EBA REPORT ON THE IMPACT OF FINTECH ON INCUMBENT CREDIT INSTITUTIONS' BUSINESS MODELS

03 JULY 2018

EBA EUROPEAN BANKING AUTHORITY

Contents

Abbreviations

API	Application Programming Interface
EBA	European Banking Authority
ECB	European Central Bank
eIDAS	Electronic Identification and Signature (Regulation (EU) No 910/2014)
EIOPA	European Insurance and Occupational Pensions Authority
ESAs	European Supervisory Authorities (the EBA, ESMA and EIOPA)
ESMA	European Securities and Markets Authority
FinTech	Financial Technology
FSB	Financial Stability Board
GDPR	General Data Protection Regulation
ICT	Information and Communication Technology
NFC	Near field communication
PSD2	Payment Services Directive 2 (Directive 2015/2366/EU)
RAR	Risk Assessment Report
R&D	Research and Development
RTS	Regulatory technical standards
SME	Small and medium-sized enterprises

1. Executive summary

The development of the financial technology infrastructure enabled by the technological breakthroughs in the recent last decades, in combination with the significant socio-economic trends and demographic shifts in the population, whereby consumers are now seeking easy access, choice, better control and speed, have led to today's fast-paced technology-driven environment. These are important forces for credit institutions to rethink the ways they offer banking services and adjust their business models and strategies, combined with the motivation to seek more diversity in protecting and increasing their revenue sources and reducing costs in today's low interest rate environment (see Figure 3).

The potential disruption in the provision of financial services from the application of emerging technologies and the entrance of new players into the market appears to be forcing institutions to rethink their business models, as a potentially passive reaction may result in institutions' current duties being executed and taken over by other, possibly new, players.

Currently, four main drivers appear to shape and induce changes in incumbents' business models, namely (i) customer expectations and behaviour, (ii) profitability concerns, (iii) increased competition and (iv) the regulatory framework.

Among the different digitalisation projects pursued by incumbent institutions, the EBA identified two main trends, namely (i) digital transformation and (ii) digital disruption. Digital transformation involves a transformation of internal processes, and it aims to digitalise and optimise operations. Digital disruption is a change to the traditional banking market from its current form through the creation of a new market enabled by the use of innovative technologies, which includes new ways of customer interaction to enhance customer experience.

In embracing this change, incumbent institutions need to consider a number of aspects and consider the changes required in their corporate governance and operating models to implement their strategic goals.

Incumbent institutions are at an advanced stage in launching online and mobile banking solutions, while there is an increasing interest and use of cloud computing and biometrics solutions. However, the use of big data, machine learning (and wider artificial intelligence) or blockchain solutions is mostly at an exploratory phase (section 3.7).

New entrants, although putting competitive pressure on incumbent institutions by threatening to reduce revenues primarily in payment and settlement and in the retail banking and business segment (see Figure 2), could actually help to facilitate innovation in the banking sector, from stability and integrity perspectives.

Incumbent institutions are keen to collaborate and establish relationships with other FinTech firms, which is currently the prevailing model among the different ways that incumbents interact with FinTech in general. In terms of investment, most incumbent institutions appear to take a rather strategic view when investing in other FinTech firms (e.g. FinTech start-ups), while investment through venture capital funds seems to prevail over direct acquisitions.

Risks to business model sustainability mostly stem from incumbent institutions' ability and capacity to adapt and their speed of doing so, from strategic, operational and technological angles, to changing customer expectations and increasing competition, as well as their ability to address profitability concerns and new regulatory requirements. This is particularly challenging for some large complex incumbents that have a very formal and slow governance structure, further restricted by legacy ICT systems or legacy non-performing assets (section 5).

Incumbent institutions consider that BigTech firms have the potential to become significant competitors in the provision of financial services, as is evident from their increasing footprint in the financial sector.

In the context of its ongoing monitoring of financial innovation, the EBA will continue monitoring the impact on institutions' business models from FinTech and consider expanding the focus of the analysis to cover the wider FinTech ecosystem.

