its users have bought something they saw on the platform (although not necessarily on the platform). However, not all social media platforms are suited for commerce, Twitter announced in 2016 that it would be removing buy buttons and disbanding its commerce team. They realised that people don't go to Twitter to shop and the rolling out a slick payment experience is not likely to change that.

Social commerce in Asia

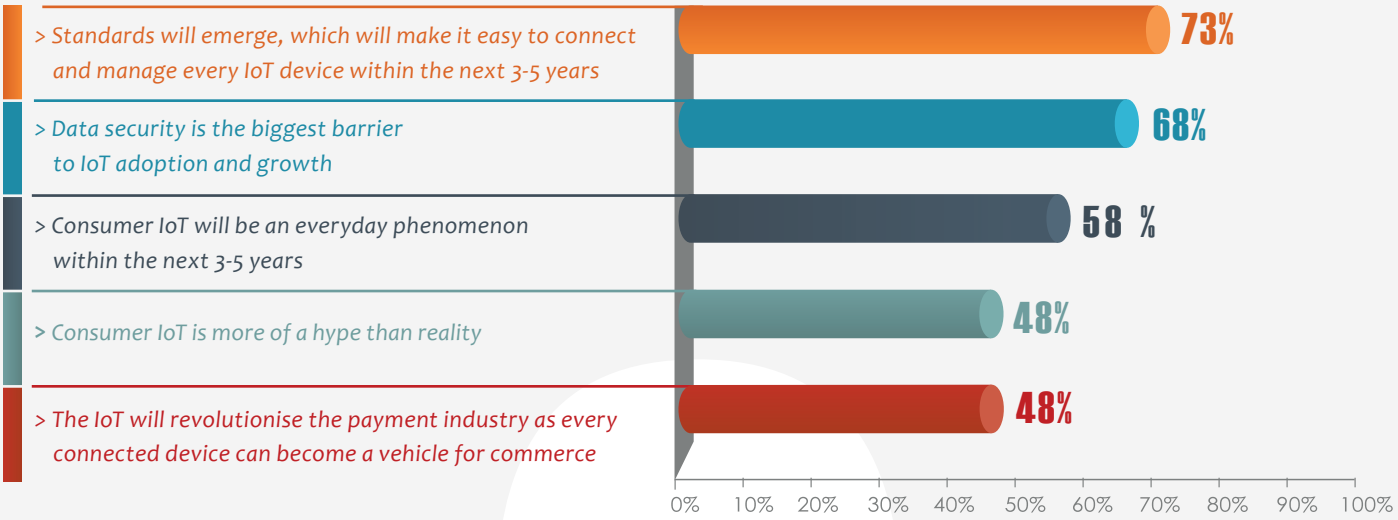
The purpose of social commerce is to enhance customer engagement whether through the website or mobile app. This engagement normally translates to higher sales.

China in particular has seen social commerce bear fruit. According to Business Insider, users of Taobao, a unit of the Chinese internet giant Alibaba, "visit the app more than seven times a day, for a total of roughly 25 minutes". This is significant because it beats Amazon hands down. Users of Amazon's app engage for a mere 9 minutes per day. As a result Taobao experienced a "39% YoY increase in monthly active users in Q2 2016", and its mobile revenues grew to $2.6 billion. A key reason for this success is that Alibaba, or its main rival Tencent, invest in a broad range

Payment methods



Views on consumer Internet of Things "IoT" (e.g. wearables, connected cars, connected home)

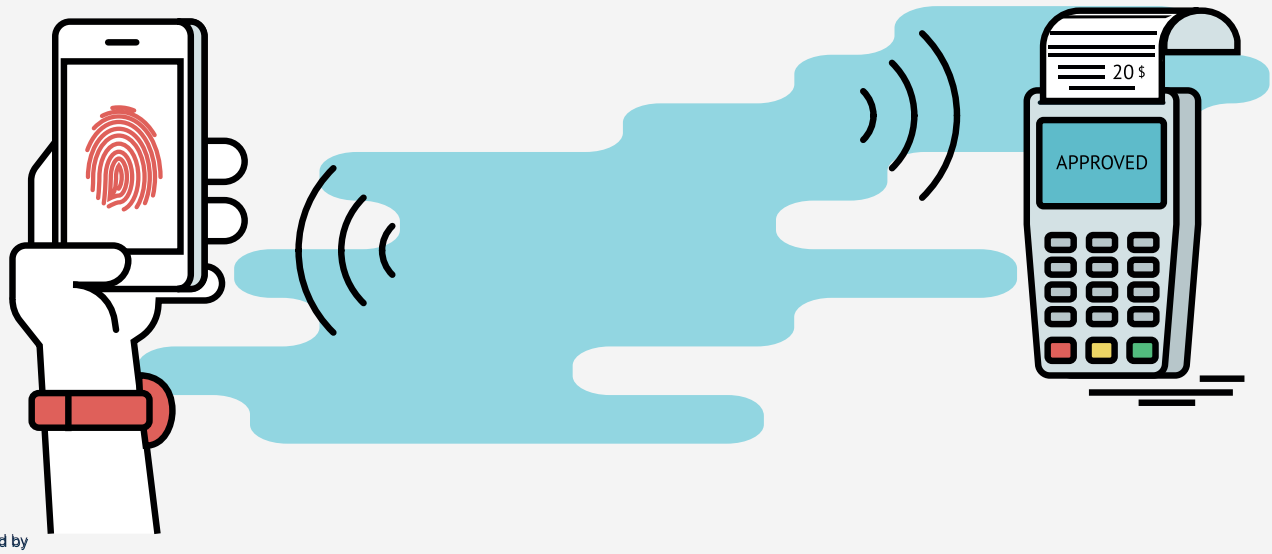


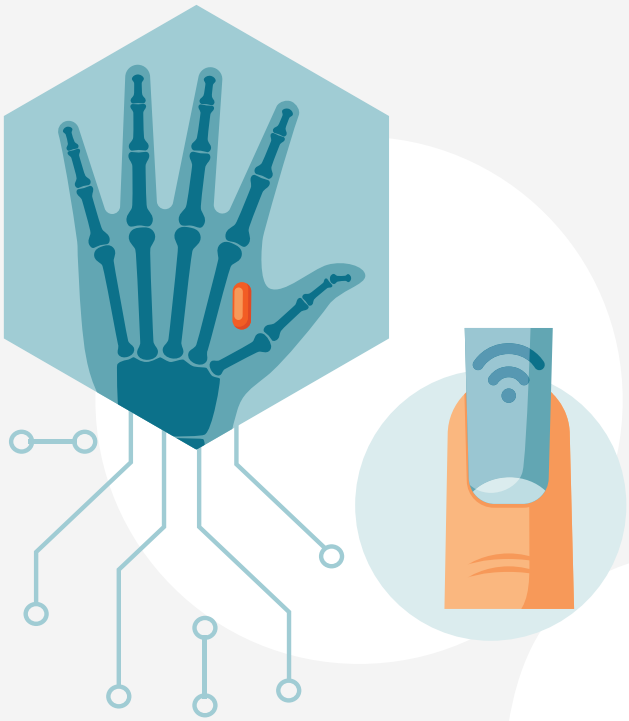
of services, from ordering almost anything online to digital payments, from credit scoring to consumer finance to ordering taxis. They are able to leverage a much wider range of customer data to serve more relevant and meaningful content.

