



SwissFinanceCouncil

Fostering International Dialogue

The EU and its Partners
**Banks and Investors
in a Digital World**

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Foreword

We are delighted to present the Swiss Finance Council's third Discussion Paper on 'The EU and its Partners: Banks and Investors in a Digital World.' The topic of digitalisation in financial services has, quite rightly, rapidly moved up on the EU policy agenda in recent years. With this paper, we hope to contribute to the debate by demonstrating how technology can empower consumers, enhance their user experiences and make access to financial services more inclusive.

For the financial sector, digitalisation poses challenges as well as opportunities. The need for financial institutions to innovate is not a one-time event, but rather a continuous process to which they have to adapt. Financial institutions need to stay agile and prepare for a world in which digital transformation comes first and change is constant. Therefore, banks have to embrace digitalisation as an opportunity: to meet their clients' expectations, to build sustainable business models, to help start-ups develop their businesses, and to encourage cooperation between small and large institutions to address industry-wide challenges.

Digitalisation can play a pivotal role in delivering a successful Capital Markets Union, enabling further investment for growth and jobs whilst ensuring appropriate levels of consumer and investor protection. The financial sector is well placed to facilitate our vision of a 'global digital ecosystem,' provided technologies continue to develop and are regulated in a way that promotes interoperability and unfettered access across borders.

In our Discussion Paper, we demonstrate that technological innovation is primarily driven by new client behaviours and expectations. Further, we explore the digital transformation potential and its impact on banks and their clients. Finally, we reason that Europe needs a comprehensive strategy that encourages innovation and financial and digital education, and articulate recommendations on how policy-makers and regulators can successfully transform Europe into a more competitive ecosystem for innovation that contributes to stronger economic growth.

To make this transformation successful, the EU should build on its strengths, including its long tradition of highly educated workforce and its experience in developing common EU standards. It is paramount that the EU sets a regulatory framework, which fosters innovation and promotes global cooperation.

We hope this Discussion Paper will serve as a seminal contribution to the current digitalisation debate and stimulate further reflections on the topic.



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Executive Summary

Digitalisation and globalisation go hand in hand. Thanks to the already high integration of the Internal Market, the European Union (EU) is well placed to make the most out of the digital transformation and thus foster economic growth and employment enhancing activities. In order to capitalise on these benefits and remain competitive on an international level it needs to create favourable framework conditions.

The Swiss Finance Council's Discussion Paper 'The EU and its Partners: Banks and Investors in a Digital World' explores the potential of the digital transformation and its impact on banks and their clients. Our starting point is the 'Digital Client' and its desire to be able to access financial services and products across borders and across markets.

The first chapter focuses on the 'Digital Client' and shows that technological innovations are largely driven by new expectations from clients and that banks must adapt to the diversity of client demands in a more competitive environment, characterised notably by the emergence of new financial technology (Fintech) companies. Exploring the possibilities presented by new technological advances such as automation and the use of Artificial Intelligence (AI) will pave the way to a new generation of more inclusive and holistic financial services where the client's experience is at the heart while location becomes largely irrelevant. However, there is still some way to go to achieve this and some obstacles will need to be overcome.

The second chapter looks at the transformation taking place inside banks to meet clients' new needs. The majority of Fintechs focus on one element in the banking value chain and aim to displace the banks' service offerings. We identify a series of core clusters, such as funding and lending, and payments and trading, where change happens. Digitalisation will have to become an integral part of banks' business models if they want to continue playing a central role in the future of financial services. Finally, a number of regulatory and non-regulatory obstacles will need to be addressed to help banks deliver the digital services that their clients expect.

Our paper also discusses the conditions for future success. How can the EU's approach to the digitalisation of financial services be shaped by the experience of its international partners? Europe needs a comprehensive approach to the digitalisation of financial services which encourages innovation, education, and global cooperation. Digitalisation holds the key to fulfilling the ambition of an integrated Single Market for financial services, facilitating cross-border supply and consumption, enabling a better allocation of capital, and hence contributing to the EU agenda of growth and jobs.

Our Discussion Paper makes the following policy and regulatory recommendations to allow Europe reap the benefits of a competitive and global digital environment.

Our key policy recommendations at a glance

1. Updating the regulatory framework to reflect today's technological developments.
2. Creating regulatory and tax incentives for technology investments to foster innovation.
3. Supporting digital identification, an EU-wide e-ID system and appropriate standardisation.
4. Supporting increased financial literacy and IT skills.
5. Encouraging the use of regulatory sandboxes and ensuring coordination.
6. Calling for enhanced cooperation on cybersecurity.



Introduction

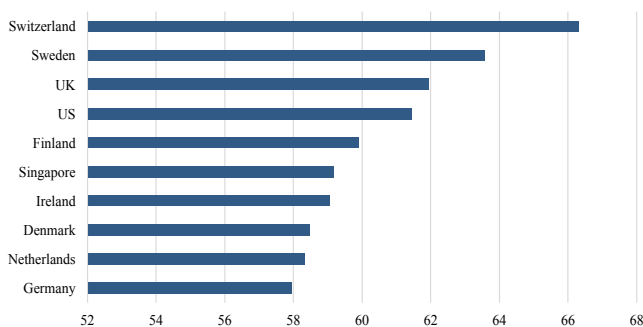
Digital competitiveness: is Europe on the right track?

Digitalisation and globalisation

Digitalisation and globalisation have, alongside demographic changes, emerged as key drivers of today's economies. Data flows are ever-increasing, and digitalisation enables global companies a faster and more efficient cross-border operation. At the same time, the flows in global trade and financing are stagnating, whilst the amount of bandwidth that is used cross-border has grown forty-five times since 2005.¹

Harnessing the benefits of digitalisation for the European economy is therefore of crucial importance. According to the European Commission (EC), recent studies estimate that digitalisation of products and services can add more than EUR 110 billion of annual revenue in Europe in the next five years.² As such, Europe faces the imperative of creating favourable framework conditions for the digital transformation, in order to remain competitive with innovation hubs from other regions.

Figure 1: Global Innovation Index 2016 ranking, measured on a scale 0-100³



Source: The Global Innovation Index 2016

Innovation is an important factor for driving economic progress and competitiveness. The Global Innovation Index (GII) is used as a recognised tool for refining innovation policies. It considers factors such as human capital, IT developments, institutional support, and market sophistication to rank countries across the globe. An important role is also played by the quality of innovation, represented by elements such as the quality of universities and the number of registered patents. Whilst the GII is not meant to be a definitive ranking of economies with respect to innovation, as shown by Figure 1, Europe is home to the top three economies of the 2016 GII. In a post-Brexit scenario, this is likely going to include only one EU Member State. While Europe remains one of the world's most innovative regions, other large economies, including emerging countries such as China and India are gaining momentum.

Digitalisation as the new driver of further integration and expansion of the EU Internal Market

The Internal Market is a success story of the EU and a strong incentive to discourage fragmentation along national borders. It currently accounts for more than 500 million consumers and has one of the largest pools of savers, many of whom could also be potential investors. It is one of the EU's biggest assets. To expand the EU Internal Market and to take it to another level, we need to increase scale, make it easier for service providers to cross borders, ensure that consumers and savers have trust in the digital market, and provide superior user experience.

Digitalisation should be viewed as an opportunity. It can drive integration by making borders less relevant and ultimately make Europe economically stronger and more united. This is essential to successfully compete on a global level, restore growth and create jobs.

Thanks to the already high integration of the EU's Internal Market and highly skilled workforce, Europe is well placed to make the most out of the digital transformation and thus mitigate some of the effects of the post-crisis economic challenges.

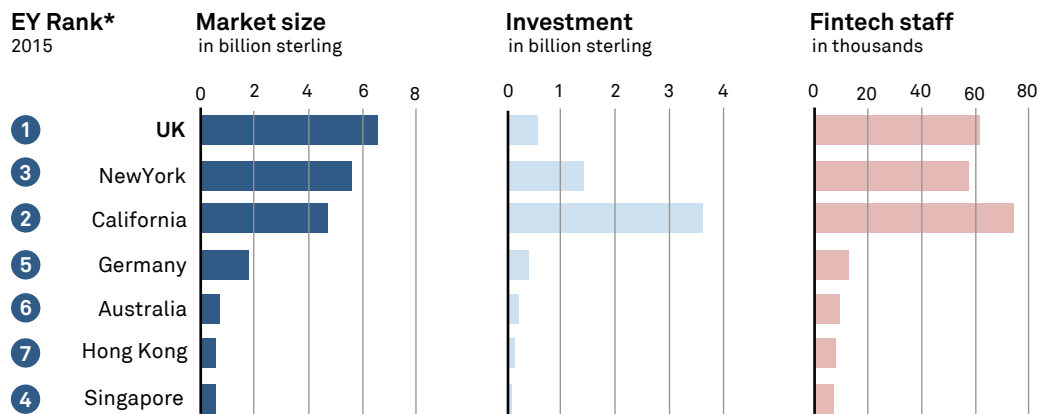
Against this backdrop, the EC launched the EU Digital Single Market strategy in May 2015 to foster Europe's digital competitiveness. It consists of 16 initiatives and covers many aspects of the economy and society. It aims to unlock the potential of a Digital Single Market and creates conditions to enable innovation while providing a strong framework in terms of data protection.

Digitalisation and financial services

The financial services industry already plays a significant role in improving Europe's digital competitiveness. For instance, banks are among the frontrunners in applying digital technologies not only to meet customers' expectations, but also to drive the transition to more sustainable business models.

There are many areas where financial institutions can take advantage of new opportunities. These opportunities are first found in retail financial services, particularly in payments, where there is a strong need to adapt the offering to the growing willingness, especially of younger, tech-savvy people, to use new technologies. Here, technology can help with clients' online on-boarding and allow e-identification. Robo-advisory, i.e. the automation of financial advice,

Figure 2: Fintech hubs ranking – Europe in international comparison⁴



*Ranking based on ecosystem attributes which includes talent, capital, policy and demand.

Note: investment refers to the period from October 2014 to September 2015. The ranking is based on four criteria which include i) talent, defined as the availability of technical, financial and entrepreneurial skills; ii) access to funding at all stages of Fintech's development; iii) policy, regulatory and taxation regimes fostering innovation and supporting entrepreneurs; iv) and demand of Fintech, which includes consumers, corporates and financial firms.

Source: Ernst & Young; Thomson Reuters

is another promising area for growth which could offer secure and reliable investment management solutions to smaller individual investors irrespective of their location and at an attractive price. Last but not least, there are numerous potential benefits of blockchain for banking clients that merit further exploration. They range from real time transactions allowing risk reduction and better capital management, to improved regulatory effectiveness, e.g. by using blockchain for Know Your Customer (KYC) or anti-money laundering (AML) checks, thus enabling fast client verification.

For banks, digitalisation is also an opportunity to address the impact of the significantly higher regulatory costs, persistently low interest rates and a difficult economic environment. In order to succeed under these circumstances, banks are making the digital transformation part of their core strategy and are driving the process forward.

The EU's approach to the digitalisation of financial services

Europe's good international standing in innovation is not necessarily mirrored by a similar position in Fintech. Figure 2 shows the different attributes that are being used to evaluate the size and importance of a Fintech hub and demonstrates that in Europe, only the UK and Germany have made it into the top seven Fintech hubs across the globe.

Several initiatives have been taken at the EU level to help create a more stimulating environment for Fintech companies. The EC has recently launched a new Task Force on Financial Technology, and it will soon publish its Action Plan on Retail Financial Services which will include a financial innovation

angle. It is also seeking to adapt some of the existing legislation to the changes brought on by technology. In addition, the EC has tabled new initiatives to facilitate the free flow of data, as part of its Digital Single Market strategy, having fully realised that access to data is the 'new gold'. The overview below shows the initiatives taken at EU level on the digitalisation of financial services:

- At the level of the **European Commission**, the decision to set up a Task Force dedicated to Fintech is welcome as it offers a platform to engage with the financial services industry and discuss the impact of digital transformation in financial services in a horizontal and cross-sectoral way, ranging from the competitiveness of the Internal Market to financial regulation, data and consumer protection.⁵ The upcoming publication of an Action Plan to enhance the cross-border provision of retail financial services and overcome existing structural barriers will, for the first time, lead to some concrete proposals that might seek to adapt legislation and practices to the changes brought on by digitalisation and innovation.

- The **European Parliament**, as co-legislator for the EU Internal Market, seeks to assess the influence of technology on the future of the financial sector and better understand the interaction of these changes with the current regulatory framework. It has so far made recommendations to the EC on Fintech and virtual currencies, and has commented on the EC's Action Plan on Retail Financial Services. To date, the European Parliament has been mostly supportive of innovation in financial services which it appears to see as an opportunity for better consumer choice and ease of access - provided adequate consumer protection is ensured - and creating new jobs. A report published in December 2016 by the Internal Market and Consumer Protection Committee calls for instance for the identification and removal of barriers preventing the development of

BOX

Overview of the main EU initiatives regarding the digitalisation of financial services

EUROPEAN COMMISSION

- EU Digital Single Market Strategy (2015), including Regulation on electronic identification and trust services for electronic transactions in the Internal Market (eIDAS, 2014)
- Report on crowdfunding in the EU Capital Markets Union (2016)
- CMU Action Plan/Call for Evidence (2016)
- Communication on European Cloud Initiative (2016)
- Digital Skills and Jobs Coalition Members Charter (2016)
- Review of Anti-Money Laundering Directive IV (2016-2017)
- Cross-sectoral internal EC's Task Force on Financial Technology (launched in 2016)
- The European Free Flow of Data Initiative to establish free flow of data within the Single Market (2017)
- EC Action Plan on Retail Financial Services (expected in Q1 2017)

EUROPEAN PARLIAMENT

- Own Initiative Report on Retail Financial Services (2016)
- Own Initiative Report on Virtual Currencies (2016)
- Own Initiative Report on Fintech (2017)

EUROPEAN SUPERVISORY AUTHORITIES (ESAs)

- EBA Opinion on Virtual Currencies (2014), and EBA Opinion on a proposal by the EC regarding virtual currencies and AML (2016)
- Joint Committee of the ESAs Discussion Paper and report on automation in financial advice (2015 and 2016)
- EBA Discussion Paper on innovative uses of consumer data by financial institutions (2016)
- EBA Consultation on Regulatory Technical Standards on strong customer authentication and secure communication under the Payment Services Directive (PSD2, 2016)
- Joint Committee of the ESAs Discussion Paper on the use of Big Data by financial institutions (2016)
- ESMA Report on the distributed ledger technology (DLT) applied to securities markets (2017)



EU-wide digital services. It also outlines the potential benefits arising from the development of a common European online banking payments system, which it sees as a key element of the Capital Markets Union (CMU).⁶

- The **European Supervisory Authorities (ESAs)** are looking at targeted aspects in accordance with their specific remit and have published reports on robo-advice, the use of blockchain in the securities market space, the use of consumer data by financial institutions, and virtual currencies, among others. So far – and similarly to international regulators such as the International Organization of Securities Commissions (IOSCO) and the Financial Stability Board (FSB) – they seem to agree that e.g. the potential benefits of blockchain and the proliferation of automated advice are still at an early stage and warrants no new regulation. In addition, the ESAs are also drafting technical standards, notably in the payments area (in the context of the Payment Services Directive 2/PSD2) where technology is rapidly growing.