2. Background

2.1 General

1. Article 1(5) of the Regulation establishing the EBA (Regulation (EU) No 1093/2010) requires the EBA to contribute to promoting a sound, effective and consistent level of regulation and supervision, ensuring the integrity, transparency, efficiency and orderly functioning of financial markets, preventing regulatory arbitrage and promoting equal competition. In addition, Article 9(2) requires the EBA to monitor new and existing financial activities.

2. These mandates are key motivations underpinning the EBA's interest in financial innovation in general and more specifically FinTech, which is defined by the FSB[1] as 'technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services'.

3. The EBA has decided to take forward work in relation to FinTech by initially publishing a Discussion Paper[2] on its approach to FinTech. Following the public consultation on this Discussion Paper, the EBA published its FinTech Roadmap[3] setting out its priorities for 2018/2019.

4. One of the priorities set out in the EBA FinTech Roadmap is the analysis of the impact of FinTech on incumbent institutions' business models in order to enhance knowledge sharing among regulators and supervisors. This thematic report, one of the steps towards achieving this priority, aims to analyse the impact of FinTech on incumbent credit institutions' business models based on facts and observations collected by the EBA through its engagement with the supervisory community and the industry, within the broader activities of the EBA FinTech Knowledge Hub. It focuses on the current landscape, observed trends and main FinTech-related factors affecting the business models of incumbents, without envisaging or intending to model scenarios for potential future development.

5. This report provides an in-depth analysis on the changes and trends observed within the incumbent credit institutions and summarises the current types of relationship between incumbent credit institutions and FinTech, focusing on the following aspects:

   - the main factors driving technological innovation in incumbent institutions;
   - status of adoption of innovative financial technologies by incumbents;

[1] http://www.fsb.org/wp-content/uploads/R270617.pdf

[2] https://www.eba.europa.eu/documents/10180/1919160/EBA+Discussion+Paper+on+Fintech+%28EBA-DP-2017-02%29.pdf

[3] http://www.eba.europa.eu/-/eba-publishes-its-roadmap-on-fintech

- changes to incumbent credit institutions' strategies, internal organisation and operations;
- the interaction of incumbent credit institutions with new FinTech firms;
- the major risk factors affecting the sustainability of incumbents' business models.

6. The aim of this report is twofold:

   - to provide an overview of the current FinTech landscape and the observed changes in the incumbent institutions' behaviour in adopting financial technologies, as observed by the EBA in the context of its continuous monitoring of financial innovation;
   - to raise awareness and share knowledge of the main trends affecting business models and provide support to supervisors and other stakeholders to identify and understand the potential challenges to the sustainability of incumbents' business models.

2.2 Methodological approach

7. A number of different sources of information were used in the preparation of this report, namely:

   - **Industry feedback on the EBA's Discussion Paper on FinTech:** feedback received from the public consultation on the EBA's Discussion Paper on FinTech (August 2017).
   - **Discussions/interviews with a sample of credit institutions:** bilateral discussions/interviews with a number of incumbent credit institutions (conducted with 15 EU credit institutions between October and December 2017) with the aim of achieving a broad representation with respect to geography, current business models and levels of FinTech activity. These were structured discussions/interviews covering all aspects of the analysis.
   - **EBA risk assessment questionnaire (RAR):** in the context of the EBA risk assessment questionnaire, conducted on a semi-annual basis among banks and market analysts, 37 European banks were asked a series of questions in relation to the impact of FinTech on their business models (October-November 2017).
   - **Discussions/interviews with competent authorities:** structured discussions/interviews with a number of competent authorities, focusing on supervisory knowledge of emerging technologies/products affecting banks and their business models.
   - **Desk research:** background research into the overall FinTech developments and activities.

8. The sample of EU credit institutions covered during the discussions/interviews with the EBA and included in the RAR mainly consisted of global systemically important institutions (G-SIIs) and other systemically important institutions (O-SIIs). To that end, this report is mostly applicable to those systemically important institutions.