In Southeast Asia, 30% of digital sales are estimated to take place via social media. The leading countries are Thailand, where 51% of online shoppers have purchased goods directly via social media, followed by Malaysia and Indonesia with a third of consumers. Users browse products on Facebook or Instagram (the social media leaders in the region) whose platforms provide a cheap opportunity for small sellers to sell online compared to creating a fully-fledged e-commerce site. Payment, typically a bank transfer, is arranged through popular chat apps such as Line in Thailand. Direct contact with sellers is particularly important for Southeast Asian shoppers to build trust.

The perennial digital debate security versus convenience?

The never-resolved debate about security vs. convenience in payments continued to rage in 2016 as the European Banking Authority (EBA) sought feedback on its Regulatory Technical Standards (RTS) for strong customer authentication; part of which suggested that every online transaction over €10 be subject to strong customer authentication (e.g. one time password or biometrics). These proposals drew criticism from key players across the payments industry who argued this would disrupt online





shopping and cause inconvenience for consumers. In addition, a letter co-signed by 39 European and national organisations called on the EBA to allow for a risk-based approach to authentication.

Our survey respondents see both sides of the argument. 69% believe that the methods of authentication today are insufficient to meet the needs of the digital economy. However, an almost unanimous 97% believe the level of authentication should be tailored to the level of risk associated with the transaction (authentication and the role of digital identity is explored in a separate section of this report).

A revised RTS proposal, published in February 2017, has clearly incorporated industry criticism. The strong authentication threshold has been raised to payments over €30 and risk-based authentication is allowed, if prescribed fraud thresholds are met, which vary depending on the transaction value. Breach of these fraud levels comes with a strict penalty with providers required to strongly authenticate all transactions until the provider is again deemed compliant.

Distracted by the debate between regulators and service providers, it is easy to forget the consumer's perspective. According to a survey by Visa, 61% of consumers would abandon purchases if they were required to complete further steps at checkout. Seeing as the average transaction value for online payments is well above the €30 threshold (~$109 in the UK), it will be interesting to see the impact of additional steps on already poor conversion rates across e-commerce.

Connected things

48% of the senior payment executives taking our survey indicate that connected things or the internet of things (IoT) will revolutionise the way we live, shop and pay. These things include wearables, home appliances, and even connected cars.

Wearables

In 2016, Fitbit, The world's biggest maker of wearable technology, announced its plans to acquire and integrate "personnel and intellectual property specific to wearable payments" of Coin, a payments start-up that developed a "universal credit card replacement" platform. It plans to incorporate Coin's payments know-how and contactless payment features in its hardware.

Wearables encompass all items that consumers can wear, including smart watches, wrist bands, fitness devices, spectacles, and all types of clothes and shoes. Spain's Imagin Bank's new ImaginPay bracelet or UK's Barclays Bank's key fob have been in the market for some time. Consumers seem to be interested in wearables for increased connectivity and convenience. But despite the growth of new devices and firms offering these, sales so far have underperformed.

Design, customisation, extended connectivity and battery life are key aspects that will need to improve before sales and customer expectations can reach a new level. The ability to initiate payments will benefit both – the customer as well as the provider of wearable technologies – to kick start "wearable" commerce and add another dimension of convenience to the way we buy things today.

However, new developments at the cross-section of wearable technology and payments have provided another potential use case for the practise of 'body-hacking'. To protect against it, 'Dangerous Things' has launched a subcutaneous NFC (and RFID) implant that can be used with compatible payment applications, including digital wallets. Consumer demand for this type of personal technology may be limited now, but the availability of this product in the market is indicative of a consumer trend towards smaller, more portable, safer, and most importantly, always-present form factors for making payments.

Smart homes

Smart homes or "Connected Living", according to Jörn Leogrand at Wirecard, "is all about making life easier and more convenient: A fridge that tells us when we're out of milk, a thermostat that adjusts itself according to our preferences. These innovations are helpful because they free up our minds. Gone are the days when we have to make a second trip to the supermarket to pick up the one item we forgot, or ruin a vacation because we can't remember whether we turned off the air conditioning at home."

There has been limited development and low level of smart / connected appliances sales due to the long replacement lifecycle of home goods (a fridge may be replaced every ten years or so), higher prices (are consumers ok to buy a connected oven if it costs twice the price?) and the complexity to offer simple products with advanced functionalities (one single connection / app to control all home devices). However, other initiatives bypassing existing hardware are promising like Amazon's Dash Button which has grown from being used for a single product in 2015 to over 150 today or its Echo loudspeaker, which offers concrete advantages to consumers. Jörn Leogrande predicts that "Invisible apps and seamless payments are the next big step in Connected Living." The integration of payments in a smart home is expected to create a new platform for commerce that will contribute to create added value for consumers.

Smart cars

Smart cars, transit and transportation include all the recent and futuristic self-navigating and self-driving car models (or other means of transportation) that boast a new range of benefits. Consumer expectations are high with an increased need for security, convenience and connectivity. But similar to wearables and smart homes, current sales for smart cars are low, with only a few commercial releases. The market remains fragmented or active in niche providers like Tesla with its electric cars.

Future use cases include cars that automatically pay tolls, service fees and parking fees through a token securely stored in the car. Insurance companies already place tracking devices in cars for lower premiums. This could be changed to dynamic premiums which only enable insurance payment when driving, with factors such as weather conditions, time of day, traffic conditions, all factored in. More time is needed so that new models can appropriately capture consumer expectations in terms of functionalities, connectivity or prices.

Consumer trends for the future

Having looked at a wide range of consumer trends within the payments space, we can see that consumers trends do not typically move in the direction in which consumers expect because consumer expectation is not the driving force behind them. The migration from plastic to mobile, regulation to develop ACH payments, increasing numbers of alternative payment options and providers, the trend towards social commerce, increased payment security and the IOT all have a commonality – they give consumers what they want, and improve upon what they currently use at little or no additional cost to the consumer. We should expect all future trends within the payments space to continue with this approach.

Technology is Changing Retail
A necessity to adapt

The retail industry has undergone massive changes over the past two decades. 1994 saw the first e-commerce transaction, taking place at a tech start-up called Net Market. Founder Dan Kohn sold a Sting CD to a friend from Philadelphia who paid for it using his credit card. Not everyone agrees on the Net Market milestone. But one thing is certain - merchants in 1994 had little idea how big e-commerce would become one day.

Since then, changes in the retail landscape have come quickly, with major innovations happening every couple of years. As Markus Eichinger at Wirecard indicates that "digital payments are the logical consequence of a digitised world – and they offer many advantages such as cross-channel payments, a seamless checkout or international payment processes."

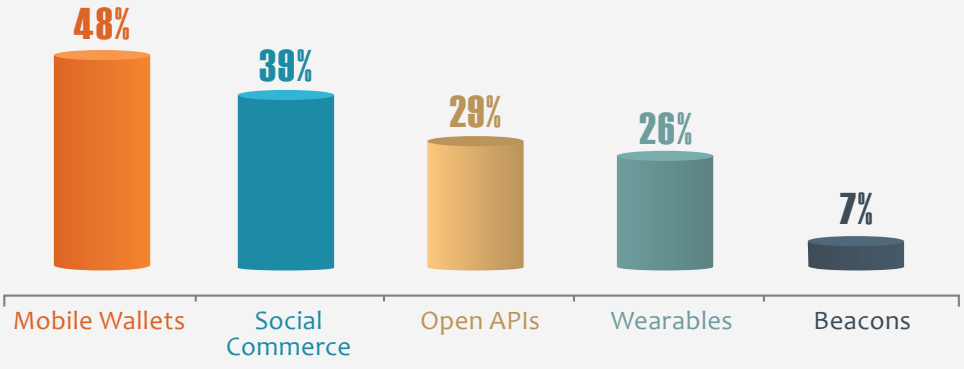
While e-commerce has been the focus of retail innovation, many consumers still want to visit physical stores. The continuing convergence of physical and digital channels has paved the way for Omnichannel retailing, delivering a consistent customer interface regardless of channel. Customers today are well informed and technologically savvy and no longer interact with merchants or service providers over a single point of interaction but use whatever convenient channel combination saves them time to complete a transaction. Retailers who fail to integrate customer facing channels risk customer loyalty. Technology will continue to be at the heart of retail strategy, whether through enhanced customer support, complex order fulfilment or flexible payment options.