As the above illustrates, there does not seem to be a well-developed and internationally coordinated regulatory strategy for the digital transformation of financial services by the EU institutions. The focus so far was mainly set on assessing the opportunities and risks attached to the use of innovation in specific areas. Similarly, digital actions do not seem to feature heavily in the EC's Communication which was issued as a follow-up to the Call for Evidence.⁷ In the absence of a coordinated and inclusive approach, we risk failing to harness the full benefit of digital opportunities for the European economy. An integrated and globally aligned approach could avoid national retrenchment and elimination of the barriers and obstacles to the advancement of digital financial services.

From a European perspective, we highlight the need to reach out to other global financial centres to align regulatory approaches and jointly foster innovation. A global vision of the digital financial services market should include an active interaction with all stakeholders, especially from countries that are at the forefront of developing a strategy for the digitalisation of financial services and are home to large and interconnected financial centres.

As we have highlighted in our two previous Discussion Papers, if Europe wants to restore growth and jobs, it needs open markets (SFC Discussion Paper of 2014), private investment and world-leading digital infrastructure investments (SFC Discussion Paper of 2015).⁸ We chose digitalisation as our third Discussion Paper's topic because we believe that Europe needs to lead the way in meeting consumer demand for cross-border services.





1

The Digital Client

1.1 Trends in client behaviour and the emergence of the digital client

Digital interaction is changing clients' behaviour and expectations, driven by the growing demand for convenient access and by previous users' experiences in other sectors. The customer experiences with companies like Amazon in retail and Uber in transportation have raised the bar for other industries to become increasingly digital by delivering superior personalised and digital customer interactions. At the same time, significant technological advances in data science and computer technologies have led to a dramatic transformation in the banking industry itself, resulting in a proliferation of different banking channels, the innovative use and adoption of new technologies, and the digitalisation of business models and client interaction.

On average a customer interacts with his main bank seventeen times per month, the vast majority of these interactions occur through digital channels or ATMs.⁹ The uptake of smart phones in particular has fundamentally changed clients' interactions with their banks. Mobile is the fastest growing channel across financial services, currently making-up around 35% of digital client interactions.¹⁰ This is especially true for retail clients, who have higher adoption rates than private banking clients.¹¹ Nonetheless in-person contact remains important. Research shows that about 50% of the clients seek out advice, and about the same proportion prefer to handle their own financial affairs. Only about 15% of those that want an advisor's help are comfortable with a purely digital interaction model.¹² Figure 3 shows the increasing demand for online and mobile access by the younger generation and the steady demand for branch-based services by the older generation of consumers.

McKinsey has identified five patterns that help to better understand client behaviour in the digital age.

The categories distinguish between different preferences regarding channels and online engagement, and range from digital natives fully comfortable online, to those who use digital services purely as an add-on, with a much greater preference for traditional channels:¹⁴

i) Naturally digital: these clients can also be called digital natives, as they are very comfortable online. When making a decision, they refer to digital channels first and they are experts in social networking. These clients engage deeply with digital channels and tend to look for tailored solutions.

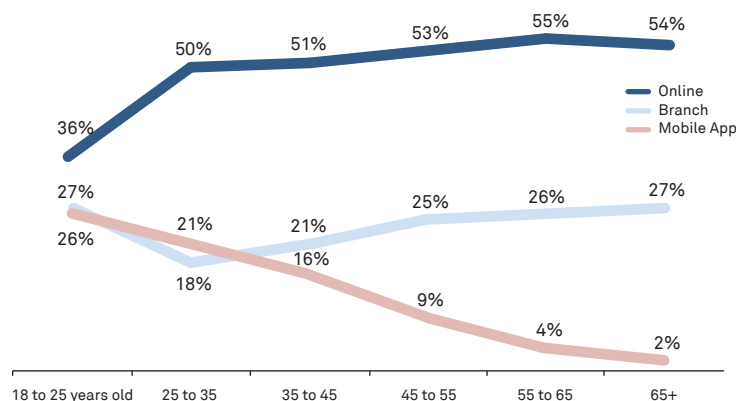
ii) Digital by convenience: time or location restraints lead to these customers choosing digital channels for practical reasons. As a result, the digital channel has become their main channel, but they are not necessarily looking for a superior customer experience.

iii) Digital by choice: these customers are looking for a better customer experience and will actively choose between online and offline offerings. They are comfortable in both worlds, but when they do choose the digital channel they behave much like 'naturally digital' consumers.

iv) Digital by opportunity: the consumers seek to expand the offline offering available to them by using digital channels. They are looking for a true multi-channel experience.

v) Digital as add-on: these consumers prefer traditional physical channels and they use digital channels sparingly. They have working knowledge of the digital world and will use those channels to perform basic research.

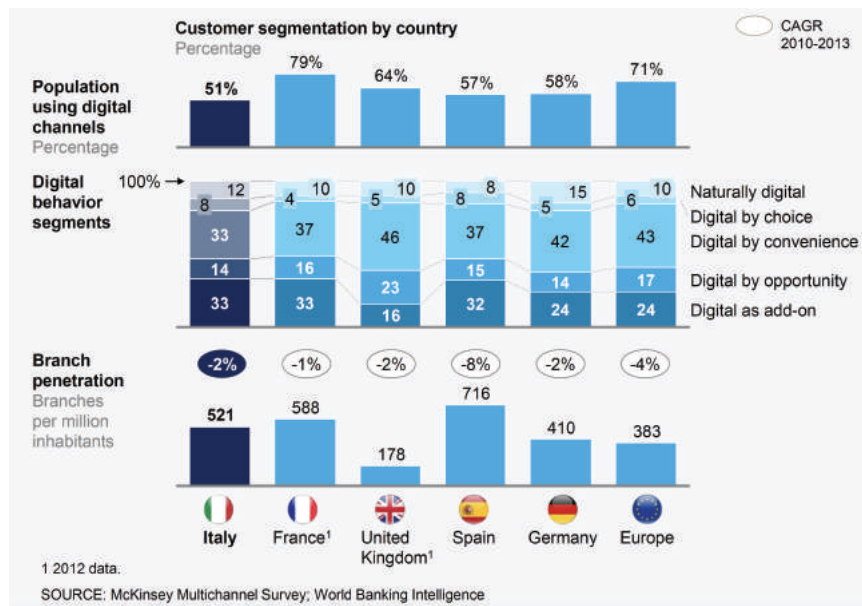
Figure 3: Preferred retail banking channels by age¹³



*Respondents were only able to select one channel.

Source: PeopleMetrics

Figure 4: Customer segmentation by digital behaviour and branch density by country measured by CAGR¹⁵



Understanding these different customers' preferences is vital for banks to segment their clients and develop a targeted multichannel strategy (see Figure 4). Banks need to take a holistic digital and omnichannel approach that allows clients to switch between online and offline touchpoints without undue friction, retaining the option to speak to a bank representative live, if needed, either in a branch or via a live chat.

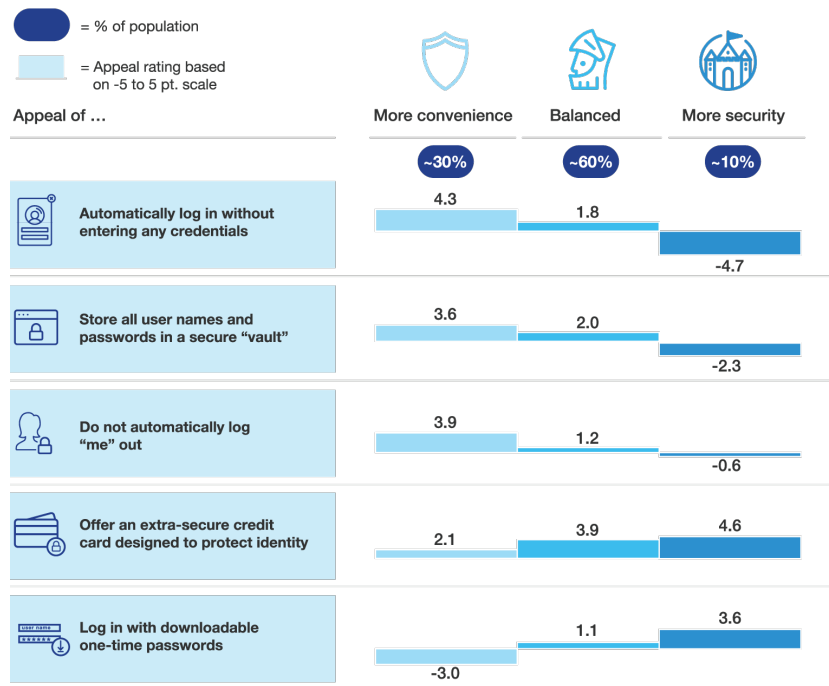
Millennials,¹⁶ who were born in the Internet and mobile age, are more likely to be naturally digital, growing up with superior customer experience expectations, and a readiness to switch providers in order to find them. Millennials are also among the client segments that are the most likely to switch providers,¹⁷ it is all about convenience and context for them. So being proactive, and not reactive, about meeting clients' needs and striking the right balance between security and convenience is of crucial importance to banks.

Millennials across the world also represent the next generation of entrepreneurs. In many cases, they are running and growing 'digital first' businesses that demand 'digital first' services. Surprisingly, research has shown that millennials differ greatly from their parents' generation when it comes to banking.¹⁸ Their attitudes towards money, risk, and success have been shaped both by lightning-fast technology innovation and the unprecedented economic and market volatility that constrained their job prospects and earning abilities, as well as disrupting their parents' investments.

There are other significant differences, too, between these emerging approaches. Digital natives tend to be prepared to trade some of their data in exchange for convenience and additional offerings when compared to traditional client segments. They are motivated by the desire to obtain services tailored to their specific situation and needs, whereas other clients, who are less familiar with digital channels, place much more value on privacy and security which they would not be prepared to trade for added convenience.

Trying to satisfy both tendencies can detract from the customer experience, as too many authentication services are considered inefficient and complex. As an illustration, Figure 5 shows that customers have diverging approaches for dealing with security and their data. Some prefer convenience, some prefer security, and the majority (60%) is comfortable with a blended model. The emergence of a truly secure and interoperable digital identity might offer a solution that effectively marries convenience with added security, and helps banks to meet the diverging expectations of their various client segments. Until this happens, as we said earlier, the digital access will continue to be spearheaded by the younger generation. Nonetheless, the financially strong but technology averse customer will remain important and, as a result, banks will be required to follow a omnichannel approach that is capable of catering to the diversity of client demands and expectations.¹⁹

Figure 5: Appeal of identity verification by different customer segments²⁰



Source: McKinsey

1.2 Adapting to clients' changing expectations

Digitalisation will allow banks to meet demand for services on the consumer side, essentially democratising services that thus far have been the preserve of the wealthy. As technology would enable to leverage Wealth Management investment competencies, we see a lot of opportunities for technology to help widen the client base and bring rich investment functionalities also to retail clients. Digitalisation is a key ingredient to create sufficient economies of scale and establish more sophisticated investment in the retail segment to address the demand for such services on the consumer side. Robo-advisory will bring portfolio investment to client groups who previously had no access to it.

Incumbent financial institutions' slow take-up of innovation and adaption to customer demands has contributed to the rise of Fintechs. These innovative and agile newcomers who are not held back by a plethora of legacy IT systems have been given a head start in mastering the art of digitalisation and of new technologies. They have applied lessons learned on digitalisation in other sectors to financial services, and now research shows that around 50% of clients do business with at least one non-traditional firm.

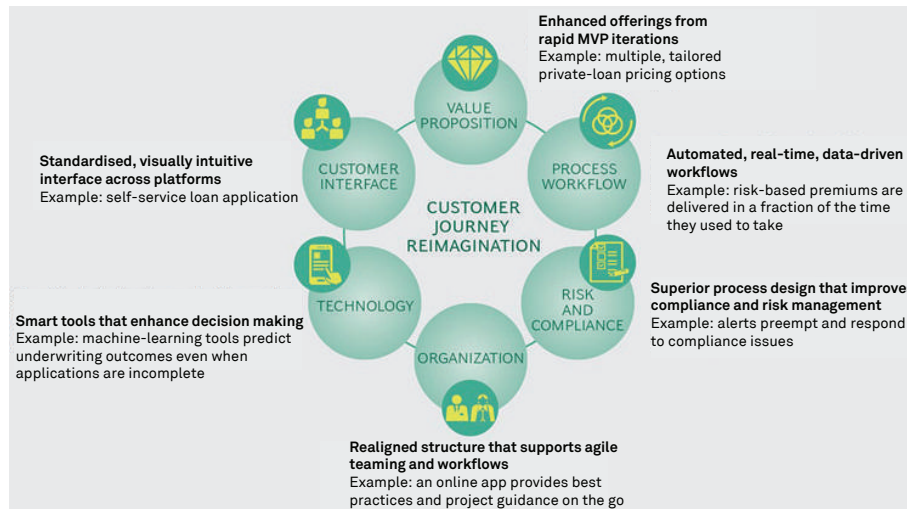
Traditional banks still hold significant advantages however, notably clients' trust and familiarity, not least by supporting and collaborating with Fintechs. They are also increasingly closing the gap in the areas of convenience and quality of service.²¹ Customer

trust in traditional banks is still higher than for the newly emerging Fintechs but we cannot exclude that this could change in the future.

Thus far, Fintechs compete in areas which complement traditional services with novel offerings. Such 'disruption' has already become reality in the retail and corporate space with successful Fintech companies being able to attract clients and significant investments in businesses such as peer-to-peer lending, crowdfunding, payments and robo-advice. Thus, many of these newcomers have found niches where they can satisfy the customer's demand for cheaper, easier and faster services. Consequently, incumbents are challenged to develop an integrated strategy where all processes are aligned to reinvent and ameliorate the customer journey (Figure 6).

Financial services providers need to adapt to the new digital 'paradigm' to meet clients' expectations of 'anywhere, anytime and anything'. The customer experience that large technology companies like Amazon and Google offer, has raised the bar for other industries that are becoming increasingly digital by delivering superior personalised and digital customer interactions based on data they are collecting during their interaction with clients. These evolving client expectations centred around ease of access via always-connected devices mean that banking services will have to become more accessible and convenient through simpler digital interfaces, more efficient and automated through improved back-end processes and near real time transactions. Going forward this deeper understanding will open new doors for banks' offerings,

Figure 6: Reimagining the customer journey requires end-to-end change²²



Source: Boston Consulting Group

as clients come to them for advice pertaining to taxes, their hobbies, etc. (i.e. a holistic lifestyle offering).

All these developments bring existing clients closer to the experience they are coming to expect from other service companies. In addition, lower costs and increased scalability of digital services mean that sophisticated services are becoming available to a wider range of clients. This has the potential to improve access to and the range of financial services for the unbanked and underbanked population.

1.3 Identifying innovation trends in client services

To better understand how banks can best adapt to the needs of the digital client and bring about these customer benefits, we turn now to the four major 'innovation trends' redefining the future of the industry.

The first one is called "wealth assistance". This is probably the least disruptive from a bank's point of view – but also one of the most powerful and relevant from the client perspective. It relates to how clients expect banks to assist them, and involves shifts in expectations regarding accessibility, personalisation, and transparency of the services provided. Clients want personalised advice that is presented in a simple fashion, and demand it anytime and anywhere. Going a step further means that client's financial needs are anticipated based on past preferences, their immediate context as well as their anticipated emotional reaction. Clients will be accustomed to interacting both with personal advisors and robots according to their preferences and needs.