3. Current landscape

9. While technological innovation in finance is not new, investment in technology and the pace of innovation have increased significantly in recent years. Technological developments are changing the way consumers and firms access financial services and their expectations. Many credit institutions are rethinking their approaches to customer interaction while continuously adjusting their ICT systems, embedding new technologies into their operations.

10. Technological innovation in general and financial innovation in particular have also triggered the need for incumbent credit institutions to adapt their business models in response to this force, in addition to an already challenging operating environment characterised by generally low profitability.

11. As a general trend, incumbent credit institutions seem to be moving from a 'product-/channel-centred approach' towards a 'customer-centred approach', adapting their supply to particular customers' needs.

12. This section aims to provide an overview of the observed landscape in which incumbent credit institutions operate and covers the following elements:

    (i) key drivers of financial innovation;

    (ii) a stylised overview of the key players in the evolving financial services landscape;

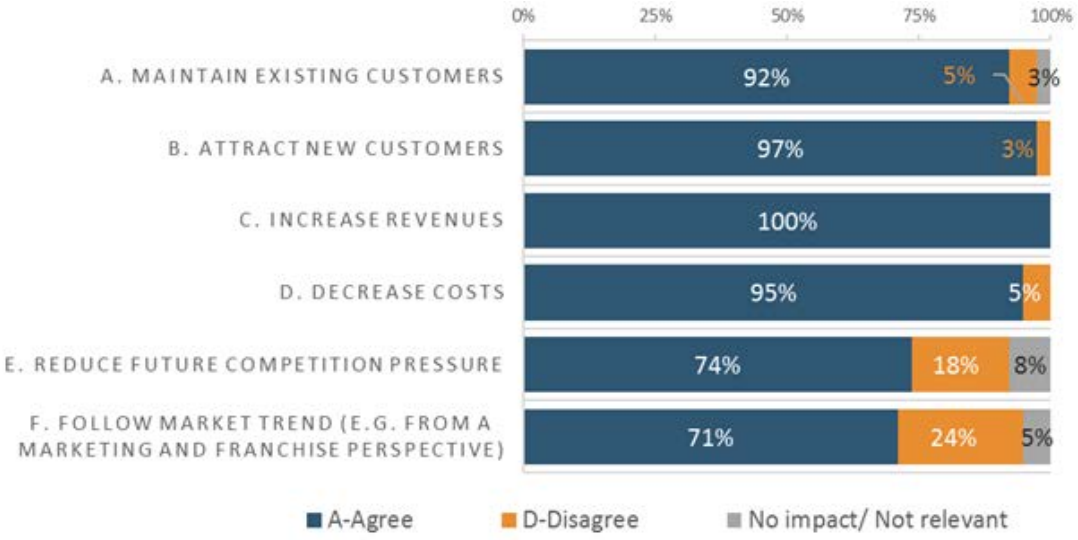
    (iii) main innovation trends observed: *digital transformation* and *digital disruption*; and

    (iv) changes in aspects of incumbent institutions' governance, organisation, operating models and strategy execution that are related to implementing FinTech.

3.1 Key drivers of financial innovation

13. In the context of the EBA risk assessment questionnaire (November 2017), 37 European banks were asked to indicate the main drivers for adopting technologically enabled financial innovations (see Figure 1). Their responses reflect the situation as of October 2017.