Keeping abreast of the latest technology developments is an imperative and our retail survey respondents are taking this to heart. 48% of respondents are already taking advantage of mobile wallets and 39% are integrating social commerce into their strategy. Of those who have yet to integrate with mobile wallets, 55% plan to do so over the next 12 months, by far the most important technology for our respondents in the near future.

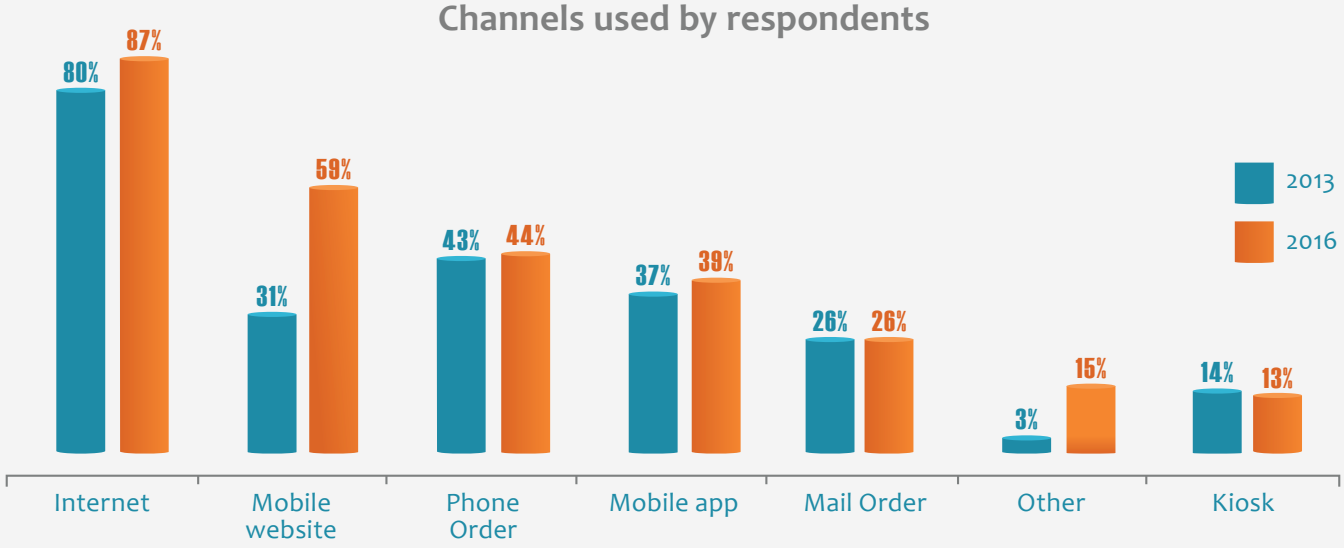
Omnichannel is here to stay

Online retail is experiencing strong growth and much of these gains being made by online-only retailers. Under current conditions of intense competition, traditional

Which technologies are retailers already taking advantage of?



Channels used by respondents



retailers are betting success on Omnichannel retailing. Today, consumers use all retail touchpoints: they buy online, pick-up in-store, use smartphone apps to compare prices, download special offers, avidly make use of in-store digital tools and get their purchases shipped directly to their homes.

In our recent retailer survey, respondents demonstrate a clear trend towards deployment of digital channels to operate alongside traditional means of interaction. Retailers who sell and interact over the internet with their customers increased from 80% in 2013 to 87% in 2016; 37% to 39% for mobile apps and 31% to 59% for mobile websites.

A growing proportion of shoppers happily hop from online to mobile to in-store, on journeys of discovery. They like a product they see on social media, research customer reviews online, proceed to buy it over their mobile device and collect it at a store. Merchants are now ensuring that they facilitate this growing cross-channel shopping trend by re-engineering their systems and processes to provide customers with a consistent and integrated interface.

Payments at the core

Payment is an integral part of the retail experience. It acts as the gateway to a successful purchase. The actual payment process must be simple, flexible and error-free.

Which business drivers would influence your choice of accepting new payment methods?

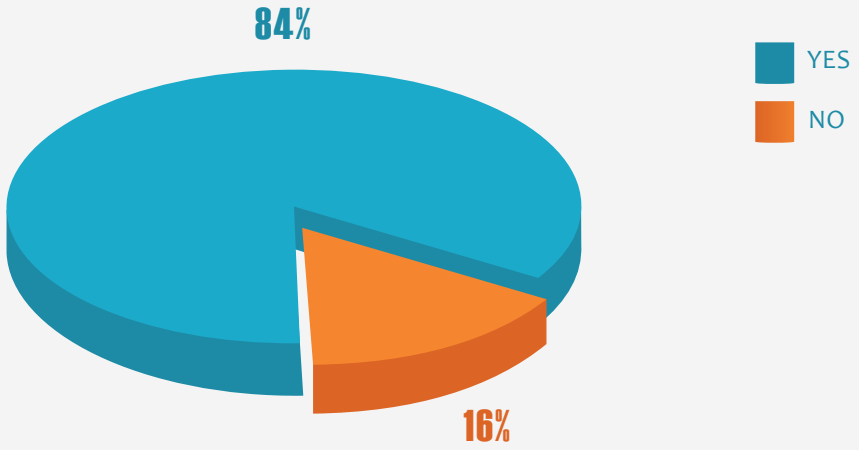
Regardless of the sales channel, customers have a strong response to the payment experience. According to a study conducted for Box Technologies and Intel, 9 out of 10 consumers in the UK would avoid a store if the queues are too long. Research also suggests that most consumers abandoned the mobile checkout process when faced with extra steps and processes such as entering additional passwords.

Retailers acknowledge the significance of the consumer experience surrounding payment. In our retailer survey, 78% of respondents cited an improved customer experience as the most important driver influencing their choice of payment method acceptance.

Additionally, nearly half of the respondents indicated that payment methods are also important for accessing new customer segments and geographies. Accepting local payment methods is becoming increasingly important. For example, a retailer selling to customers in the Netherlands would benefit from accepting iDeal, the most popular online payment method in that country.

Payment methods vary in terms of the benefits they bring. American Express, with its feature-rich programmes, tends to generate higher transaction value than competitors. PayPal provides access to a customer base of more than 190 million account holders. The '1-click ordering' feature developed by Amazon is characteristic of a simple customer experience designed to encourage repeat sales and is positioned at the core of Amazon's payment checkout strategy.

Would you consider using third-party providers?



At ease with outsourcing

As payment complexity has significantly increased, retailers face pressure to be compliant with the latest payment standards. Regulatory constraints, for instance, Payment Card Industry Data Security Standards (PCI DSS) compliance or Point-to-Point-Encryption (P2PE), can create a significant burden on IT resources.