Strongly connected to this concept is our second trend, 'privacy'. The expansion of the traditional bank offerings and transformation into a 'holistic bank' brings with it the issue of the use of Big Data to analysing their clients' behaviour and use this information to tailor their offer accordingly.²³ Banks already collect and store large amounts of exceptionally well-guarded information about their clients, but so far, they have been hesitant to use this data in the ways that many Fintech companies do. As data becomes a firms' most prized asset, using it to further augment the client relationship will increasingly become key to banks' customer experience. Every digital interaction, be it online comment, review or item purchased contributes to an individual's digital footprint, and this information is becoming increasingly important to every business.

While fully respecting privacy, and within the context of data privacy regulations, better use of this data through advanced analytics can be made in order to enhance the customer experience, e.g. through:

- Offering contextualised, targeted products and experiences;
- Making more accurate credit-worthiness assessments;
- Providing better financial advice;
- Reducing costs for consumers, and
- Better protected them from fraud.

While many customers use their personal data freely when interacting with service providers, they are becoming increasingly sensitive about who has this data and how it is being used. Well publicised incidents of data loss as a result of hacking are raising consumer awareness for this issue and affecting their behaviour. Trust is probably the most important factor for online



economic activities. A recent study shows that a lack of trust in privacy and security can severely affect the success of digital offerings.²⁴ Increasingly users are looking to strengthen control over their data. Looking to the future we see customers reclaiming the undisputed authority over their digital identity and data. They make conscious decisions as to which data is given to which third party under which conditions, including the permission to monetise it.

Our third trend, 'open finance' is concerned with the overall ecosystem of financial services. 'Open Finance' is about enabling new value flows between participants and service providers. The rise of the sharing economy and platforms that bring together the best offers in the market has had implications for the financial sector. Clients are already familiar with crowdfunding and some platform solutions. Looking to the future, we expect empowered clients to use platforms to assemble their own portfolio of wealth services by pulling together the best solutions from the best providers. Banks are well positioned to offer this platform, while client pressure will incentivise them to increasingly open their value chain, exchange data, and co-operate with third parties, financial and otherwise.

Our fourth and final trend is 'Beyond Banking'. Based on the close relationship with their clients, underpinned by the personal data the bank is entrusted with, banks will increasingly be in the position of a trusted advisor able to help clients with some of their biggest decisions. And through their knowledge of and experience with a diverse and perhaps even global client base, banks will be able to step up to the challenge. An entrepreneur might expect his bank to help with business decisions beyond the strictly financial. A student might use a digital personal financial advisor to manage his budget and become increasingly financially literate. A young family might ask their bank for tax advice and help with their long-term financial planning. Clients may even come to expect banks to show them opportunities they did not know existed. Market leading banks are starting to pursue this vision with a number of innovations that go 'Beyond Banking'.

1.4 Which technologies are at the forefront of addressing clients' demands?

We have considered the diversity of the client base when it comes to digitalisation, as well as the trends underpinning technological change in services clients' needs. Digital technologies were first introduced in the retail banking space, especially in payments. These innovations focused on improving the service from the customer's perspective, and aimed for seamless, 'end-to-end' execution. However, digital is increasingly becoming a feature in the non-retail space as well, and many banks are executing on a less branch-centric way of approaching consumers and launching a series of multichannel offerings.

For large banks, it is key to be able to offer leading-edge technology to sophisticated Wealth Management clients.

The first step to improve the client experience is a seamless, fast but also secure onboarding, followed by client data integration, and quality relationship management utilising all channels, from digital to physical. To ensure a competitive offer in today's world, banks have to invest materially in technology to allow for business growth, but also client satisfaction and client retention. Thereafter, banks need to offer holistic digital services which continually meet clients' needs, combined with strong underlying competence and capabilities in financial advice and services. This will be the essential part of the winning strategy for banks to attract and retain clients.

We are only at the beginning of what automated services can offer. Big data and advanced analytics will broaden the scope of services traditionally provided by banks, incorporating financial and tax planning into clients' life planning, such as for retirement, health, their own and their children's education, and general wellbeing. Technology could then impact all investor segments and evolve into much more disruptive and wide-ranging forms of advice.

There is clearly more to come in terms of utilising new technologies. The increased application of these technologies will continue to shape the expectations of customers across industries as things that were once outlandish become the new normal. We now turn to the technologies themselves, and how banks can embrace them to offer enhanced client experiences.

a. Mobile technologies driving change

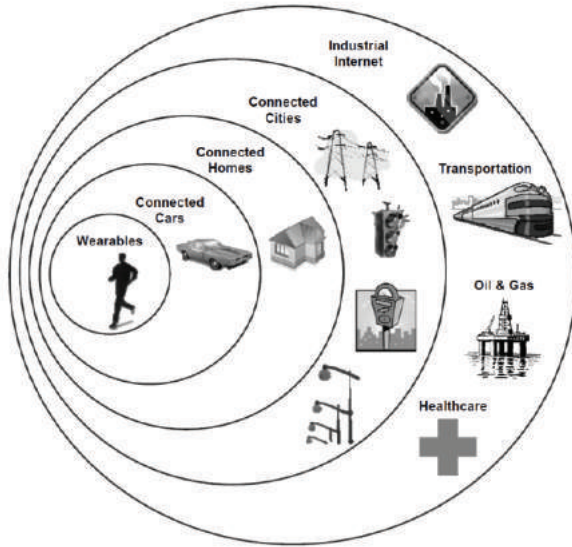
Consumers continue to lead the mobile charge in most markets. As a quick indicator, a recent survey asked a sample of just over 100,000 consumers which they would miss more for a day, their mobile phone or physical wallet? More than half said their phone, with the share reaching 79% in China.²⁵

b. Increased interconnectedness leading to the 'Internet of Things'

As the 'Internet of Things' progresses further²⁶, it is not inconceivable that payments will increasingly disappear as a client touch point, furthering the trend towards a cashless society. Connected personal devices, vehicles and appliances could potentially automate transactions, and, for example, payments can happen at a point of certain activity taking place which triggers a payment automatically without the consumer initialising a separate payment process (see Figure 7).

Banks will have to be constantly looking to augment the client experience, including through the use of Artificial Intelligence (AI), and keep a clear vision of the next decade's 'cognitive bank'.²⁷

Figure 7: Invisible payments through connected devices



Source: UBS

c. Automation and the use of Artificial Intelligence at the forefront of broadening the investor base

One of the leading enablers of an increased automation of financial advice is the use of AI. Examples of work in this space are partnerships between banks and software companies using machine learning software for automating parts of IT monitoring and problem solving. These have helped lead to the development of solutions that combine modern robo-advisory techniques (i.e. the use of automation in the provision of financial advice) to personalise and deliver expert

insights and investment strategies to a new broader pool of clients (see Figure 8).

In many instances, it is unprofitable to offer bespoke client advice without high asset minimums. Consumers therefore consider the services of traditional intermediaries too expensive or extensive for their needs, and instead prefer to manage their own portfolios using online tools.²⁸ Robo-advisers or automated financial advice tools /mobile asset management and financial advice platforms are one answer. They typically combine a range of financial tools to, among others, manage client's investment portfolio and optimize it, with a component of AI promising to automatically provide advice to manage and improve the portfolio in a semi-automated way. Technology will also help realising economies of scale. We see significant potential for technology to help widen the client base and bring rich investment functionalities to retail clients and therefore meeting one of the objectives of the EU Capital Markets Union.

MyPrivateBanking has predicted that 'hybrid robo services will grow in size to USD 3,700 billion assets worldwide' by 2020, and reach a total market size of USD16.3 trillion by 2025. There is also an expectation that hybrid robo-advisors will manage 10% of investable assets by 2025.²⁹ Banks have been approaching the concept differently. Some prefer to offer fully automated wealth management services, others incorporate robo-advice capabilities within a hybrid model centred around strong human oversight and quality control. Using technology as an enabler, this approach aims to increase the value for clients.

Figure 8: Application of AI in areas where consumers demand enhanced client experience and engagement

<p>Conversational Interfaces</p> <p>Enable customers to interact and execute orders through text or voice based channels in a conversational context.</p>	<p>Virtual Advisors</p> <p>Deliver personalized and real-time financial advisory with a fraction of cost through an automated advisor powered by cognitive capabilities.</p>	<p>Customer Service</p> <p>Automated customer service: Answer customers queries in a natural language 24/7 and better understand client needs by being context aware.</p>	<p>Marketing</p> <p>Be where, when and on what the client is: Dynamic and learning marketing approach to reach customers with specific messages through appropriate channels and whenever they are open for it. Use machine learning to identify when a client is likely to leave the bank.</p>
<p>Smart Spending</p> <p>Analyze financial positions and learn about spending behaviors and guide in future situations.</p>	<p>Passion Fields</p> <p>Assist and advise clients regarding their passions and interests beyond banking such as collectibles like art, cars, wine, sports etc.</p>	<p>Client Segmentation</p> <p>Client-profiling by interests to personalize content, target recommendations or initialize conversations.</p>	<p>Sales</p> <p>Targeted offers and content curation to individual clients - based on their profile and past behavior.</p>
<p> Data Analytics: not specifically featured as foundation for all AI</p>		<p> Machine Learning</p>	
		<p> Voice Recognition</p>	<p> Computer Vision</p>
		<p> Natural Language</p>	

Source: UBS



However, it is unclear whether robo-advisors will be able to replace the personal interaction in the near future, as for the bulk of existing customers, a client advisor is currently better placed to respond to their needs or sense what those might be. We therefore see them as complementary, not as a replacement of banks, for the time-being.

The ability to analyse Big Data and use it to make financial advice more specific and personal, using AI algorithms is critical. As such, many institutions are investing heavily in Big Data and advanced analytics to meet the consumer demand for broadening the range of advice and digitally delivered products beyond portfolio allocation and plain vanilla investment products.

Through advanced uses of analytics and ways that combine all client interactions, information and Big Data, banks will be able to optimise customer service and increase touch points that lead to more services on offer for the growing segment of 'self-directed' clients. This will fit with the broader trend of shifting the control of specific tasks that are done by the bank today to customer.

Today, new digital services are emerging that combine digital wealth management technology with the banks' market-leading expert insights and provides clients with on-the-go, online access to:

- New digital wealth and goal planning tools to map and plan their financial future;
- Investment strategies based on analysis of clients' financial personality, financial situation, and their personal goals;
- Curated access to banks' expertise in asset allocation and bespoke advice services.

The increased use of robo-advisory and its benefits, as well as potential risks, have not gone unnoticed also by the regulators. The ESAs, as well as IOSCO have published reports on automation in financial advice, noting that the growing use of automated advice tools is having an important impact on the investment advice value chain, including asset allocation, portfolio selection and trade execution.³⁰

The regulators recognised that there is a spectrum of human intervention in connection with automated advice tools. Such interventions include the provision of initial filters, as well as focussing on the potential investor's financial circumstances and needs, before directing them to a regulated advice, broking or sales function. The key regulatory concern seems to be that consumers should receive the same advice and level of protection as for the traditional face-to-face advice.

The ESAs concluded that the existing EU legislation covers the provision of automated advice adequately and there is no need for additional requirements.

d. Blockchain and Smart Contracts

New technologies, and distributed ledger technology (DLT) in particular - often referred to as 'blockchain' technology - are likely to significantly improve quantity and quality of information available to economic agents and supervisory authorities, and improve consumers' trust in contracts and counterparties and enhance risk management. In turn, this will help reduce uncertainty and adverse selection. It will strengthen property rights and make transactions faster and cheaper for both the banks and the consumers, ultimately boosting overall economic welfare.

A definition of blockchain: a blockchain is a record of all the transactions ever made in a decentralised network since its existence, back to the first-ever transaction. This record is however not kept by any central authority. Instead, it is maintained by the collective efforts of anyone who cares to join the network and become a 'miner'. Miners are incentivised by earning a reward as well as transaction fees in exchange for their work. They are prevented from cheating by the ingenious 'proof-of-work' process they are obliged to use to carry that work out. This process makes it impossible for anyone to introduce bogus transactions. Only valid transactions can make it through the process, and each valid transaction is cryptographically linked to the previous one, forming a chain of transactions. The chain is then updated in blocks of valid transactions (hence the name). The most current version of the chain, which by its very nature cannot be unilaterally altered or counterfeited, is constantly updated on all the computers on the network, creating a viable 'distributed ledger'. This ledger can be inspected and verified at any time by anyone. The system, which is fully autonomous, therefore provides its own trust.

There are two types of DLT – Public where all transactions are visible but identity is not (e.g. BitCoin) and Permissioned ledgers where users with appropriate permissions can see the underlying transactions (applicable to the regulated finance industry). In addition, blockchains have been expanded to execute pre-defined actions if a condition is met, a feature that is referred to as 'Smart Contracts'. Potential applications cover a wide range of financial transactions, from bond payments to leasing contracts or trade finance deals.

It is important to note that DLT is not a panacea, but is very likely to form the foundation of next generation financial services infrastructure because this technology provides consistency of information for all parties, including supervisory authorities, and lineage leveraging encryption techniques. The technology is content agnostic allowing cross product/function processes to be built in a common 'system' rather than in the existing fragmented product and functional systems that currently exist.



The potential benefits of blockchain for banking clients are many. They range from real-time transactions allowing risk reduction and better capital management, to improved regulatory effectiveness. Examples include using blockchain for KYC or AML checks, thus enabling fast client verification and facilitating future banking based on the concept 'anytime, anywhere'. Most importantly, in a future scenario, blockchain solutions could mean better experience to clients thanks to the automation of highly manual and paper-based processes.

Digital signatures based on the blockchain technology help protect consumers, among others, against fraud (e.g. fake messages), and enable them to sign up to new products more easily. Third parties have no access to the private signature key and therefore cannot forge a valid digital signature. The digital signature also ensures that the consumer cannot later pretend that they did not purposefully use it, because a valid digital signature can only be generated for a given instruction if the signer is using the correct private key. A transaction to transfer ownership is only valid if the transaction is digitally signed with the correct private key. If the digital signature is valid, the transaction is accepted and recorded on the blockchain.