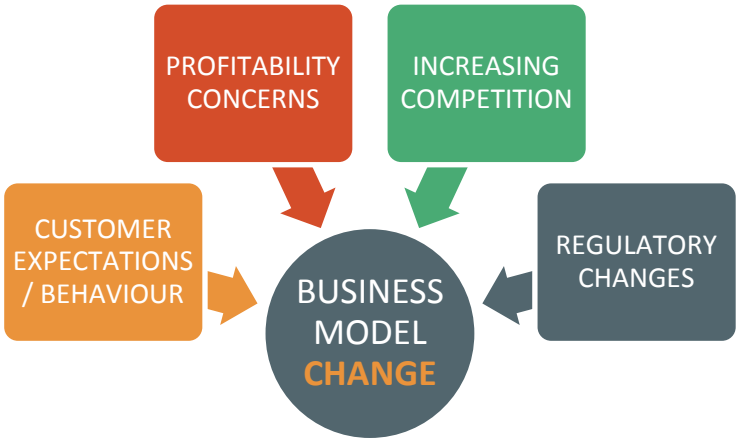
Figure 1. *The main drivers for having a relationship with FinTech companies and/or products/services*



Source: EBA RAR H2 2017

14. Incumbent institutions primarily see FinTech-enabled products and services as a key driver for business growth — all of them expect FinTech to increase revenues, and 97% hope it will help to expand their customer base. Incumbents also identify cost-saving opportunities and possible improved ways of retaining existing customers (92%). In the context of a comprehensive response to the overall development of FinTech, such strategic opportunities trigger decisions to embrace FinTech in their activities and operations.

15. The EBA has identified four broad drivers that shape and induce changes in incumbents' business models. These are (i) customer expectations/behaviour, (ii) profitability concerns, (iii) increasing competition and (iv) regulatory changes.



16. In response to these drivers, various digitalisation/innovation programmes have been launched across incumbent credit institutions, bringing together the different functions of the organisations (e.g. business, control and support functions) into a common effort to embrace technology and adapt to the changing environment.

17. At this stage, the approach followed by most institutions is to take sufficient time to understand and assess these new and emerging technologies and then analyse how these can be crystallised into feasible propositions and potentially implemented. To this end, incumbent institutions have realised the need to invest in research and development (R&D) in FinTech in order to be well placed to embrace technology and innovation into their operations and activities.

18. Incumbent institutions also take into consideration the balance between digital-only banking and maintaining physical banking for customers who are less keen to use online channels and need access to physical banking. Moreover, the need to attract and retain talent, and equipping the existing workforce with the necessary skills, expertise and knowledge, are key factors in facilitating the implementation of innovative and digitalisation strategies.

3.1.1 Customer expectations and behaviour

19. Customer expectations and behaviour with regard to financial services have changed dramatically — customers now demand easy access, fast service and intuitive interfaces. For financial service providers, this often means an implicit requirement to provide 24/7 access to financial services and go beyond the traditional physical branch and online-based customer service and put increasing emphasis on mobile digital communication channels.

20. Customer intelligence is becoming of utmost importance to institutions as a way to make better business decisions, improve customer acquisition, retention and satisfaction, and improve revenue, profitability and the added value provided to customers.

21. Banking has always been a business of trust, and incumbent institutions benefit greatly from the loyalty of their clients. The majority of customers appear to continue to trust the incumbent banks to maintain their funds and data, which may be seen as one of biggest current advantages for incumbents on which they are building to keep up with the pace of technological development and competition.

22. However, the number of customers using daily banking, payment or investment services provided by new entrants and other FinTech firms is growing, and increased customer mobility (also facilitated by APIs) will be a significant driving force in the future.

3.1.2 Profitability concerns

23. Many incumbent credit institutions have made a significant recovery following the financial crisis, involving the need to build up their capital buffers. These incumbents are now under pressure from low profitability, which is largely driven by the low interest rate environment. In addition, some incumbent credit institutions face issues of high levels of non-performing loans. The issue with legacy assets and higher provisioning costs and low levels of interest income put pressure on incumbents' overall profitability and increase the need to implement cost-cutting programmes.

24. According to the EBA Risk Dashboard[4] (data as of Q4 2017), the EU banking sector has shown a slight improvement in capital levels and asset quality, while profitability remains a key challenge. Important structural challenges persist, as the high level of non-performing loans remains a source of concern, while lingering low profitability raises the question of cost-efficiency and business model sustainability amid a more competitive environment. Compared with the first three quarters of 2017, the average return on equity (RoE) decreased from 7.2% (Q3 2017) to 6.1% in Q4 2017, showing its usual seasonality at the year-end. The RoE remains below the cost of equity, and legacy assets, cost-efficiency and banks' business models are still some of the main obstacles to reaching sustainable profitability levels.