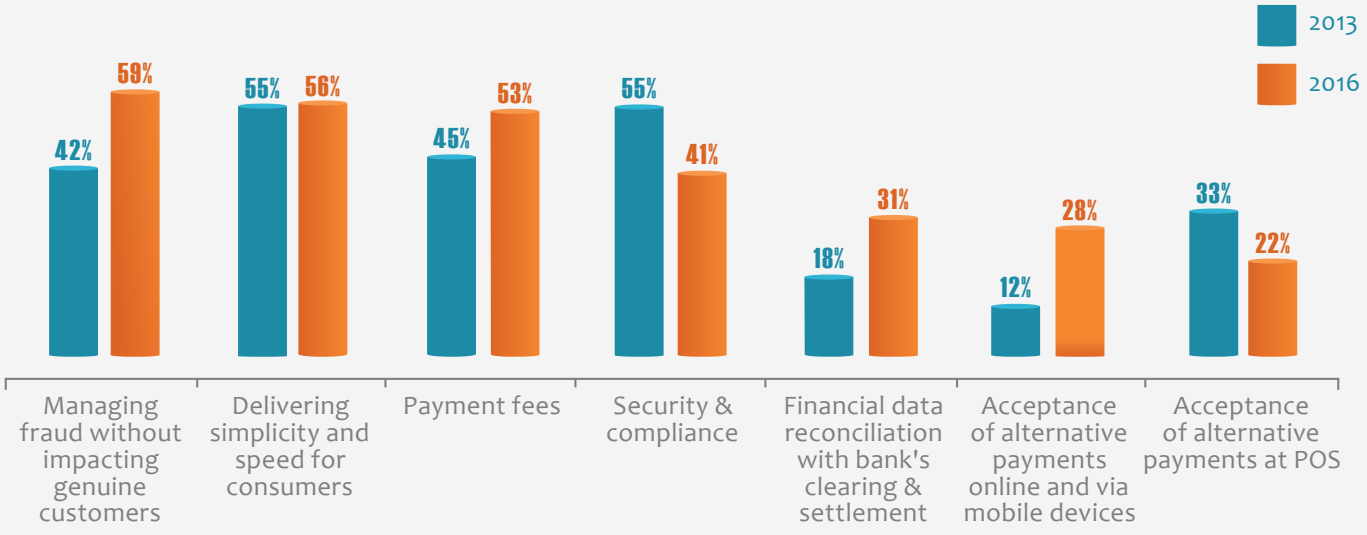
A majority of retailers (84%) surveyed this year indicated that they would consider using third-party providers for hosted services or services in the cloud for payment-related processes. In the 2014 survey, only 60% of retailers had considered the use of third parties. This reflects both the evolving needs of the market and an increase in relative comfort with outsourcing.

Acceptance challenges

Retailers worry about minimising and managing fraud without impacting their customers or disrupting their business.

With consumers engaging across multiple channels with an increasingly complex range of payment methods and devices, retailers are faced with added challenges, including a potentially heightened complexity of fraud management. The increased quantity of personal information shared with various entities across different channels raises customer concerns about security. Security breaches as evidenced in multiple cases in the US and Europe have become a significant issue and source of genuine concern for retailers and customers.

Key challenges in accepting payments



Acceptance of mobile and other new forms of payments is expected to double in the next two years according to a global survey among IT security practitioners, conducted by Ponemon Institute on behalf of Gemalto in 2016. Retailers need to ensure there are adequate levels of security when accepting mobile payments. Survey results show that security in online payments is a top concern but one which has not been fully addressed.

To tackle fraud across all points of interaction, retailers need a cross-channel view of their customer's purchasing activity, browsing history and channel preferences. They must develop complete fraud mitigation systems and deploy adequate procedural controls and safeguards to maintain customer trust.

Consumers today expect retailers to provide sophisticated processes and digital tools but they also, above anything else, desire simplicity. With so many ways to interact, consumers are faced with an overabundance of clutter. A move towards more personalised shopping experiences, with a focus on the information relevant to each consumer, will help relieve some of this pressure.

The driving force

Our survey respondents were asked to indicate which trends would likely have the greatest impact on the retail customer experience over the next few years.

A majority (79%) cited "seamless cross-channel interaction" as most likely driver. This recognises the importance of delivering consistent customer interfaces. But retailers have yet to achieve this. A 2015 Economist Intelligence Unit study found that only 5% of executives surveyed could claim that they had deployed a consistent customer experience across channels.

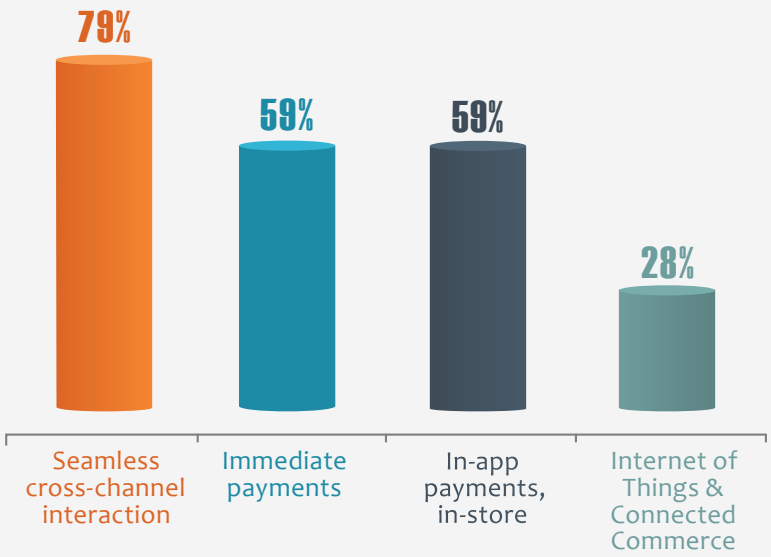
Creating strategies that integrate sales channels is not exactly a new idea. However, when you consider the multitude of shopping channels available and the evolving behaviour and preferences of today's shoppers, the goal shifts from merely improving the customer experience to creating a single customer journey regardless of sales channel. This has become vital to a successful retail strategy – a bad user experience in one channel may impact conversions in another.

Customer interaction has become a key brand differentiator for all types of retailer and will form a crucial driver of customer loyalty. Going forward, there cannot be siloed customer journeys for different channels and delivering consistent, personalised and relevant experiences will be beneficial to both customers and retailers.

In-app payments, in-store

The idea of selecting the products you want in-store, paying and leaving without ever having to go to a checkout or POS system is compelling from a consumer's perspective. The practicalities of this, from being able to identify what a customer has bought to the method of

Which of the following will have the greatest impact on the retail industry over the next 2-3 years



payment itself, have held this back from the mainstream. However, we are now seeing retailers taking on the challenge.

While not a direct comparison to a traditional retailer, Starbucks has been one of the few to successfully deliver this kind of experience. In 2015, Starbucks updated their app to allow customers to order and pay for items in advance, without waiting in line and paying at a POS. Now, many others have followed suit.

Facilitating payment through an app under the retailer's brand is a powerful tool and puts the retailer in competition with open-loop systems such as Apple Pay and Samsung. Walmart Pay, announced in December 2015, has now been rolled out in all 4,600 US stores and represents one of the first major retailers to offer a self-branded payment experience. For retailers without loyalty programmes these payment apps are a way to gain data driven insights into shopper behaviour.