Additionally, general purpose blockchain platforms such

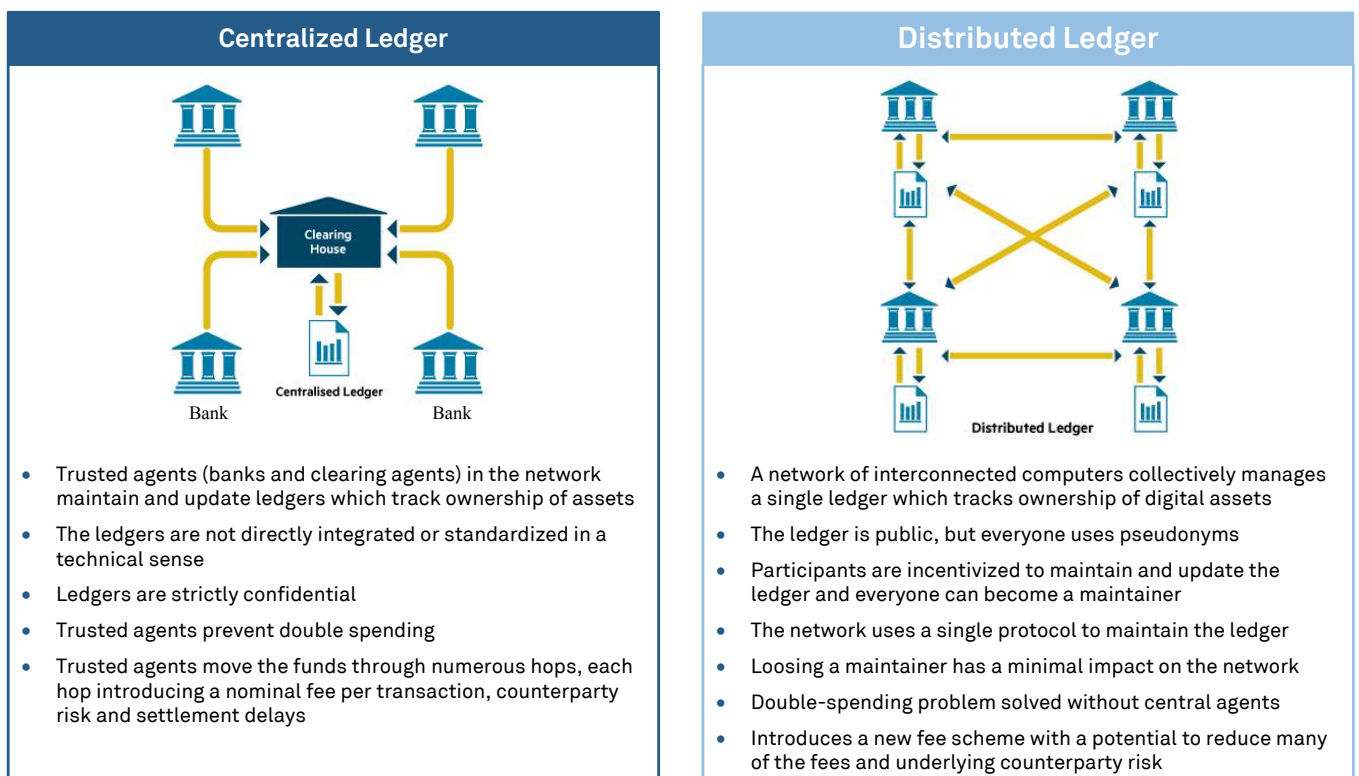
Ethereum have introduced the concept of 'Smart Contracts on blockchain'.

These programmable digital contracts can self-execute, self-enforce, self-verify, and self-constrain the business logics 'described' by their code, relying on the underlying blockchain protocol to communicate, compute and validate the transactions, while maintaining/updating the distributed ledger shared by every network participant. An example is smart equity. This type of smart contract could automatically register ownership when it is purchased, pay its own dividend, carry out its own stock splits, and perform any other task associated with its lifecycle, such as pay a stamp duty or other form of transaction tax.

Blockchain would also make it possible for clients to benefit from real-time cross-border payments and therefore real-time liquidity management without any cut-off times and corporates could access the full scope of best-in-class local banking services from our partnering banks without any target market restrictions normally applicable to global banks.

To better understand the potential impact of blockchain, Figure 9 shows how profound a shift from the current centralized infrastructure the DLT represents.

Figure 9: How decentralised distributed ledgers compare to today's centralised infrastructure



Source: UBS



1.5 Obstacles to digital investment from the consumers' perspective

We believe that digitalisation and innovation can help at each stage of developing and providing services to banks' clients. Nonetheless, the user's understanding of such products is still under-developed, and differs greatly between jurisdictions and language groups, thus hampering the provision of cross-border services. Moreover, geographically motivated, access restrictions limit the possibility of having a single view of the customer globally. Innovation, use of new technologies, and efforts to tackle cybercrime should not be confined to political borders, and cannot be effective if they are.

We see three primary obstacles to achieving a truly digital investment experience for the digital client: cybersecurity; data privacy; and digital identity.

a. Cybersecurity

Cybersecurity is critical to taking the next leap into digital financial services. Given the trusted relationship between a bank and an account holder, staying one step ahead of cyberthreats is critical to the survival of banks and to the reputation of the sector. Security of assets and identity will be fundamental for most clients of financial services companies to feel sufficiently confident to embark on the digital future.

b. Data privacy and protection

Data privacy is a second obstacle to achieving a broader digital investment landscape. In an ever more connected world, the question of who owns personal data and who determines how it can be used, must be addressed. Data protection is one of the key issues associated with Big Data and is gaining importance due to increased volumes and availability of personal data and consumers wanting immediate access to more personalised products and services over a variety of distribution channels. At the same time, the nature of information is changing. What used to be proprietary is now available publicly or semi-publicly, especially through social media.

Arguably, banks have some of the most relevant client data possible in terms of developing tailored services to client. At the same time, however, due to reasons of business philosophy and partially regulation, banks have been reluctant to embrace this opportunity, in the way other businesses with sensitive data have (e.g. Health). Paradoxically, banks are in a unique position to provide a distinguished offering ensuring, above all, data protection and privacy and security due to their long experience of managing such data sensitively.

Additionally, portability of data is also an important element for consumers as they want to be able to move data freely to wherever those data are needed. Therefore, clarity is required about the circumstances under which personal data can be transferred safely and securely, including to recipients located in other regions.

In some cases, regulators are already taking steps to adjust the legal framework to clarify where and how such data can be used. The EU General Data Protection Regulation (GDPR) is the first legislation which lays the foundation covering the rights of persons of their data and how to protect it, and it outlines the cross-border aspects. While this is a welcome step, governing bodies must ensure that the regulatory landscape does not become so fragmented that it impedes the development of seamless digital financial services.

c. Digital identity

The development of a digital identity framework is the third obstacle to the development of digital financial services. An identity which can be ensured, verified, safeguarded and handled is key in the next phase of the digital financial experience. Client identification and verification and KYC checks represent costs to banks and insurance companies and considerable inconvenience to consumers. A digital on-boarding process that re-uses home state national digital ID schemes as well as other Member States' digital ID schemes developed under the EU eIDAS Regulation would reduce costs, fraud and the time required to undertake KYC checks. For clients, the main benefit is having a digital identity which is readily verified and can be used by them across borders and multiple parties, and which results in a more seamless, faster, more secure, and successful application journey. We firmly believe that the main benefit of the e-ID will be its transportability. Currently consumers do not have the possibility to use biometrics, videocalls, third-party verification to verify their identity.

Although the EU eIDAS Regulation creates an interoperability framework for the national e-ID systems, currently it remains up to individual Member States to define the terms of access to the online authentication of government e-IDs by the private sector.

In Switzerland, client identification via digital channels ('digital on-boarding') is in place and is further facilitated by Qualified Electronic Signature (QES) which allows for fully digital, i.e. paperless, client onboarding.

1.6 Conclusion

In the future, whilst we expect there to be new and better ways of looking at things using technology, know-how, content and expertise will remain the distinguishing and differentiating features of banking. We expect automated advice to increase for affluent clients, but they will also continue to look for advice for complex questions and scenarios from human advisors. Leading wealth managers will continue to offer superior client solutions due to this expertise, breadth, and depth of coverage. Moreover, completely new roles will emerge as experts to design, operate and manage such 'robots' within the banks.

We expect automated advice to evolve over time, with



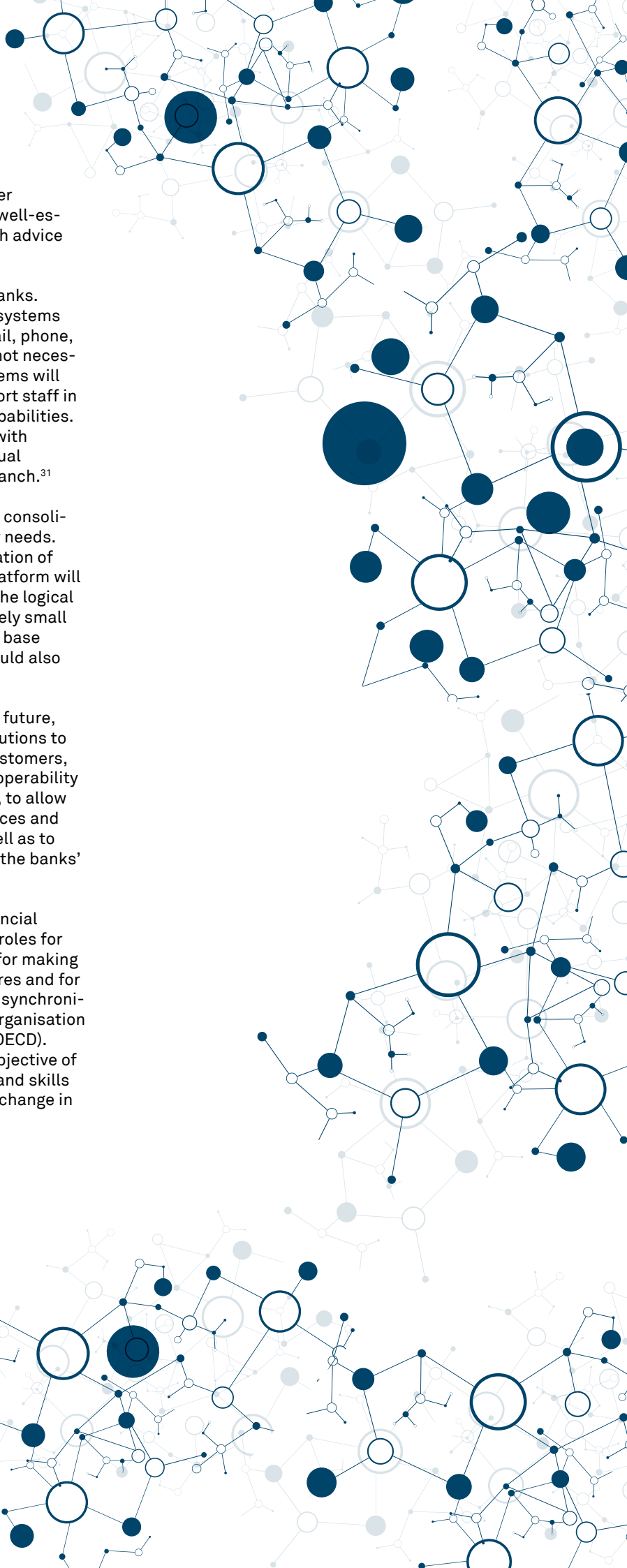
the preferred model emerging when the smaller automated advice vendors engage the larger, well-established companies, particularly in the wealth advice space.

AI will also change how clients interact with banks. Clients will increasingly deal with AI-enabled systems when they contact their bank, whether by email, phone, online chat, or text message. At first this will not necessarily be direct contact. Early AI-enabled systems will more likely be used to help advisors and support staff in doing their jobs better by augmenting their capabilities. But increasingly, clients will interact directly with machines, either virtually, for example via virtual assistants or in person when walking into a branch.³¹

Identity platforms will continue to mature and consolidate and start to serve specific digital identity needs. There will also likely be move towards the creation of large-scale identity platforms. What such a platform will ultimately look like is very much in the open. The logical outcome of this journey is likely to be a relatively small set of regional platforms that will serve as the base identity layer for the digital economy which could also conceivably become a global platform.³²

Consumer loyalty is expected to decline in the future, thus accentuating the need for financial institutions to stay agile, to understand the needs of their customers, and quickly act upon these insights. The interoperability of customer interfaces will be at the forefront, to allow customers to seamlessly switch between devices and channels during their digital interaction, as well as to use applications which are complementary to the banks' existing functionality and client data.

Finally, there needs to be further push for financial education and digital literacy. There are clear roles for governments to help better equip consumers for making conscious decisions about their financial futures and for the EU to coordinate these national efforts, in synchronisation with international bodies such as the Organisation for Economic Cooperation and Development (OECD). These efforts would also feed into the wider objective of a more equitable access to financial services and skills development, and ultimately foster a positive change in savings and spending habits.





2

The Digital Bank

2.1 Banks' role in financing the economy

In the first chapter, we described how digitalisation changes consumer demand, thereby impacting the services clients expect from financial institutions. In this chapter, we highlight the current digitalisation streams in banking and how digital trends are reshaping the business model of banks. Furthermore, we discuss how banks adapt their service offerings and consider new entrants, and we outline the obstacles which will have to be addressed to ensure that digitalisation delivers benefits for all stakeholders. To start with, we shortly illustrate the traditional functions of a bank.

Banks fulfil a range of critical macroeconomic and other functions, essential for the economy. As intermediaries, banks receive surplus money from people who are not yet using it (savers) and lend to those who need it (borrowers) to, for example, start or run a business, or to fund a mortgage. In a normal interest rate world, a bank borrows money from a group of people at a lower rate of interest and lends it to another group of people at a higher rate. Roughly 60% of European banks' income stream consists of net interest income. The basic product offers behind this function of a bank include deposit taking, the offer of a current or savings account, foreign currency accounts and, of course, loans. Last but not least, banks provide liquidity to financial markets as market makers be it in the fixed income business, the foreign exchange business or equities trading. To fulfil their function as intermediaries, banks rely on their ability to transform size, maturity and risk.

Another main function of banks is to facilitate transactions ranging from money transfers to payments, security, trading and settlement. Historically, banks acted as central trusted agents in a system where participants needed a reliable counterparty to trade with and transfer value.³³

2.2 How the banking sector is adapting to new challenges

In the previous chapter, we highlighted that the client has become the primary driver for change, and banks are in a race to improve the clients' experience when offering their services. They no longer compete only with financial institutions, but with new Fintech start-ups, large IT and telecommunication companies, and consumer goods providers.

These new competitive challenges come at the end of a period where the banking sector has underperformed the market materially. In Europe, this has been driven by a lack of profitability as well as high

costs. For example, cost efficiency measures have been partially neutralized by growth in compliance and regulatory costs. Thus, the market valuation measured by the price to book ratio has been materially below historical averages in recent quarters.

In addition, stricter regulatory rules (focused on capital, liquidity but also balance sheet size and complexity) have been established since the financial crisis. Increasingly, banks, insurers, pension funds, and other financial services institutions operate in a highly-regulated environment and are faced with high demands for auditability, security, data quality and operational resilience. Robotic process automation allows modern banks to meet these demands and achieve significant operational efficiencies whilst meeting consumers' preferences. Research shows that robotics can bring cost reductions of up to 80%, increase quality by reducing human error and the time taken to perform tasks, and generate scalable solutions to run on top of current IT infrastructures requiring minimal integration.³⁴

Technology also provides banks with an opportunity to meet the challenges posed to profitability by high cost pressures and low revenues. While many traditional banks try to overcome the high cost to income ratio of 70–90%, the best in class institutions, which are already using advanced digital solutions offer their banking service on an efficiency rate of 40–45%. Market participants and investors in general expect this to become the new norm for profitability in European banking. ING for example is growing steadily in Germany on a pure digital channel with a cost to income ratio close to 40%.³⁵

Technology adoption is likely to evolve in three distinct phases: the first phase is based on the long-standing practice of automating specific processes with pre-defined macros, usually programmed into a specific desktop application like Microsoft Excel. The second phase will be marked by the development of autonomous, virtual robots that can work on rule-based processes. The highest order are the likes of IBM Watson, which understand language and can provide insights back to the operator. Alongside these developments, banks will need to continue to reflect on what these advancements mean for their business models and for their clients. Finally, AI is likely to disrupt banks beyond the internal structure and impact the industry as a whole. Eventually AI could even drive market diversity, with more small and medium-sized participants entering the marketplace.