25. This puts many incumbents in a situation where they need to address both profitability issues and the evolving customer demand for simple and transparent digital services, involving significant investment.

26. At the same time, through digitalisation strategies and projects, incumbent institutions aim to benefit from efficiency gains and reduced costs through the introduction of further automation. The potential for lower operational and regulatory compliance costs appears to be another opportunity to improve profitability and flexibility to embrace technological change.

27. The closure of physical branches is an ongoing strategic consideration for many incumbents in an effort to reduce operating expenses by increasing the degree of financial service automation and digitalisation and reducing overheads and staff costs. This trend also reflects customers' changing socio-economic needs.

3.1.3 Competition

28. The number of new entrants (such as digital-based institutions), other FinTech firms (such as FinTech start-ups) and technology providers, which aim to design and provide financial services in innovative ways, puts competitive pressure on incumbent institutions and facilitates innovation in the banking sector.

29. When it comes to the provision of payment services, a number of new players are currently entering the market and appear to offer better user experience, impacting existing customer relationships with incumbents and raising concerns over possibly narrowing the scope and scale of institutions' payment services. Similarly, the scenario of a platform-based economy has raised concerns over competition and increased uncertainty over the ownership of customer relationships.

30. In the same context, the enforcement of the revised Payment Services Directive (PSD2) is perceived to create important opportunities for both consumers and institutions while bringing

[4] https://www.eba.europa.eu/documents/10180/2175405/EBA+Dashboard+-+Q4+2017.pdf/d429ed31-65ba-498b-9115-d0e4639112ac

in a new dynamic from the competition perspective, as new players can gain access to the data traditionally available only to incumbents.

3.1.4 Regulatory changes

31. The current regulatory landscape, following the recent implementation of the GDPR and PSD2, raises data protection and customer consent as key requirements to be respected by all institutions. PSD2 (applicable from 13 January 2018) intends to create a more integrated and efficient European payments market, encourage innovation and protect consumers by making payments safer and more secure. The GDPR (which came into force on 25 May 2018) aims to harmonise data privacy laws across Europe, to protect and empower all EU citizens' data privacy and to reshape the way organisations approach data privacy across the region. These pose another multi-dimensional challenge for institutions from the technology, operational and strategy perspectives.

3.2 Impact of FinTech on incumbents' business lines

32. To identify the existing business lines that could potentially be affected the most, as part of its semi-annual risk assessment exercise, the EBA asked the incumbent institutions to indicate what impact FinTech firms could potentially have on their different business lines in terms of increasing/decreasing revenues and costs. The institutions' responses are presented in Figure 2. The findings suggest that payment and settlement business lines are most affected, with a negative impact on incumbents' revenues. FinTech firms seem to pose a threat to institutions' revenues by eroding fees linked to payment services and commission income. At the same time, the opportunity to increase revenues or significantly reduce costs is rather limited.

Figure 2. *How do you see FinTech firms affecting the current business model (business lines) of your bank?*