According to Jörn Leogrande at Wirecard, "smart data is a huge opportunity for retailers to find and bind clients by combining customer centricity and data-driven promotional activities. The goal should be to provide customers with personalised offers and in the future maybe with personalised prices. Smart Data means a completely new approach: not only can data be used for risk management purposes, but for creating market insights and new products."

AmazonGo has perhaps gone the furthest in trying to implement this idea. A customer enters the store by scanning an app generated barcode, selects his or her items and leaves the store. The system detects where products are taken from or returned to the shelves by the customer and keeps track of purchases in a virtual cart. The customer is then automatically charged when he or she leaves the store.

These ideas all take elements of bringing the application experience in-store, despite the differences in implementation. The goal in each case is around creating better customer experiences, however, it does suggest that there can be no one size fits all approach and what works in one segment could be unsuitable for another.

Shaping the future of retail

These trends and technologies can certainly be described as taking us closer to a fast and error-free experience that meets customer expectations. Retailers are now placing greater emphasis on the customer experience in both their product/service design and business model. Instead of making heavy investments in advertising or sales strategies, designing systems for better customer interactions is where retailers are starting to differentiate in a highly competitive marketplace.

Being Digital
Highly desirable if not inevitable

Digital identity is undoubtedly emerging as a critical component for the future of digital services. In today's fast-paced, technology-focused world where online transaction volumes are growing year-on-year along with identity theft and fraudulent activities, it is a legitimate concern for entities (individuals, businesses, or legal entities) about the authenticity of their counterparties (i.e. are they truly who they claim to be?).

Currently, the standard identity systems for digital transactions are mostly based on physical documents (passports, driver licences, etc.) and manual processes, which create operational inefficiencies as well as limitations for purely digital offerings. For example, to open a bank account online, consumers would need to manually enter their driver licence or ID number for proof of identity. To apply for mortgage online, consumers may have to scan and submit a list of verification documents such as a passport or letter of employment. In any case, physical identity is not highly secure due to the overexposure of information and the fact that the documents can be falsified, altered, lost or stolen.

However, according to Carlos Häuser, Executive Vice President Payment & Risk Management/Shared Services at Wirecard, "the way in which consumers verify their identity online is rapidly changing, a development which is being driven forward by biometric data. It is very likely that biometric data will become more important as a result of the strong growth in the m-commerce market. The use of fingerprint sensors increases user-friendliness. This involves customers quickly using the fingerprint recognition service on their smartphone to confirm a mobile transaction."

The need for digital identity

The demand for digital identity is clear as it has the power to increase automation, improve risk management, as well as unlock the potential to personalise services and deliver them in a simple, consistent and convenient manner.

The following trends demonstrate an increasing and immediate need for an efficient and effective digital identity system:

- **Internet usage** is growing globally and online transaction volumes are increasing
- **Complex cross-border** transactions are on the rise
- **Fraudsters** are becoming more global and organised costing banks and merchants billions of dollars annually
- **The Fintech industry** is thriving with new offerings that are entirely digital
- **Customers** are expecting better and more efficient interactions with their services providers. Also, they are becoming more technologically savvy and demand greater level of control over their data
- **Regulators** are demanding greater accuracy and transparency around transactions

Three core applications

To recognise the importance of digital identity, it is crucial to understand what it is and how it works. Digital identity can be defined as any process where authorisation, identification and authentication are performed digitally.

Authorisation

Authorisation can be seen as both the beginning and the end of the identity mechanism. In the beginning, it is the process of setting up preliminary rules or policies indicating which users can have permission to transact or access the service system. Once a user's identity is identified and authenticated, authorisation becomes the function of granting or denying access rights based on his or her eligibility (i.e. meeting the requirements under the predetermined rules or policies).

Identification

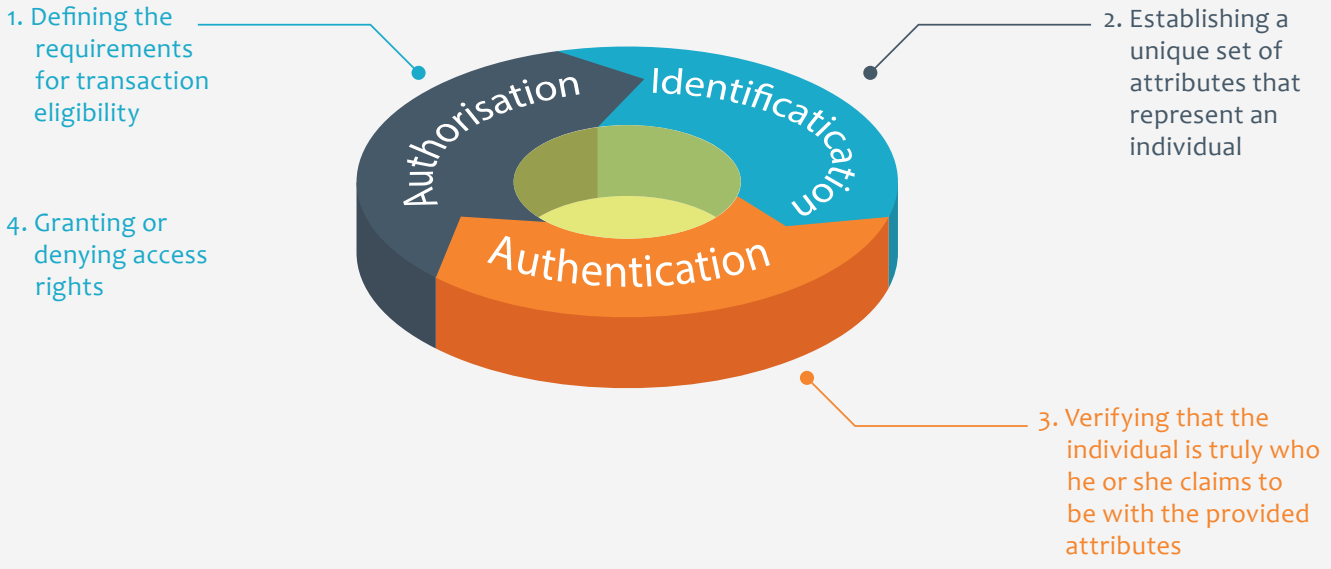
Identification is the process of establishing the attributes that represent an individual, which are broadly categorised by the World Economic Forum into three groups: inherent, accumulated and assigned.