2.3 Where digital change happens and the expected impact

In this section, we define the most important digitalisation streams and illustrate the expected impact on established banks and their business models.

a. Funding and lending

Besides transaction services, funding and lending innovation has been the most prominent form of technology-driven banking innovation in recent years. The main drivers for new Fintech firms offering funding and lending services were the capital efficient arbitrage they capitalize on (no full banking license needed), coupled with the rise of technology to match funding and lending efficiently on a digital platform. This leaves the new entrants with far lighter balance sheets (as they typically do not take credit themselves), lean, integrated IT platforms and fast, cost-efficient processes compared to the asset-heavy balance sheets and legacy IT systems of established banks.³⁶

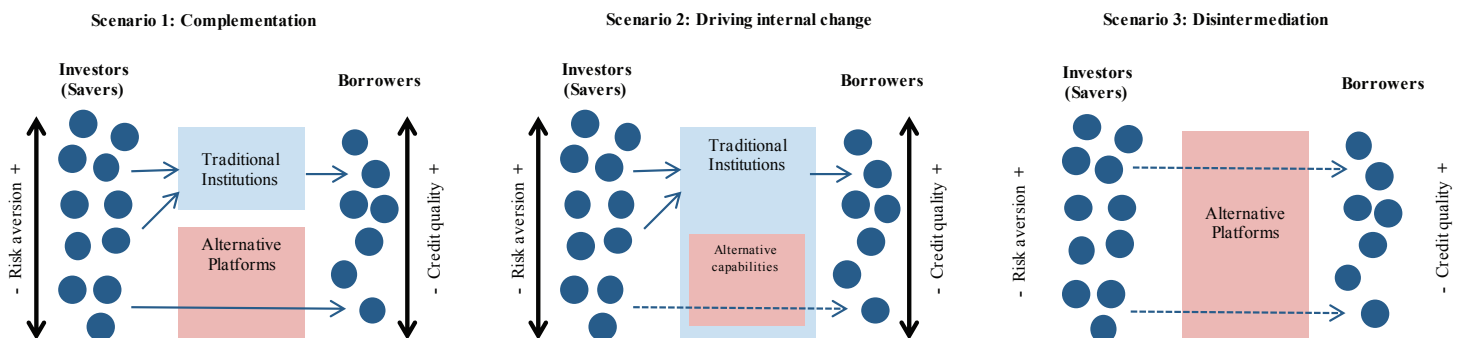
These peer-to-peer lenders can therefore offer higher rates to savers and provide borrowers credit at lower costs, thereby threatening to disintermediate traditional banks. In doing so, they expand financial services to previously underserved clients that would not meet a bank's criteria for credit. As the technology advances and credit risk assessments build a track-record, peer-to-peer platforms will likely continue to attract assets and savings from traditional banking.

However, the established players still have critical advantages over newcomers: they provide instant liquidity to savers, they can offer reduced costs through economies of scale and they are very experienced in managing complex credit products over the life cycle, including in distress or default. Reflecting the lack of these benefits, the growth of peer-to-peer lending platforms seems to be limited by a lack of savers rather than a lack of borrowers.³⁷

Longer-term peer-to-peer lending is likely going to be complementary to the traditional banking industry. However, it is also possible to see the more ambitious platforms trying to move into traditional banking (at the expense of probably losing some of their regulatory advantages), or that traditional banks buy/build their own peer-to-peer platforms to serve all borrower/saver segments (see Figure 10).³⁸

An example of a peer-to-peer lending platform in Germany is Auxmoney, established in 2007. It offers loans of EUR 1,000 to EUR 25,000 with a duration of 12 to 60 months. Depending on how the borrower scores, they are put into one out of seven different risk baskets and the interest rate is set accordingly from 3.95% – 16.3% nominally. The company charges the borrower an undisclosed fee on the face value as a compensation, depending on the duration and risk category. A saver pays a one-off charge of 1% on his investment and typically spreads it over a meaningful number of loans. The platform claims the default rate to be approximately 3% (see www.auxmoney.com).

Figure 10: How new technology could alter financial intermediation



Source: Credit Suisse; (World Economic Forum, 2015)



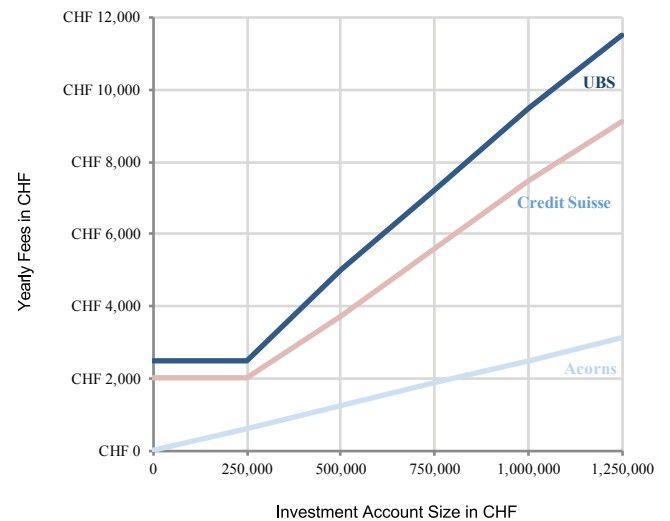
b. Investments, assets and wealth management

Increased sophistication of software engineering and the popularization of online access, combined with the demand for low cost investment advice, have led to the emergence of a multitude of digital asset managers, offering new forms of investment and wealth management. Networks like eToro (which allows its users to follow and copy trading activities of other investors), self-clearing broker dealers like Folio Investing (which offers a fractional share platform and enables clients to purchase any amount of an ETF or stock), and robo-advisors such as Betterment, SigFig and Acorns compete to gain market share. Robo-advisors typically determine clients' risk profiles, goals and asset allocation through an online self-assessment. Subsequently, they automatically build computer-generated diversified portfolios of low-cost ETFs across multiple asset classes and give investment recommendations based on algorithms.³⁹

Marginal costs from managing an additional client portfolio are thus very low and ultimately facilitate management fees well below 0.5% with minimum investments of USD 500 or even lower.⁴⁰ This is possibly altering the perception that portfolio advice and rebalancing are high-end services beyond the reach of small ticket investors. Robo-advisors like SigFig or Acorns charge only 0.25% on assets under management, which stands in stark contrast to traditional financial institution's solutions like Credit Suisse Invest Partner or UBS Advice (see Figure 11). The technology is still in its infancy, rather standardized and most providers solely build portfolios with ETFs. However, they offer significantly increased accessibility to wealth management service for unbanked or underbanked client groups with smaller deposits. So far, only 20% of affluent Americans have a financial advisor while mass affluent households (USD 250,000 – USD 1 million) in the US alone are estimated to hold about USD 7 trillion of assets, reflecting the room for growth of low-cost wealth management solutions.⁴¹

In 2015, BlackRock acquired FutureAdvisor in an attempt to stay ahead of the technology curve, and as more large players start seeing potential, the number of acquisitions is likely to grow. While most providers of automated digital investment services currently operate as investment brokers and, therefore, are not subject to banking supervision, regulatory requirements are likely to become stricter. This could lead to further consolidation and strategic alliances within the sector. As robo-advice becomes more sophisticated, it could serve and be accepted by a wider array of client groups including High Net Wealth clients. This is especially the case considering the potential for hybrid combinations of computer-generated recommendations and interaction with a human advisor. In any case, it is probable that the most sizeable portion of the take-up will stem from the currently untapped asset base of retail and mass affluent clients, and a smaller percentage from larger, more sophisticated clients.⁴²

Figure 11: Fee structure of CS Invest and UBS Advice vs. robo-advisor



Source: Credit Suisse, UBS, Acorns

Two examples of robo-advisory tool are Credit Suisse Invest Offering and UBS Advice, non-discretionary, feature-rich investment solutions with an investment advisory agreement. These solutions are striving to combine our rich investment competencies with modern Big Data capabilities and opportunities. With the launch of these solutions Credit Suisse and UBS were among the first banks to shift from a product-focused business model to an advisory-centric set-up, aligning their organization with new self-directed client behaviour and value expectations.

c. Payment and trading

Technology-driven change in transaction services is one of the most visible fields of financial service innovation. Historically one of the core businesses of financial institutions, payment services and trading activities ran on well-established platforms, involving time-consuming, error-prone and complex procedures.⁴³ With the rise of standard internet technology, mobile connectedness and secure, efficient distributed ledger systems, the transfer of value might take alternative routes, challenging established financial institutions.⁴⁴

While the retail and peer-to-peer payment markets are not perceived as overly inefficient per se, the shift to online and mobile business and the move to an increasingly cashless society leads to a growing number of mobile payment systems (such as mobile wallets) and peer-to-peer applications.⁴⁵ However, innovations in customer-facing technology normally link to existing transaction systems like credit/debit card networks or standard banking systems, leaving the underlying processes untouched. Still, as demand for speed and standardization rises, alternative and more efficient systems might be developed to meet this.

Secondly, the currently complex and occasionally slow, error-prone systems of global clearing and settlement, trade finance and exchange-based securities trading could face fundamental changes as blockchain/distributed ledger technology offers some compelling use cases in finance. This new technology has the potential to bring automation to a large number of current activities, such as servicing coupon payments of smart securities, keeping crypto-cash in escrow, executing regulatory reporting, notarising the terms of a trade agreement, and drastically reducing the cost and the risk of current services thanks to disintermediation.

Given the fact that the blockchain technology can store information in a shared database, but still offers high security, speed and a small risk of manipulating past transactions, it could replace central trusted institutions (like a clearing house) and speed up international payments considerably. Deployed within banks, this technology has the potential to significantly reduce middle-and back office processes (see Figure 12).⁴⁶

Success of payment innovations relies on their widespread adoption (to capitalize on economies of scale), security, standardisation and how regulatory issues will be resolved (e.g. regarding fiat currencies on blockchain networks).⁴⁷ Solutions like PayPal and Apple Pay manage to integrate themselves into the existing ecosystem (e.g. transactions on the card networks for Apple Pay), but reshaping the global payment transaction system as a whole will take considerably more time. Different Fintechs offer platforms at the moment (e.g. Ripple, Coinbase), while Visa, one of the first large scale payment processors, recently announced it would start offering business-to-business international payments based on a new blockchain solution.

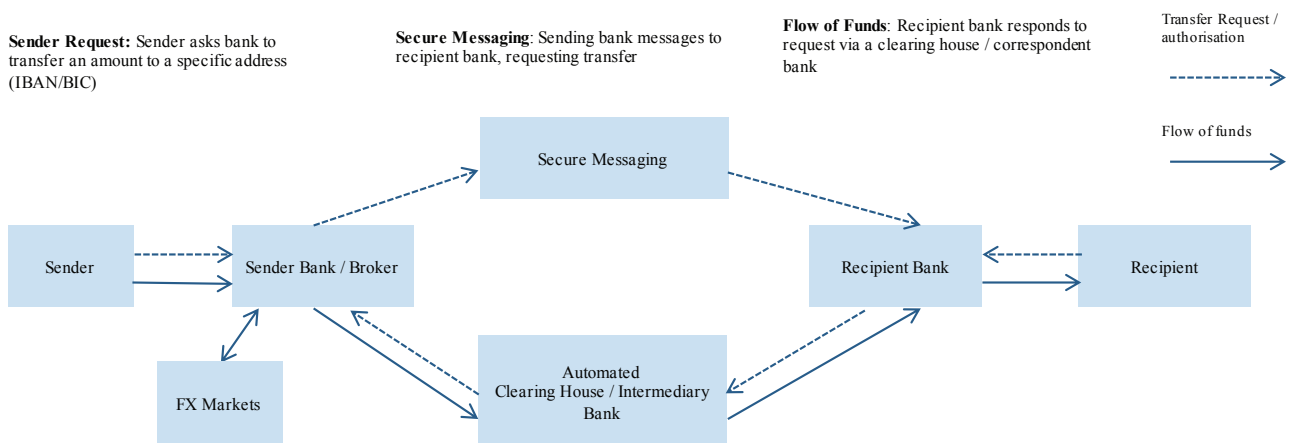
In late 2015, nine global financial companies founded a consortium called R3 in order to explore the potential of distributed ledger technology and cryptocurrency in finance and trading. With backing of more than seventy leading financial institutions, R3 is working to establish blockchain standards and protocols for the financial industry, e.g. through a blockchain-based platform (Corda) that would facilitate common interbank services and would be used as a basis for tailor-made solutions.

More recently, banks are also exploring an innovative approach to international trade – utilising blockchain technology – which could simplify and accelerate the trade process by holistically combining trade finance and all ancillary services - logistics, inspection, insurance, payments, FX and financing – into one single tool.

A solution – based on smart contracts – essentially allows for the digitalisation and fully automated but pre-defined conditional execution of trade agreements. A completed proof-of-concept has shown the technical feasibility of both automated transaction execution and intuitive front-end integration. The solution allows for end-to-end digitalisation and automated processing. Furthermore, sellers and buyers can initiate as well as monitor transactions anytime and anywhere.

The Smart Bond project was one of the first experiments with blockchain and smart contracts. It aimed to validate the feasibility of the overall blockchain approach and the initial smart contracts hypothesis on a popular financial instrument, a simple bond, which was modelled on blockchain.

Figure 12: International Payment System offers leverage for simplification



Source: Credit Suisse; (World Economic Forum, 2015)



Banks are still at very early stages of large-scale blockchain adoption, despite the promising use cases for blockchain. It is possible that we will see widespread blockchain implementation in other industries first - for example supply chain management, e-governance, healthcare, or real estate. Considering the complexity and regulatory uncertainty around blockchain, banks will have to be cautious, especially with public blockchain networks. More research is needed and recent incidents have shown that the protocol itself needs to be improved as well. The latest waves of blockchain technology, also defined as blockchain 2.0 protocols, moved away from the initial use case and controversies of Bitcoin, evolving their protocols to support different asset classes and more sophisticated financial instruments.

d. Personal Financial Management

Personal financial management applications offer technology-driven solutions to meet clients' needs. In a first step, applications like Mint bundle the information on one's personal financial situation through a single interface, giving an easy and quick overview of all assets and liabilities.⁴⁸ More complex solutions automatically categorise client transactions into different buckets, which are then the basis for planning and budgeting aids like projected cash flows or even credit scores. Automated savings applications or dynamic investment strategies finally link personal financial management with robo-advisory services.