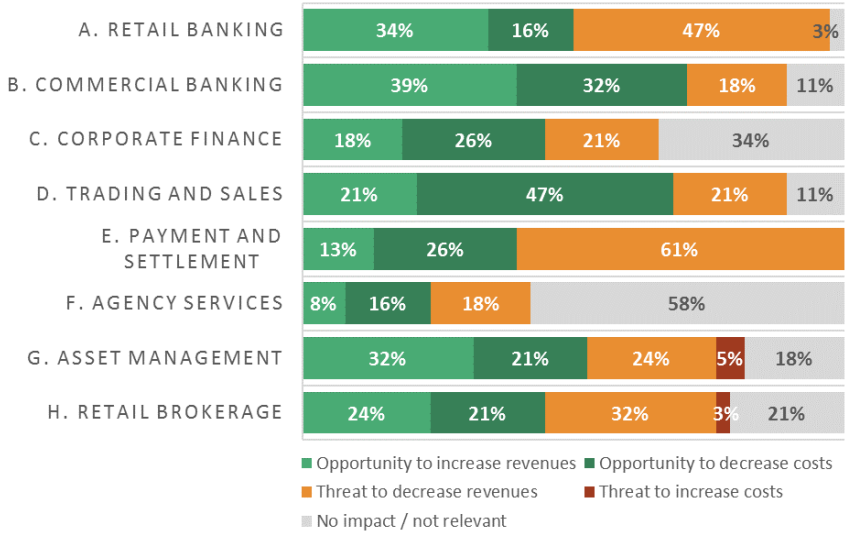
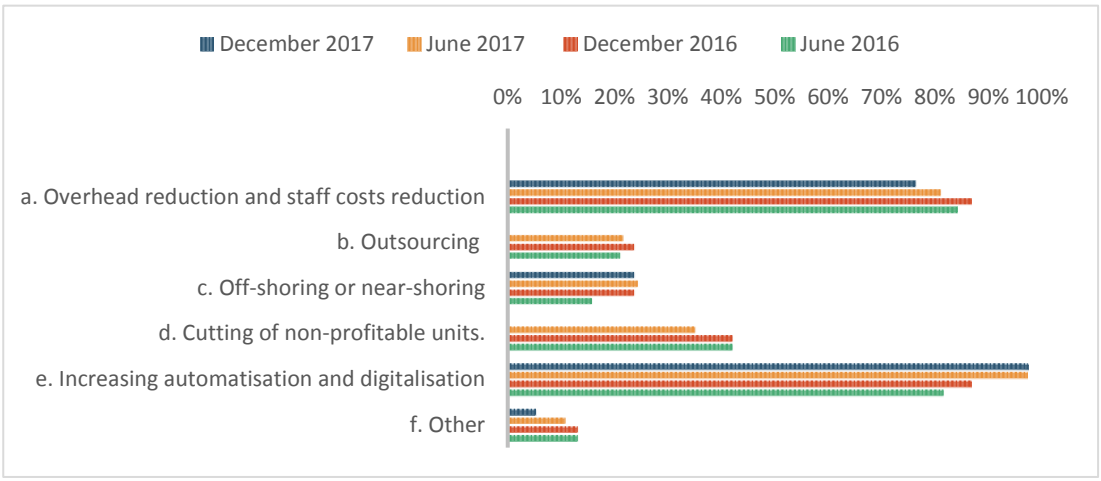


Figure 3. *How are you reducing operating expenses/costs?*



Source: EBA RAR H2 2017

33. Noticeably, at this stage, FinTech firms are becoming active in non-capital-intensive business areas such as cross-border transfers, micro-payments or card payments. As a result, retail banking is the second most affected business line, as the arrival of new entrants (such as digital-based institutions) and other FinTech firms has significantly increased competition in the retail banking segment. This adds to the decrease in the net interest income, offset by a rise in the net fees and commissions, and the moderate increase in net trading income observed in the November 2017 EBA risk assessment report[5].

34. However, new technologies also bring new opportunities. Completely new business models in the retail payments market are enabled by mobile wallets, which encompass many innovative technologies such as mobile banking, digital wallets, biometric authentication and NFC.

35. Promising opportunities seem to arise in commercial banking and trading and sales business lines. This is possibly due to the potential benefits of the new technology-based propositions such as commercial banking aggregator models, use of robo-advice and application of better data analytics. This can be also seen as a possible explanation of banks' growing appetite to address costs through increasing automation and digitalisation, as reported in the November 2017 EBA risk assessment report (Figure 3).

36. Many institutions envisage potential opportunities for their SME clientele and thus are focusing on a number of FinTech-based solutions to provide digital tools to SMEs and support them in solving their business problems and performing time-consuming tasks in a more cost-efficient, convenient manner.