- **Inherent attributes** – attributes that are intrinsic to an individual (e.g. date of birth, gender, biometrics such as fingerprints, facial features, voice pattern, iris)
- **Accumulated attributes** – attributes gathered or developed over time (e.g. medical records, purchase history, preferences, keystroke dynamics)
- **Assigned attributes** – attributes that are reflective of the individual's relationship with other entities (e.g. phone number, email address)

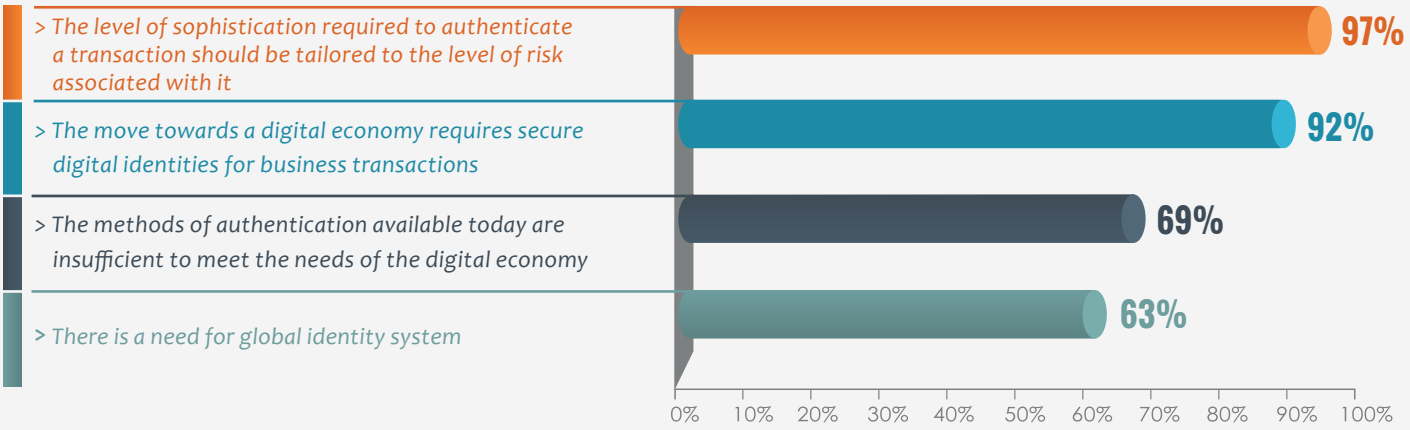
Authentication

The authentication process involves linking these attributes to the individual and ensuring they match. Many different techniques have been implemented for this process ranging from analysis of actions to measurement of body parts to DNA profile. Strong authentication requires payment service providers to apply multi-factor authentication, a combination of at least two authentication elements: (1) knowledge – something only the user knows; (2) possession – something the user possesses and (3) inherence – something the user is. In the US, the National Institute of Standards and Technology provides technical requirements for Federal agencies implementing digital identity services. In Canada, the Office of Privacy Commissioner provides guidelines for identification and authentication that balances the right to protection of personal information with the need of organisations to collect and use that information for legitimate purposes.

Core applications of digital identity



Moving towards secure digital identity



Our 2017 survey revealed that 69% of respondents believe methods of authentication available today are insufficient to meet the needs of the digital economy as evidenced by the increasing number of fraud incidents. 92% believe the move towards a digital economy requires secure digital identities for business transactions. However, not every digital transaction requires a high level of authentication. An overwhelming majority of respondents (97%) indicated that the level of sophistication required to authenticate a transaction should be tailored to the level of risk associated with it.

The link to privacy and security

Personal data is now routinely being collected at an unprecedented scale. With automated facial recognition and location tracking, many individual attributes can easily be associated with identity. The use of big data creates value for consumers and businesses in terms of targeted marketing and improved customer service. But it also creates discomfort and concerns for consumers when their data could be saved and used for some unauthorised and intrusive solicitation purposes. With massive data breaches impacting millions of consumers, entities across the globe are required by law to take extra measures to protect the privacy and personal information with appropriate safeguards even though privacy and security may sometimes interfere with convenience and effectiveness.

In the digital world, exact copies of every transaction or communication can be made and saved. Privacy is easily lost during transactions. To enhance privacy and security, the identity system needs to be able to verify an individual's identity without revealing its digital representation. For authentication purposes, the system would ensure no party receives sensitive or personal information from other parties. For example, the SecureKey Concierge Service in Canada which connects people to government online services using their banking credential, is a privacy enhancing authentication network. When people visit a government services website that offers SecureKey Concierge, they can simply select their bank and login in as usual. However, no password or personal information is exchanged between the bank and the government. The bank does not know which government services users are accessing, and the government does not know which bank the users bank with.

Most of our survey respondents, about 93%, agree that the winning systems need to minimise consumer privacy concerns by providing consumers with more control over the initial gathering and subsequent dissemination of personal data. Consumers should have complete control over their own data and decide how and by whom their data should be used.

Our survey also indicated that 64% of respondents believe consumer concerns about privacy and divulging personal data will limit acceptance. 56% believe consumer experience will be negatively impacted by the additional steps required to input additional information. But an equal proportion indicated that consumers will adopt more secure procedures when they realise they will be protected from fraud.

Digital identity ecosystems

According to the GSMA and the World Bank Group, there are four types of "digital identity ecosystems":

- **Government-driven centralised system** (e.g. Belgium, Germany, Malaysia) – individual's identity attributes are stored in one or more government-owned database(s) and state-issued eID serves as the basis for all or most digital transactions for both public and private sectors. The official eID can be used to authenticate other online transactions (e.g. banking, payments)
- **Semi-centralised, federated system** (e.g. Sweden, UK, Australia) – citizens can choose between multiple, government endorsed digital identity providers (e.g. banks, mobile operators) to access both public and private services via an identity hub that facilitates authentication across multiple platforms
- **Decentralised, open identity market** (e.g. US) – companies in the public and private sectors create, utilise and manage their own digital identities on the basis of a self-regulated framework
- **Self-asserted digital identity** (e.g. Facebook, Google, or other large internet players) – users choose their own digital identity attributes and no verification against official identity documents is required.

Who should be the identity provider?

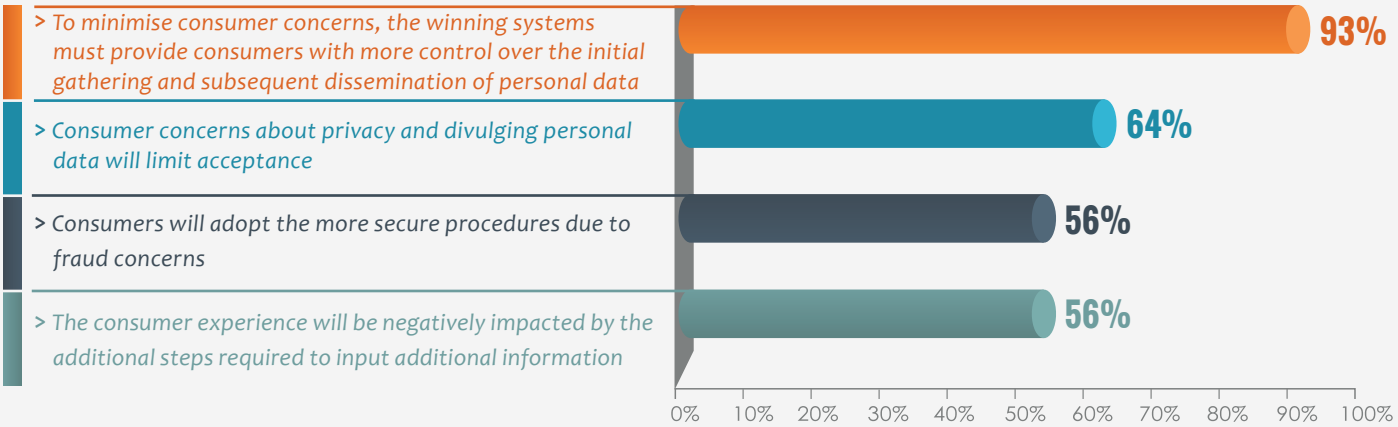
The concept of digital identity is not new but existing identity management systems are fragmented and decentralised. They are generally restricted to the networks to which these identities belong. An individual's identity may be linked to employment, industry, geographic location or other demographic or personal characteristics. Each network's identity management policies are designed to fulfil its own specific requirements and not the broader needs of users. These networks do not share information with each other. Individuals are required to manage multiple accounts across different entities (banks, government, agencies, utilities, etc.), which leads to inefficiency and poor user experience.