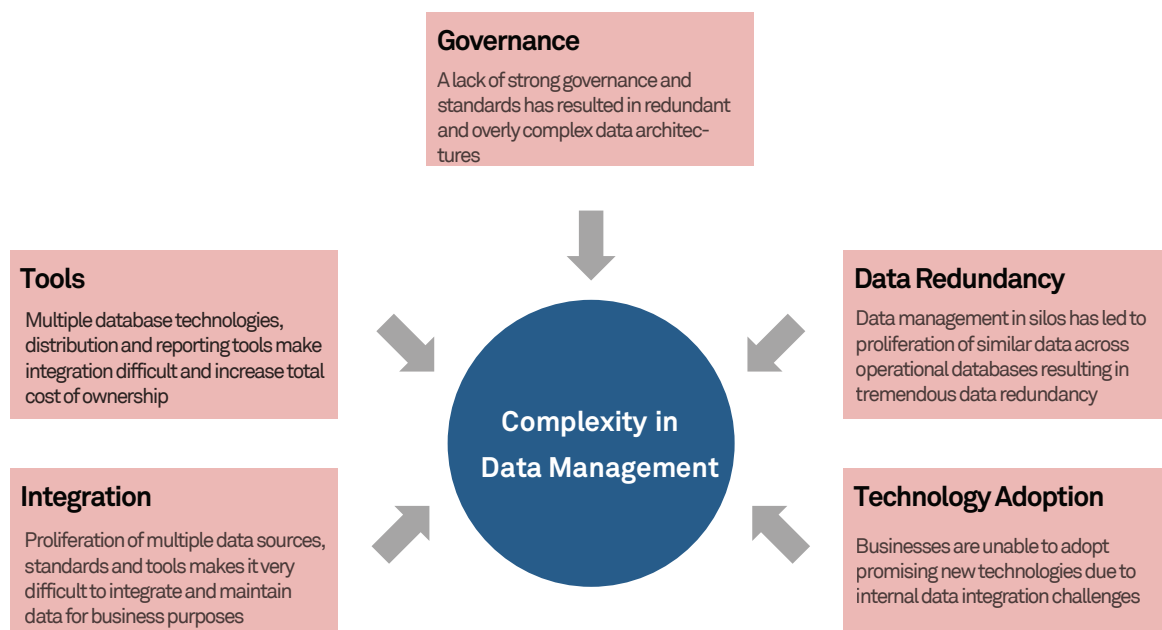
e. Cloud computing

To embrace cloud computing, banks will need to rethink today's data handling habits with ever increasing amounts of unstructured data likely to move into highly secure clouds or hybrid clouds, and better communicate the benefits and potential drawbacks of these solutions to consumers and public authorities. For example, the most secure data centres may be provided by specialised firms offering economies of scale, meaning the geographical restrictions on the location of data housing could deprive consumers of the latest developments in cybersecurity technology. Consumer protection has been an important issue for regulators to date, and this concern is likely to persist and translate to the digital realm, particularly in mature financial markets.

f. Data, administration

For decades, a rapidly growing, vast amount of data has challenged banks. Additionally, data has often been inefficiently stored and inconsistently formatted in various discrete systems from different business units, new software platforms, or as a result of a merger or an acquisition. This has led to data redundancy and rendered the conversion of this data into useful information more and more complicated, which was especially apparent during the financial crisis in 2007/08 when analysing the risk exposure for banks and the financial system as a whole proved to be impossible.⁴⁹ Figure 13 illustrates the major causes of complexity in data management.

Figure 13: The five major causes of complexity in data management



Source: Credit Suisse, (Capgemini, 2014)



Today, companies like TIBCO or Tableau have developed tools to aggregate, analyse and make forecasts based on financial data. Innovators like Squirro offer advanced data evaluation with the goal of detecting hidden insights, especially in unstructured data, by using a combination of retrieval algorithms and statistical analysis. Unlike traditional search engines, they focus on concept search such as, for example, ‘product issues’ rather than keywords and go through vast volumes of text and other types of unstructured data.⁵⁰

The benefits and the impact of aggregating and analysing relevant data are manifold. If the technological advances continue, banks can improve risk management, optimise operating models, enhance customer service, and respond more quickly to changes in the operational environment.⁵¹ While intelligent data analysis could maximise customer utility and make internal infrastructure leaner, customer-related and any other kind of confidential data will have to be handled carefully to avoid data protection infringement.⁵²

g. Security and privacy

As noted in the first chapter, the risks to security constitute one of the major obstacles to the uptake of new technologies by consumers. Fintech innovations necessitate digital availability and secure services. A growing population of tech-savvy clients demand around the clock accessibility to these services, hence, the amount of online data traffic susceptible to security breaches is surging. In addition, omnichannel solutions such as account mapping, wealth management, and payment services demand data sharing between traditional financial institutions and innovative Fintech businesses, which increases data ubiquity and poses a myriad of challenges to data security.⁵³

Providers of robo-advice such as Charles Schwab, Betterment or Acorns are already depending on algorithms to automatically execute clients’ trades. Algorithms need to be thoroughly examined before implementation and continuously monitored to avoid unintended or deliberate alterations of the code by insiders and/or outsiders. Also, Fintechs offering account mapping, wealth management and payment services require bank login data, making it crucial for them to adhere to the same encryption and protection standards as regular financial institutions.⁵⁴

If new innovative financial companies establish themselves successfully, they could be further integrated into the banking sector and existing IT systems. It will be crucial for Fintechs to meet the highest security standards, otherwise they could constitute a tremendous risk due to the sensitivity of client data they possess. Moreover, they could be utilised as entry points for cyberattacks ultimately directed at banks and their data.⁵⁵ Another concern is cloud computing. If banks follow other industries in using cloud technology to build new business models, they will need to prove that the cloud technology is just

as secure as other forms of data storing.⁵⁶ Overall, the challenges are evident. The actual impact on cybersecurity will essentially hinge on how well the financial sector as a whole will manage to collaborate and develop proper solutions to new security threats.

h. RegTech

Following the financial crisis in 2007/08, the regulatory requirements for financial institutions have increased dramatically. The impact on banks’ expenses is staggering. For example, JPMorgan Chase reported in 2014 that it spent an additional USD 2.6 billion on staff and technology from 2012 to 2014 in response to increased regulatory and compliance requirements.⁵⁷ Others estimate that 15-20% of ‘run the bank’ expenses flow into compliance, regulation and risk functions.⁵⁸

By making compliance processes less complex and capacity-demanding, the adoption of new technologies to facilitate the delivery of regulatory requirements – so-called RegTech could free capital to put to more productive uses (such as lending to the real economy), improve the quality and efficiency of supervision, and reduce risk. Driven by these trends and often complex IT infrastructure within decade old banks, there is a growing market for RegTech companies, providing state-of-the-art technology and related services to offer banks relief from the regulatory burden. RegTech companies offer their solutions in a wide range of fields, most notably in the following areas:⁵⁹ regulation management (ongoing monitoring of regulatory developments, impact analysis and system implementation), Know Your Customer (all matters related to client identification and information), market conduct supervision (trade/transaction surveillance), reporting and risk management (risk data aggregation and reporting). Key capabilities from RegTech companies include the ability to handle large amounts of unstructured data, combining it from different (external) sources and deploying artificial intelligence/machine learning algorithms in a scalable, time-efficient manner.⁶⁰

In parallel to banks, regulators, such as IOSCO and the UK Financial Conduct Authority (FCA) are increasingly focusing on the potential deployment of RegTech.⁶¹ Responses to the call for input launched by the FCA included a wide range of global, current, and future regulations, which would benefit from RegTech.⁶² Respondents named the Markets in Financial Instruments Directive (MiFID II), Basel III, the Bank Recovery and Resolution Directive (BRRD) and Dodd-Frank Act among others as specific examples where RegTech could help to fulfil the existing regulatory compliance and/or reporting requirements. Most importantly, RegTech could reduce compliance burdens without lowering standards.

RegTech solutions focusing on data aggregation and management provide the opportunity for standardised shared utility functions.



Cloud technology and open platforms enable such solutions. On the one hand, shared utilities facilitate the optimisation of core processes within financial institutions thereby benefitting from larger economies of scales compared to in-house handling.⁶³ On the other hand, challenges like confidentiality, security and data quality may arise when providing services to multiple organisations across the banking sector.

In early 2016, Credit Suisse launched a joint venture with Palantir, a US-based technology company, in order to develop compliance applications which should initially detect unauthorised trading, but could soon be expanded to complex compliance use-cases and facilitate smart KYC analytics. A further benefit could be enhanced capabilities for client support and advice that is backed by data analytics and artificial intelligence applications (source: www.palantir.com).

One major hurdle for RegTech, besides winning the trust of its clients and establishing a track-record of reliability, is the need to onboard the regulator from the beginning.⁶⁴ This would not only increase acceptance with the regulatory bodies, but also offer regulators the opportunity for more streamlined and efficient internal processes on their side.

The implementation of RegTech has to take place on both sides, from the financial institutions as well as the regulator. Regulators recognise the need to raise their technology savviness in order to fully assess these next-generation approaches and solutions.⁶⁵ Solutions which improve information flow between financial institutions and regulators and thereby help monitor global systemic risks, need to be connected to and implemented in the regulator's IT system. For instance, regulators should provide up-to-date online reporting portals and secure data transfer mechanisms to significantly increase efficiency.⁶⁶

Whereas RegTech is global in nature, the supervisory mandate and the application of such solutions remain largely national. Therefore, closer cooperation among regulators should be promoted, for instance through the EU coordinating national RegTech initiatives.

2.4 How the digital trends are reshaping banks and banking

2.4.1 New digital challenger banks

Given the extensive opportunities and technological progress in the digitalisation streams described above, challenger banks attempt to build a disruptive digital banking franchise from scratch. Starting without any restrictions from legacy systems/processes can prove to be a big advantage over incumbents and, in general, gives challenger banks a cost advantage on the processing side. More importantly, they often do not operate any branches, but offer purely digital,

advanced customer interfaces and personalised services.⁶⁷

Some companies, like Fidor, N26 or Atom, differentiate their business models even further, developing into social media banking (with large user communities discussing financial matters on the bank's platform) or purely mobile-focused platforms (where even a computer-based web interface becomes secondary).

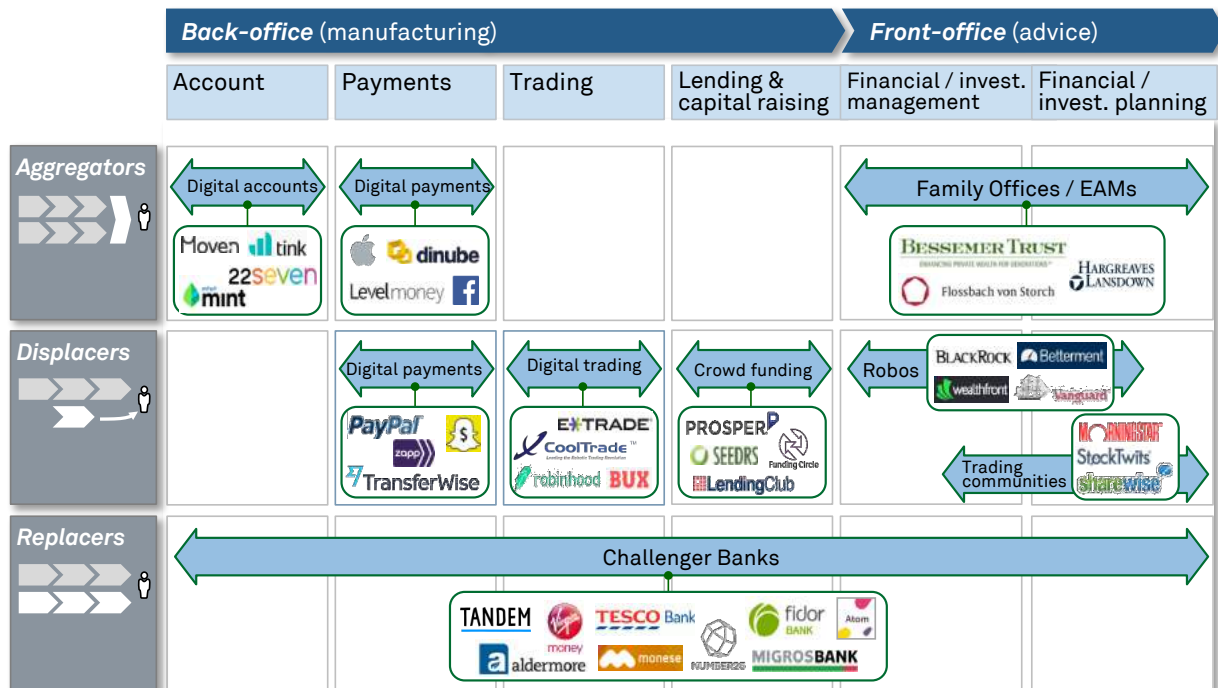
Offering fully developed banking services, these Fintechs could pose a real threat to incumbents over time, especially as the more tech-savvy generation becomes an increasingly important client segment and customer preferences move to digital business. In doing so, they put competitive pressure on established banks to drive forward their own digital strategy. However, there are significant hurdles these newcomers have to tackle in order to turn profitable. Probably the most prevalent is to reach the scale (in terms of asset under management and processed transactions) that is necessary to realise economies of scale – given the fixed costs of establishing and maintaining the banking platform, leverage becomes crucial. Closely linked to this is the fact that trust and inertia tend to keep customers staying with their established banks, hence, deposit funding is more expensive for challenger banks as they strive to lure customers away from their existing banking relationships.⁶⁸

Given these obstacles, scaling up will be difficult. Technologically successful start-ups will remain under a close watch from established banks and likely be bought/integrated or developed jointly at some point.

N26 offers all basic banking products like investing, credit cards, overdraft facilities and payment services, tailored to digital savvy customers, on a low-cost basis and in an easy to use format. The platform is designed to work on mobile platforms as well as on the internet. Withdrawals can be made from ATMs. The basic account comes for free (source: www.n26.com).



Figure 14: Aggregators, Displacers and Replacers



Source: Credit Suisse

2.4.2 Disruptors vs. Enablers: banks in need to capitalise on digital innovation

The new Fintech companies mentioned above cannot only be categorised by functional groups. From a value chain perspective, they fall into three broad categories: Aggregators, displacers and replacers (see figure 14).

- **Aggregators** are themselves not creating any financial products and wealth management offerings but, similar to online comparison platforms, provide a comprehensive market overview for clients, saving them the time to search for the various offerings available and often also act as intermediaries helping clients find the best offering for them.
- **Displacers** focus on one element of clients' banking value chain and typically offer it at much more competitive terms and providing a much more engaging user experience. These Fintechs aim to displace banks from the respective element of the value chain. Examples include Lending Club for financing, Ripple for payments or Betterment for portfolio advisory whose offerings are outlined in the previous section.
- **Replacers** are new entrants aiming to replace banks across the entire client value chain on the long run, e.g. N26 (formerly Number26), Atom as well as Fidor.