If a centralised identity system, which allows different parties without prior established relationships to engage in user authentication and trusted transactions, were to be established, who is best positioned to be the identity provider (for storing digital data, transferring and authenticating the data)? Based on the weighted average of the survey responses, government and banks come out at the top for most regions across the globe.

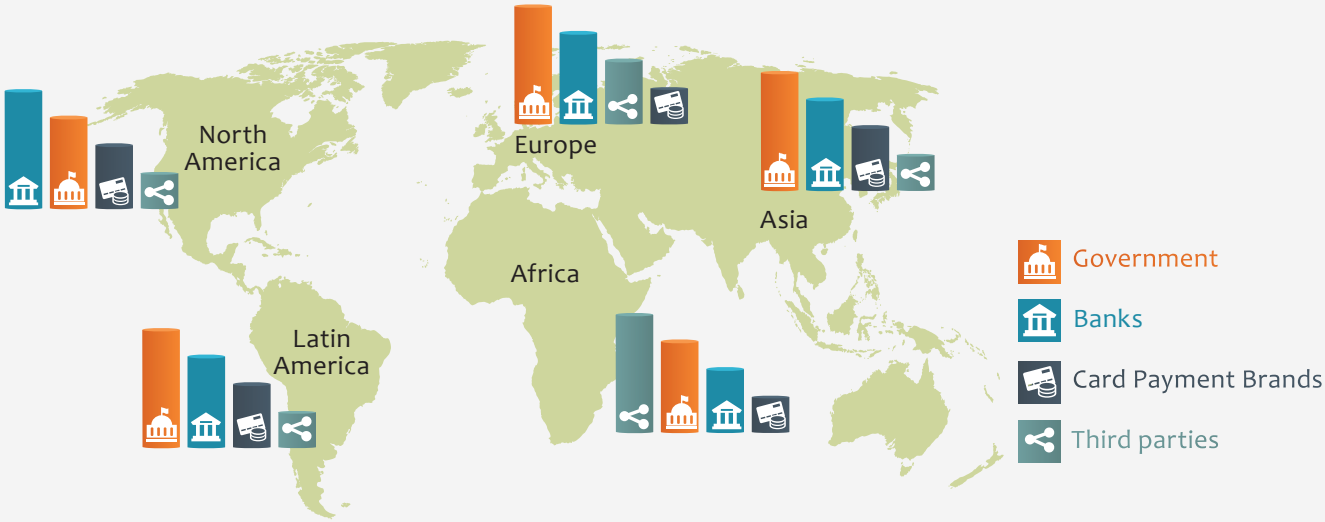
Government

Over 1.5 billion people in the developing countries, according to the World Bank, lack some form of officially recognised identification. This excludes them from access to basic services offered by the government such as healthcare, education, welfare programs, financial services, and voting in elections. An important aim of the United Nations' 2030 Agenda for Sustainable Development is for everyone around the globe to have a legal identity.

The impact of identity systems on consumers



Best positioned to be the identity provider



Numerous new national eID programs are now in place or are in the process of being rolled out. Most of these programmes include biometrics, with the majority in the form of fingerprints. Some examples of government managed identity systems are described below:

- By end of 2016, over a million biometric identity cards were issued in Algeria replacing the current paper documents. According to its supplier, Gemalto, the cards incorporate a range of strong security features reinforced by biometrics with fingerprints on the microprocessor for electronic authentication during access to eGovernment services and a contactless chip for International Civil Aviation Organisation (ICAO)-compliant verification of travel documents

- Italy's new Public System for Digital Identity Management (SPID) aims to provide over 10 million users in 2017 access to many public and private online services with a single sign-on

- The Senegal government will issue 10 million fingerprint biometric identity cards to citizens over the next five years

- The government of Thailand has rolled out 64 million identity cards which added digital fingerprint information on the smart ID cards

- In 2016, the Ministry of Information Technology in Bulgaria announced multiple projects on eID, ePayment and other telecommunication projects in the country. The funds for those projects are part of the European Union's Connecting Europe Facility, aiming to support activities for the integration of electronic identification in existing electronic services and online platform, providing opportunities for large cross-border transactions (e.g. banking, electronic payments, insurance)

Depending on the culture, legal environment, needs, as well as privacy and security requirements, one digital identity ecosystem may work better than another in a specific country. The government generally plays an important role in any digital identity system as it is already responsible for issuing legal identity documents (e.g. passports, driving licences, ID cards). Also, the government typically defines the regulatory framework. It is in its best interest to ensure a strong identification and authentication process while minimising fraud and abuse. To break through the boundaries of the different standalone identity systems, the government can potentially enhance their role as a primary provider of digital identity and authentication services. The government can also outsource the identity architecture to private companies or ensure interoperability of an official identity in a non-centralised system. In this scenario, private companies can leverage the existing architecture and footprint to drive efficiencies, reduce fraud and minimise costs.

Banks

Besides government agencies, consumers rely on their banks most to keep their savings, personal information and identity safe. Banks spend billions of dollars each year on identity management solutions and to meet regulatory needs.


Login
xxxxxx
Password
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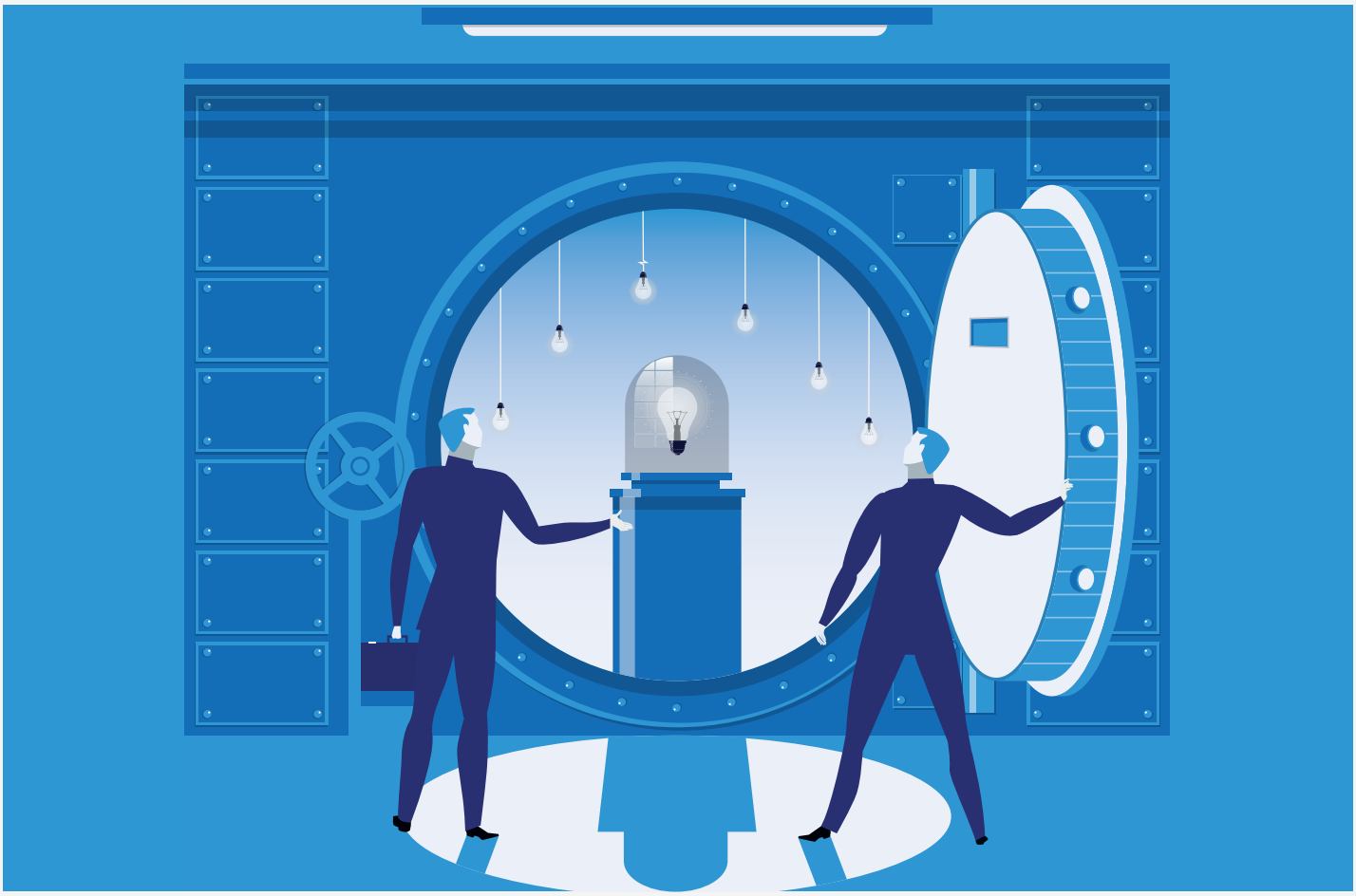
In August 2016, the World Economic Forum published "A Blueprint for Digital Identity" suggesting that financial institutions (FIs) should drive the development of digital identity because their operations and use of customer data are rigorously regulated. Most importantly, the World Economic Forum argues that FIs:

- Record and manage customer attributes for their own commercial purposes and can act as identity providers without extensive incremental effort. They collect, validate, and update user information on a regular basis for their commercial and regulatory purposes
- Have near-complete coverage of users in developed economies
- Operate globally through interconnected networks across multiple jurisdictions, giving them a structural advantage in enabling cross-jurisdictional identity transactions and systems

Various implementations already exist today. To name a few: in the UK, people can choose a list of certified companies including banks (e.g. Barclays) to verify their identity for government services like filing their taxes or their status with social assistance. Similar to SecureKey Concierge Service in Canada, there is no sharing of user information between the government and the certified companies. In Norway, BankID is used by the country's banks and public digital services. In Finland, TUPAS is an identity system in which over 10 banks act as the identity providers and is a de facto standard for digital identification. It allows individuals to log into a broad range of online services with their bank credentials.

Unlike the government, global financial institutions have footprints that extend beyond geographic or political boundaries. They can create a digital identity system that stretches across the jurisdictions in which they operate. However, their database may be limited to their existing customers and not everyone banks with the same bank. A consortium may be more effective in terms of getting greater percentage of coverage, but requires high level of collaborations amongst members. Nonetheless, a major concern with the financial institutions serving as the primary identity provider is that many people, especially those in the developing markets, are unbanked and do not have access to the financial institutions.



Distributed identity management

The use of blockchain or DLTs to enable quick and efficient validation of identity credentials offers an alternative solution to identity management. A digital identity could be created and assigned to every online transaction. DLTs could potentially introduce a whole new digital world with records (e.g. health records, voting records, marriage licences, personal identification documents such as passports, driving licences) that can be cryptographically authenticated and validated. These records will be reliable and immutable, eliminating fraud, misuse and corruption. A number of companies are already testing out this concept. Some examples:

- **ShoCard**, founded in 2015 and based in the US, is a mobile identity platform using blockchain infrastructure. Users download an app to create a ShoCard ID and take a photo of their valid, government issued ID. ShoCard then extracts the personal information from these IDs. All information is encrypted, hashed and written to the blockchain. The users can decide which third party to share their personal information with (e.g. financial institutions, retailers, utility companies) and initiate an identity verification "handshake" with that third party via the blockchain

- **Civic**, founded in 2016 and based in the US, provides multi-factor authentication without a username, password, third-party authenticator or physical hardware token through its decentralised architecture with the blockchain and biometrics on the mobile device. After users register with their personally identifiable information to ensure ownership of identity, they can share that data with a Civic Business Customer (e.g. financial institutions, retailers, utility companies) for real-time authentication of identity. Additionally, users receive an alert via a push notification to their smartphone, or a text or an email when their data such as their social security number is being used. This allows users to respond to or even prevent fraudulent activities before they happen

- **ExistenceID**, founded in early 2017 and based in Hong Kong, allows users to create a digital identity capsule for safe keeping and sharing of valuable identity documents. The capsule rates users' total identity so they can prove that they are real. However, users can choose when and whom they share different parts of their identity. Also, ExistenceID has zero knowledge of their account

These represent a few early examples. Several other start-ups are leveraging DLTs for identity management and authentication.

What does the future look like?

As everything is expected to become digitised in the future, having a digital identity will become highly desirable if not inevitable. Digital identity solution providers could be governments, banks, or service providers that leverage DLTs or there may be collaborations across these players. However, it is unlikely that a single, global digital identity solution provider will emerge in the foreseeable future as identity requirements vary by geography and by user. The ideal scenario is to empower users to control their own identity which could be registered with one or more identity management entities. While governments and banks are viewed as the preferred identity providers according to our survey, both have limitations in terms of complete coverage or meeting all the needs of the different participating parties. Survey respondents almost universally agree that winning identity management systems will need to minimise and manage consumer privacy concerns by providing users control over the initial collection and subsequent dissemination of identity credentials and other elements of personal data. Whether it is a centralised system driven by a government, a semi-centralised federated system operated by banks or open identity markets managed by companies, it will be critical to protect user information and eliminate the risk of identity theft.

> "…winning identity management systems will need to minimise and manage consumer privacy concerns"

About us

Edgar, Dunn & Company

EDGAR, DUNN & COMPANY (EDC) is an independent global financial services and payments consultancy. Founded in 1978, the firm is widely regarded as a trusted adviser to its clients, providing a full range of strategy consulting services, expertise and market insight. From locations in Frankfurt, Istanbul, London, Paris, San Francisco and Sydney, we deliver actionable strategies, measurable results and a unique blend of global perspective and local market knowledge for clients in over 45 countries.

Frankfurt
Istanbul
London
Paris
San Francisco
Sydney

Wirecard

Wirecard AG is a global technology group that supports companies in accepting electronic payments from all sales channels. As a leading independent supplier, the Wirecard Group offers outsourcing and white label solutions for electronic payments. A global platform bundles international payment acceptances and methods with supplementary fraud prevention solutions. With regard to issuing own payment instruments in the form of cards or mobile payment solutions, the Wirecard Group provides companies with an end-to-end infrastructure, including the requisite licences for card and account products.
Wirecard AG is listed on the Frankfurt Securities Exchange (TecDAX, ISIN DE0007472060, WDI).
For further information about Wirecard, please visit www.wirecard.com or follow us on twitter@wirecard.

Wirecard AG
Einsteinring 35
85609 Aschheim / Germany

Telephone: +49 89 4424 1400
Fax: +49 89 4424 1500
E-Mail: contact@wirecard.com

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www.wirecard.com

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