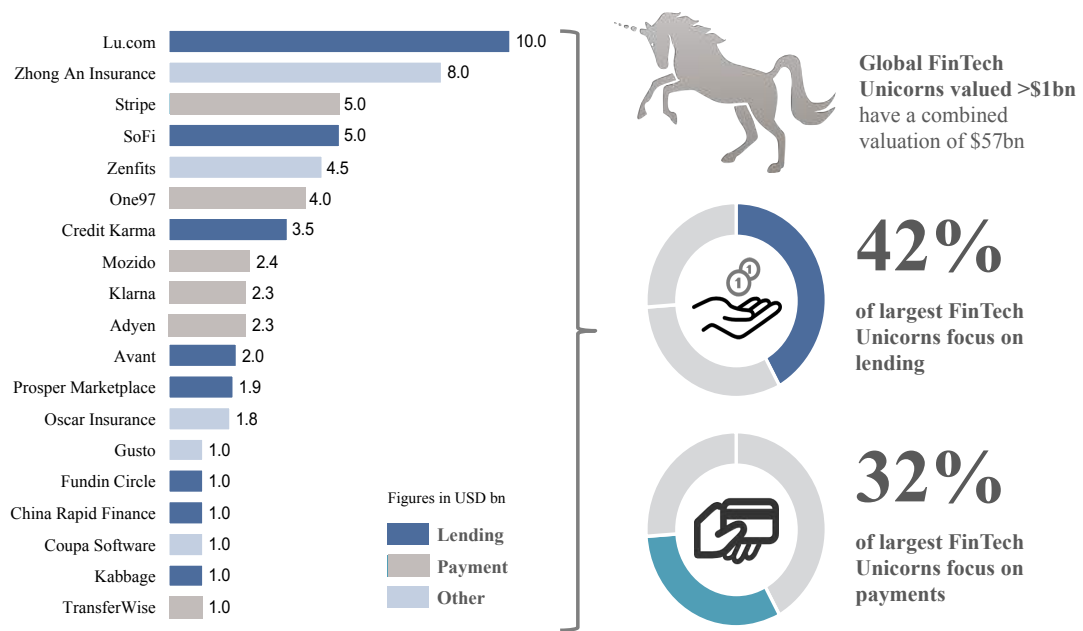
The vast majority of Fintech companies fall under the category of displacers, focusing on a very specific element of the banking value chain. Looking, for instance, at the most 'successful' or promising companies among the Fintechs (so called 'unicorns' with a valuation of USD 1 billion or above), 42% are focused on

lending and 32% on payments (see Figure 15), businesses in which the market seems to be projecting more potential for displacement success than in others. This is clearly a challenge to incumbent banks. However, in our view, it is a challenge to partner with rather than fight against.

Taking a step back, we have seen over recent years that the willingness of clients to pay has shifted along the value chain to its front.⁶⁹ In the past, clients saw significant value in receiving access to markets, financial insights and banking products and were willing to pay for such access. Today, however, technology has simplified and continues to increasingly facilitate such access. Coupled with a new kind of client behaviour that is far more self-directed than in the past, such access to markets, financial insights and banking products are becoming a mere commodity from the client point of view, with a commensurably lower willingness to pay attached to it. This is a tremendous business model challenge for banks (see Figure 16). Today's incumbent banks' revenue models are still focused on the back-end where custody and execution services as well as product issuance and structuring sit, both of which are linked to large and costly infrastructure.

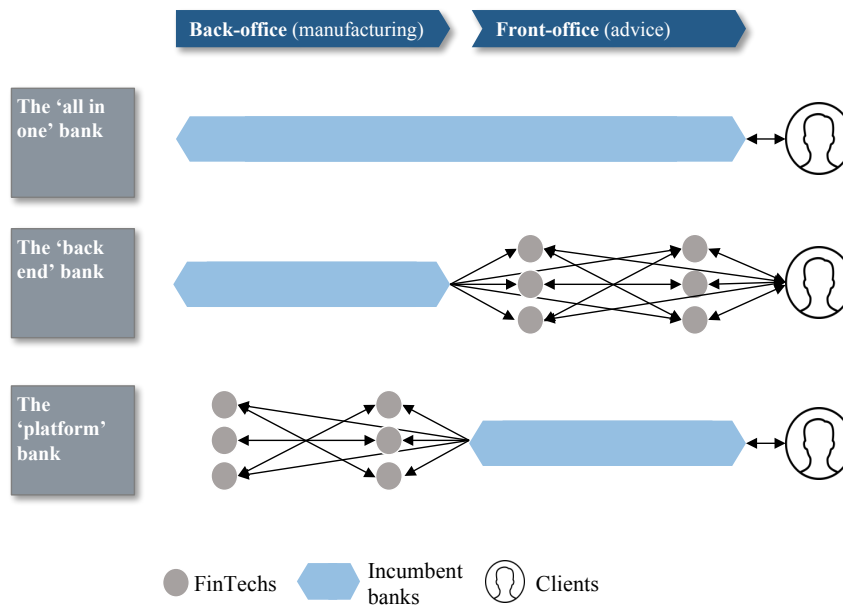
Therefore, partnering with Fintech companies within the value chain is the mutually beneficial way forward. Banks are able to create a new kind of efficient back-end that flexibly integrates and orchestrates always best-in-class capabilities, products and services while Fintechs gain scale much faster than they would otherwise would.

Figure 15: Fintech unicorns⁷⁰



Source: KPMG/CB Insights 03/2016

Figure 16: Banking reaction models



Source: Credit Suisse



2.4.3 Options and reactions: banks' response

To prevent banks from becoming a low margin 'utility-like' provider, digitalisation will have to become an integral part of a banks' business and of their clients' everyday life. While Fintech disruption will unbundle and disrupt the universal banking model, banks that invest in innovation will be able to adapt and play a central role in the future of financial services.

In responding to these new challengers, typically, the incumbent banks either take a defensive approach, fighting fiercely to secure the entire banking value chain, or choose to specialise and focus their activity either on the front-end (advice) or the back-end (asset servicing/products) of the value chain. Large banks especially have the infrastructure to specialise in back-end services, in effect 'selling' white-label solutions and/or outsourcing provider services to others while increasing their economies of scale. Alternatively, banks can specialise on the front-end and capitalise on their expert know-how, global reach and, crucially, brands recognition, which notwithstanding the financial crisis, contrasts favourably to new companies with only a two-year track-record.

Digital technologies can help banks streamline their processes and achieve substantial back-office cost savings. In the same way that SWIFT does, there are opportunities in financial services infrastructure for close collaboration to create economies of scale and better processes through automation. Research shows that automating back-offices can help banks realise up to 30% of cost savings,⁷¹ whereas increased revenues from innovative business models and new products could amount to a total of 15% of net profit. A study by SIFMA and McKinsey found that 'using blockchain for cross-border business-to-business payments could generate USD 50-60 billion of 'value' resulting from lower costs/fees and better security and speed.'⁷²

The retail banking space provides a good example of how this can be applied in the marketplace. Nowadays clients expect innovative payment systems such as mobile contactless payments or virtual wallets. Since these products already exist, a more effective way than developing them from scratch is for banks to partner with existing service providers and integrate them via white labelling by leveraging Application Program Interface (API) technology into their own services. Fintech companies benefit because they gain scale faster than they could have otherwise done, while clients benefit because they are sure to always receive the leading technology offering available. Finally, banks benefit because they save time and resources and most importantly can focus on their core value proposition, namely advising clients.

Application Program Interface (API) is a set of routines, protocols and tools for building software applications. An API specifies how software components should interact. A good API makes it easier to develop a program by providing all the building blocks. A programmer then puts the blocks together. API's enable a business or organisation to turn into a platform, linking together a set of business models and channels based on secure access of functionality and exchange of data. APIs make it easier to integrate and connect people, places, systems, data, things, and algorithms, create new user experiences, share data and information, authenticate people and things, enable transactions and algorithms, leverage third-party algorithms, and create new product/services and business models (source: Webopedia, Gartner).

The bank of the future is going to be a platform bank that connects and orchestrates the single service and product providers it is collaborating with along the value chain and, hence, facilitates an integrated offering of traditional and new 'banking' services and products. For this, API connectivity will be key for both, participating to Fintech innovation by technically enabling the partnering with Fintech companies and, at the same time, be compatible to API integration of services and products and become part of the banking value chain of the future. Consequently, Fintech companies are welcome to integrate into the future bank's respective offering, as they will enable banks to accelerate the long overdue business model shift from the back-end of the banking value chain to the front-end and become key partners always providing always best-in-class services and solutions.

2.5 Obstacles to digital investment from the banks' perspective

In the previous chapter, we looked at how cybersecurity, data privacy, and digital identity were obstacles to the take up of new technologies by consumers. Here we look at the main hurdles banks will need to overcome to deliver new kinds of services to clients. There are four main hurdles that have to be addressed first: the modernisation of the existing banking system landscape, the change in the incumbent banks' mindset, the adaption of the regulatory framework and the establishment of favourable investment conditions.

The existing banking system landscape has grown organically over time and banks have been connecting their growing system landscape with the technology available at the time, i.e. with point-to-point interfaces first and with message- and/or service-oriented middleware later. The creation of a flexible API-based, plug-and-play system infrastructure allowing the simple integration of Fintech partners represents a major platform renewal effort.



Some systems have been renovated and replaced by API-based ones in the past years, but almost all incumbent banks still have a large part of highly complex, inflexible, purpose-built systems without API compatibility. Adapting these systems is a multi-year and multi-billion effort which forces financial institutions to run two systems for the same purpose over a considerable period of transition time in a market environment with eroding revenues and cost pressure.

Changing the mindsets of incumbent banks is no less challenging. The new platform business model described is diametrically opposite to how incumbent banks used to operate. Aligning everyone from the top management to individual staff with this vision and convince them to work together towards this new model turns out to be a very difficult task. The corporate history is littered with examples of companies that did not undertake such effort in time and failed to make the jump from one technological lifecycle to the next, e.g. the music companies overtaken by web streaming services such as Spotify, television being replaced by Netflix or Nokia failing to make the shift from hardware-driven to software-driven devices in the mobile phone market. Banks cannot afford to fail to make the shift to the new platform-based and advice-focused business model. Consequently, both, the infrastructure and the change of mindset challenge that they have, need to be tackled soon and fast.

There are external challenges, namely the regulatory framework, that banks will face while transitioning business models. Large parts of banking regulation, irrespective of jurisdiction, are decades old. For example, many regulations and policies regarding KYC and other identification, documentation or data processing requirements were imposed well before every person was fully digitally connected and used to easily handle documents or services via digital channels. Existing banking regulation needs to be reviewed in the light of today's technological possibilities enabling banks to provide clients with the simple and convenient interaction they expect and using technology to ensure the level of accuracy and quality required with respect to the information and documentation to be collected.

At the same time, the regulatory framework also imposes very demanding capital and organisational requirements to some regulated activities, factually representing high barriers of entry to the Fintech companies with respect to these regulated activities in the banking value chain and also cumbersome and costly processes for incumbent banks to comply with these requirements, while the more advanced stage of today's technology could help compensate for, e.g. geolocation functionalities in the cross-border wealth management activity area. Therefore, the legitimate need for regulatory protection for investors and financial markets has to be balanced against the necessity to test and apply innovative solutions to regulated activities in the market as to facilitate their further development and refinement. To this end, several regulators, e.g. in the UK, Singapore, Australia and soon

also in Switzerland, have started to establish so-called 'regulatory sandboxes' which provide a controlled space in which new product and process innovations can be pioneered and tested, rightfully, by both, Fintech companies and banks. Sandboxes as such should be accessible to all market players in an equitable way.

Being allowed to innovate is one thing, being able to do so quite another. Fintechs need access to finances in order to build new offerings, hence the investment conditions become pivotal. In the leading centers of Fintech innovation, i.e. Israel, the U.S. and UK there are multiple sources of financing available for any development stage of start-up activity. There are government-driven programs (start-up competitions, government-sponsored venture capital funds) and angel investors providing sufficient seed funding. Once start-ups have grown and have products (and first cash flows) to show, there is typically a large and variegate venture capital firms network present, mainly thanks to innovation-fostering tax regimes. In Switzerland, however, there is still too little funding for start-ups, especially as far as seed funding is concerned. This circumstance, coupled with the comparatively high cost of operating within Switzerland, is a serious impediment to Fintech companies here and start-ups in general. The situation is similar in the EU except for the UK. Consequently, favourable investment conditions have to be put in place in order to attract capital for start-up investments.

2.6 Conclusion

Further digitalisation in financial services is unavoidable. If banks do not embark on this transition, other financial or tech companies will do so. Client demand and expense pressure cause banks to follow suit or outsource parts of their platforms and the processes.

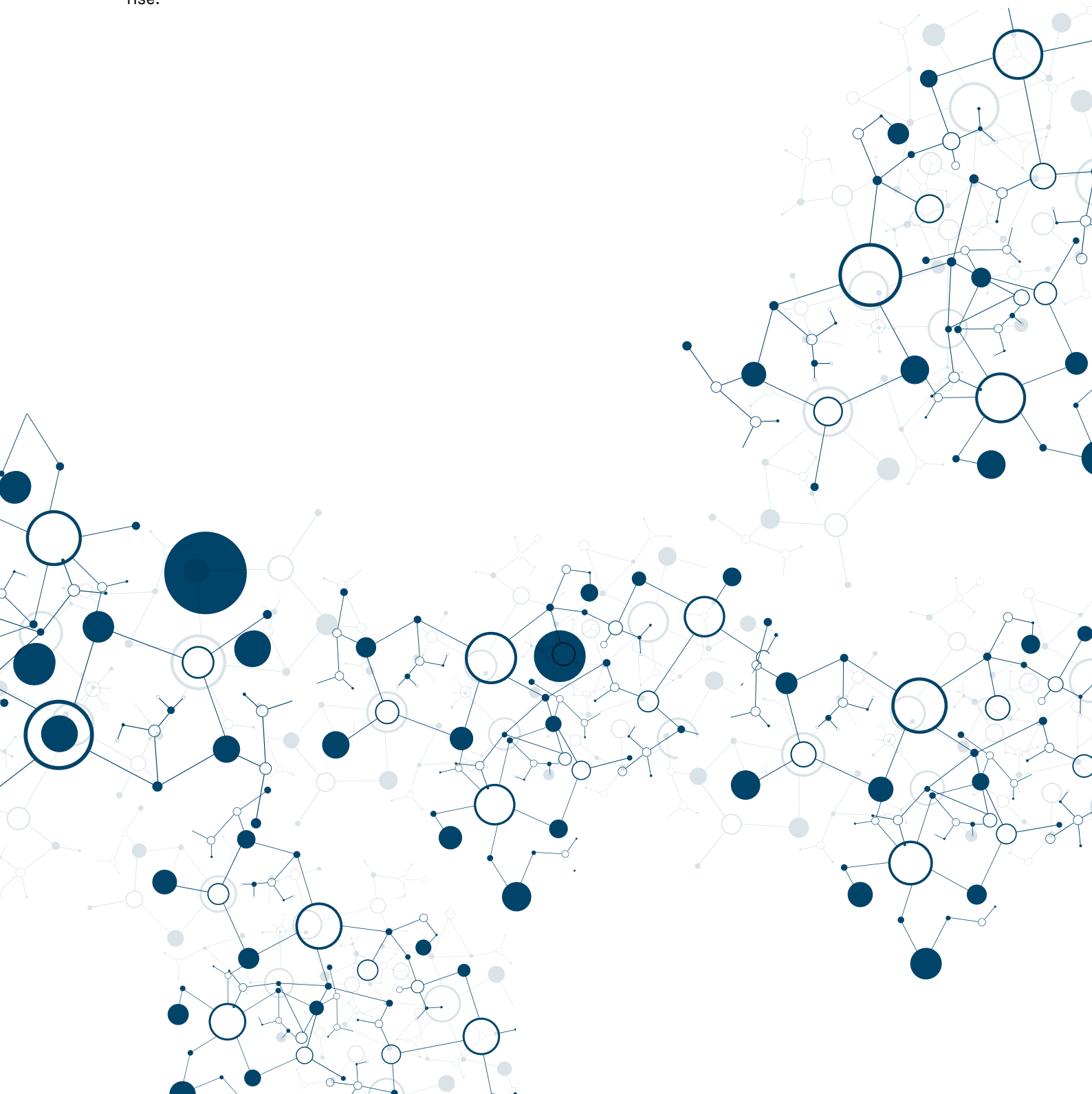
Fintech companies are unlikely to render traditional banks obsolete. Incumbents holding established, trusted client relationships start from a strong position. Long-standing partnerships and customer inertia could make it difficult for challenger companies to get hold of digital clients. Additionally, banking is highly regulated, and therefore, there are significant barriers to fully enter into banking.

However, some parts of the value chain are easier to disintermediate than others, disrupted by players which do not have to follow strict global regulatory requirements like fully licensed banks. This explains why so many smaller players are becoming active in the banking value chain, while relying on regulated partners to run deposits and book transactions. Similar trends apply to other core banking services. While it is becoming clear that the core activities of deposit taking and lending will continue to be dominated by licensed banks with access to central banking facilities and deposit insurance, the incumbents have to build an eco-system of value-adding



digital services around their core franchises. A level playing field is important, not only for new market entrants, but also for the incumbents to continue providing services to their clients.

Misconceptions about digitalisation must be avoided. The end-state will not be full automation. Recent case studies suggest that the optimal approach to most processes brings humans and machines together to maximise performance and efficiency.⁷³ Trying to automate beyond the current capabilities of 'machine intelligence' can increase the need for human corrections and overrides to the point where costs actually rise.





Conclusion and Policy Recommendations

EU regulation in a competitive digital environment

Our vision: towards a 'global digital ecosystem'

In our Discussion Paper, we explore the digital transformation potential and its impact on banks and their clients. To deploy this potential, we argue that Europe needs a comprehensive approach which encourages innovation, education and global cooperation. Our starting point is the digital client who will be able to access financial services and products across borders and across fragmented markets.

The EC has made the Digital Single Market one of its top priorities. This is an important step in the right direction, as digitalisation holds the potential of an integrated Digital Single Market for financial services, facilitating cross-border supply and consumption, interconnecting with non-EU financial centres, and favouring a better allocation of assets and capital, and hence contributing to the EU agenda of growth and jobs.

Yet, Europe needs to do more in order to stay competitive. A 'Digital CMU' could be an important tool to bridge cross-border fragmentation and to connect seamlessly with non-EU financial centres, such as Switzerland. Investors and intermediaries would be able to meet more easily, irrespective of location. It would allow providers to overcome the existing barriers that prevent a fully-fledged Internal Market and facilitate the inclusion of a wider spectrum of consumers, allowing them, among others, to easily find and compare financial products and services.

The EU should support the development of a holistic digital ecosystem within the Internal Market through a series of incentives that would see the removal of the barriers for innovation. This would include encouraging Fintech accelerator programmes and the improvement of access to venture capital for technology investments. Whilst availability of capital is good for seed capital, more investors providing growth capital (especially seed funding) are required. Policy makers should also support the strategic positioning for Europe through closer cooperation between the public and the private sector to facilitate growth of European Fintech clusters and their interconnectedness with other regions.

Regulators have the important task of balancing digital innovation with the protection of consumers. In this respect, a review and integration of the EU regulatory framework for financial services in the Digital Single Market should be a first step, to ensure that it is digital-friendly and guided by the principle 'same level of regulation for same level of risk', irrespective of the underlying technology used.

The EU could find inspiration from European financial centres that are well advanced in terms of their approach to digitalisation and innovation and are also helping to shape global standards and foster cooperation. It should also look beyond its borders to other countries which are creating favourable framework conditions for technologies. The Box shows some examples of national strategies in the digitalisation of financial services which could serve as benchmark or be inspirational for an EU-wide approach or strategy.

We fully support initiatives in the digital space which enhance the potential of an EU-wide Single Market in financial services and increase the EU's competitiveness.

To promote a global level playing field, there is the need for an active international dialogue between the EU and its partners and a globally aligned regulatory framework. Supporting the coordination efforts of international rule-making bodies is essential to reduce existing regulatory discrepancies and contribute to more regulatory convergence in the future. In the EU, the EC should take a holistic, cross border and cross-sector approach in order to avoid fragmentation and overlapping regulation.

The following recommendations for policy-makers and regulators need to be thoroughly considered in order to translate our vision of a 'global digital ecosystem' into reality.

Our key policy recommendations

1. Updating the regulatory framework to reflect today's technological developments

- The **existing banking regulation needs to be reviewed in light of today's technological possibilities** enabling banks to provide clients with the simple and convenient interaction they expect and using technology to ensure the level of accuracy and quality required with respect to the information and documentation to be collected.
- For the successful integration of digitalisation into the business world, regulatory conditions must be adapted to the new fast-evolving environment. **New business models should be enabled, without infringing the principles of competitive and technology neutrality.** We have to make sure that there is a level playing field for all participants in the market.
- Policy-makers must ensure that the regulatory landscape does not become fragmented or unneces-

BOX

Key characteristics of Fintech ecosystems in selected European financial centres⁷⁴

UNITED KINGDOM

London is number 1 global Fintech hub, based on market size, investment, workforce, calibrated regulatory environment and supportive government policy, though it still lags behind the US in terms of investment. The key characteristic of London Fintech hub is its proximity to the City of London. The global financial hub offers a wide range of financial services expertise and a large network with other Fintech hubs, particularly in Asia, and spearheads regulatory sandboxes where businesses can test innovative ideas without immediately facing regulatory obligations.

GERMANY

The German Fintech market has been growing by more than 70% since 2013 and currently consists of 250 companies. There has been a significant growth of Fintech investments in Germany (from EUR 80 million in 2013 to EUR 524 million in 2015).⁷⁵ Germany is on track to close the Fintech investment gap with the UK market. Availability of capital is seen as good for seed capital but more investors providing Growth Capital are required. Investment (especially seed funding) is expected to continue to grow. The German Fintech market is fragmented but has developed three main hubs: 1) Berlin; 2) Rhein-Main-Neckar region, and 3) Munich, each standing for a distinct characteristic. Banking and lending has been, and still is, the most dominant segment. Efforts are currently under way to better integrate the different hubs.

SWITZERLAND

The country benefits from a highly competitive workforce, globally recognised higher education institutions, and a dynamic financial services sector with financial and technological expertise. In addition, the establishment of accelerators and partnerships with highly innovative start-ups foster a culture of innovation and collaboration within the country. One key initiative is Digital Switzerland 2025, a cross-industry association based on the shared vision to strengthen the country's position as a digital hub and to project those benefits across all industries. The two global banks are key partners of this initiative, supporting Swiss start-ups especially in the Fintech space.





sarily restrictive and impede the development of seamless digital financial services. **A key focus has to be on aligning incentives to ensure access to data, addressing privacy and security concerns and overcoming technological barriers to Big Data.**

- Fintechs need access to financing in order to build new offerings, hence the investment conditions become pivotal. **Favourable investment conditions have to be put in place in order to attract capital for start-up investments.** For instance, government-driven programs might help to provide sufficient seed funding.

2. Creating regulatory and tax incentives for technology investments to foster innovation

- Banks play a unique and a vital role in the economy in stimulating growth and investment. However, their business models have been under ongoing pressure from the changes to the regulatory framework and the low interest rate environment, among others. We believe **bank lending and investment will be crucial for the creation of a strong European Fintech ecosystem** that will help Europe to compete with the rapid growth of innovation and Fintech investments in the US.

- We believe that one way of supporting growth of the European Fintech sector is by incentivising financial institutions that choose to invest in the development of their own in-house innovative solutions or in Fintech start-ups, by offering, for example, **targeted research and development (R&D) corporate tax deductions to encourage R&D expenditure, thereby ensuring equal treatment between all industry players.** In this respect, we welcome the international and planned EU rules that offer targeted R&D tax deductions and we invite the EC to call on the Member States to ensure that they implement these incentives in their national tax frameworks.

3. Supporting digital identification, an EU-wide e-ID system and appropriate standardisation

- If Europe wants to have a fully digital economy, it will need to have truly digital identities. In terms of the current regulatory frameworks, **we call for the appropriate standardisation to enable cross-border transactions and contractual agreements** across EU borders, and beyond, through non-physical channels.

- **For consumers, the main benefit of e-IDs will be portability**, i.e. having a digital identity which is readily verified and can be used by them across borders and multiple parties, for different regulatory requirements, and which results in a more seamless, faster, more secure and successful application journey.

- As noted by the European Banking Federation (EBF),⁷⁶ although the EU eIDAS Regulation creates an interoperability framework for the national e-ID systems, currently it remains up to Member States to define the terms of access to the online authentica-

tion of government e-IDs by the private sector. **National e-ID systems should be made rapidly interoperable between Member States and with third countries and accessible for the private sector to verify the identity of customers at distance.** We recognise that there may be some privacy issues national authorities may be concerned about but, at the end of the day, the e-ID is owned by the person, and they can decide whether to share it or not. Moreover, the EU should engage with other jurisdictions with a view to ultimately develop a broad-based global standard on portable and interoperable e-IDs. Developing such digital identity platform to serve as the identity layer of the digital economy will require a collective effort, involving the private sector, government, regulators, academia and others.

- In the absence of a national e-ID compatibility framework, **the current EU regulations on the prevention of money laundering and terrorism financing should be reviewed** to allow for their cross-border application (notably KYC requirements and checks).

4. Supporting increased financial literacy and IT skills

- We see a role for the national governments, the European Commission, and relevant international bodies (such as IOSCO and the OECD), in coordinating national initiatives (or creating an EU framework) for **increasing digital and financial literacy to enable consumers operate efficiently in the digital environment** and help them with making informed choices about their investments, and managing their online identities.

- These efforts would also feed into the wider objective of a **broader and more equitable access to financial services** and skill development. Ultimately it will foster a positive change in savings and spending habits.

- As digitalisation is one of the most fundamental structural changes we are going through, one way to strengthen the emerging ecosystems is to **focus on Europe's excellent international level of education and research**, including a consolidated academic network that would support a deep European talent pool for financial services and expertise to grow business within Europe and beyond.

5. Encouraging the use of regulatory sandboxes and ensuring coordination

- While coordination between regulators/supervisors at global level is essential, it is also important to **develop cooperation between public authorities and private sector**, and promote partnerships.

- We support the establishment by various national regulators within and outside the EU of **regulatory sandboxes** to allow financial institutions, including banks, to test new technologies.

- We urge the EC and the ESAs to closely follow these developments, and look into a **Europe-wide**

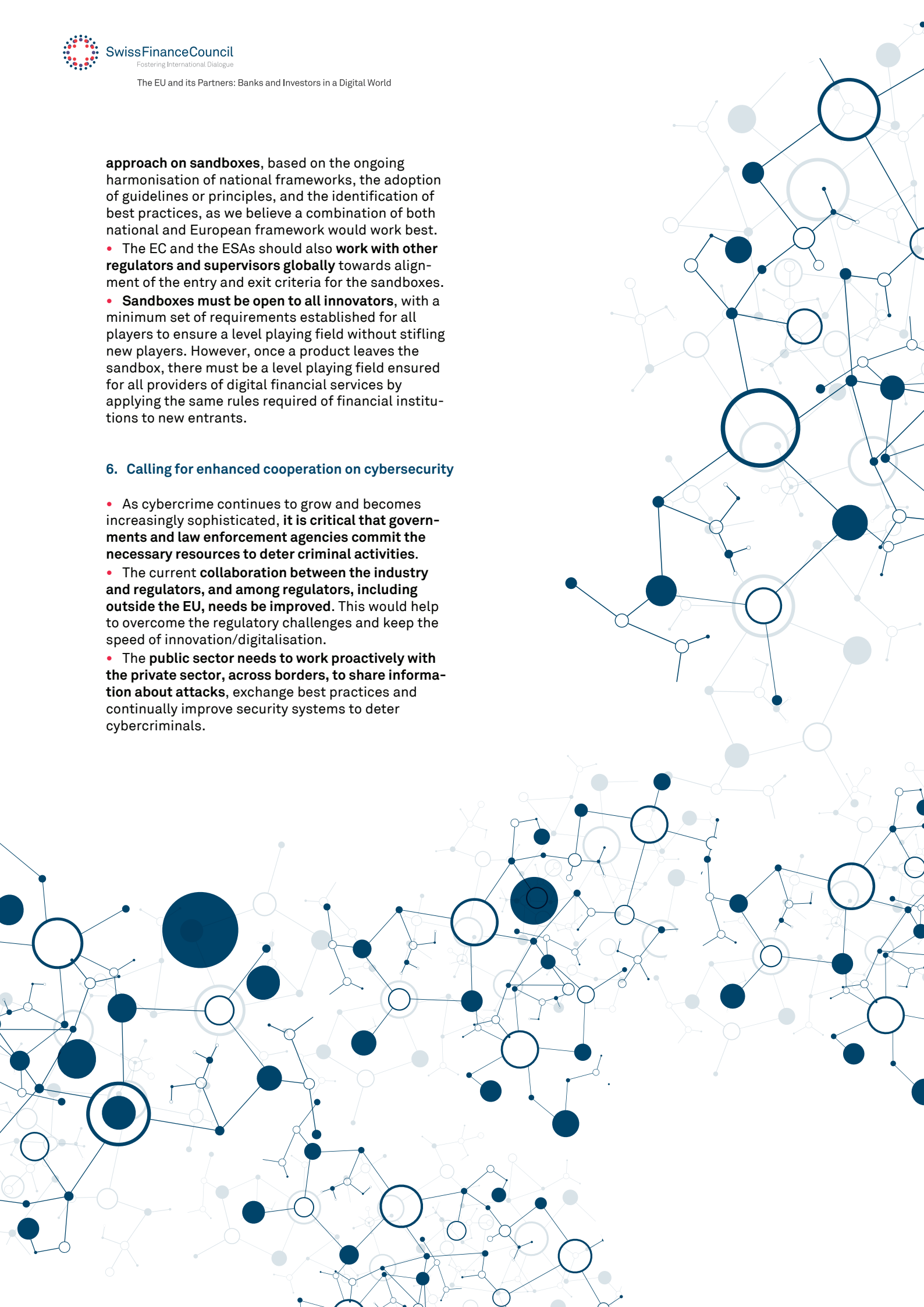


approach on sandboxes, based on the ongoing harmonisation of national frameworks, the adoption of guidelines or principles, and the identification of best practices, as we believe a combination of both national and European framework would work best.

- The EC and the ESAs should also **work with other regulators and supervisors globally** towards alignment of the entry and exit criteria for the sandboxes.
- **Sandboxes must be open to all innovators**, with a minimum set of requirements established for all players to ensure a level playing field without stifling new players. However, once a product leaves the sandbox, there must be a level playing field ensured for all providers of digital financial services by applying the same rules required of financial institutions to new entrants.

6. Calling for enhanced cooperation on cybersecurity

- As cybercrime continues to grow and becomes increasingly sophisticated, **it is critical that governments and law enforcement agencies commit the necessary resources to deter criminal activities.**
- The current **collaboration between the industry and regulators, and among regulators, including outside the EU, needs to be improved.** This would help to overcome the regulatory challenges and keep the speed of innovation/digitalisation.
- The **public sector needs to work proactively with the private sector, across borders, to share information about attacks**, exchange best practices and continually improve security systems to deter cybercriminals.



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