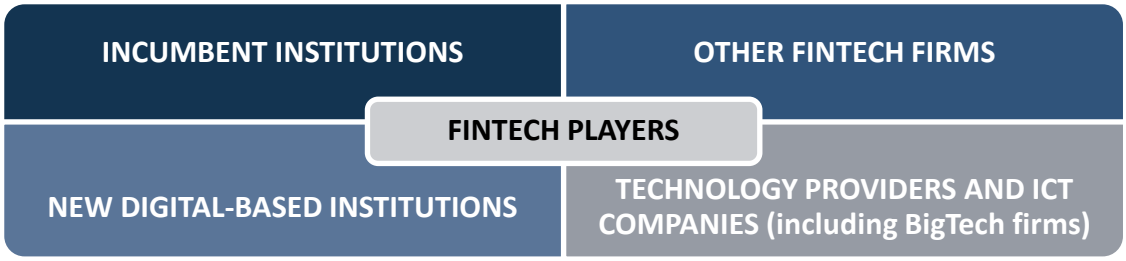
[5] http://www.eba.europa.eu/documents/10180/2037825/Risk+Assessment+Report+-+November+2017.pdf/4f9778cc-1ccd-4f65-9bc3-eb76971b9a4a

3.3 Key players

37. The ways in which consumers communicate, interact and transact are evolving and inevitably driving the need for changes in institutions' business models. Financial innovation and the growth in online and mobile applications have opened up the financial sector to new propositions and blurred the demarcation line between pure financial services or products (as an end-product) and financial services seamlessly integrated into other services and products (as a means to an end).

38. In addition to the incumbent institutions, a number of entities, previously not engaged with the financial sector, are currently entering the market to meet these changed customer expectations, increasing competition within the financial industry and offering a variety of benefits to customers. The growth in the number of FinTech providers forces incumbent institutions to increasingly build propositions from closely interconnected ecosystems of service providers, from which a trend towards reliance on cloud outsourcing in banking has emerged, which highlights the need for institutions to ensure the sustainability, resilience and trustworthiness of these providers.

39. Currently, the key players in the FinTech arena, apart from (i) the incumbent institutions, are (ii) the new digital-based institutions, (iii) other FinTech firms and (iv) technology providers or ICT companies (including BigTech firms).



- **Incumbent institutions**: these are the incumbent credit institutions that provide the full range of banking services (e.g. retail and business lending, payment services, wealth management) via the network of established physical branch and online distribution channels. Incumbent institutions vary significantly in terms of their current level of digitalisation and application of FinTech solutions, as well as their governance capacity and financial capability to adopt innovative financial solutions.

- **New digital-based institutions**: we define these as new entrant institutions, such as digital-only institutions/challenger banks with innovative business models, providing digital-based banking services that hold a credit institution or payment institution or e-money institution licence. These predominantly focus on the mobile application experience and have no physical branches.

- **Other FinTech firms**: these are usually start-up firms, without a banking/payment/e-money licence, that offer technology-enabled financial innovation solutions that could result in new business models, applications or products.

- **Technology providers and ICT companies (including BigTech [6] firms)**: typically, these companies provide technological support to institutions in terms of software applications and/or hardware. They primarily focus on the development and manufacturing of technology. BigTech firms are usually large and globally active with a relative advantage in terms of digital technology. They often have very large customer base and are engaged in providing various online-based services, for example retail customer-oriented e-commerce platforms, search engines and social networks, or business customer-oriented data storage or computing processing services.

3.4 Key trends and approaches to reacting to FinTech

40. In the light of the technological evolution in all industries, incumbent institutions have rolled out innovation and digitalisation/digital transformation strategies in an effort to grasp the FinTech agenda and explore its potential, enhance digitalisation throughout their operations and set customers' needs at the centre of their activities. To find out more about the key trends in and practical approaches to FinTech, the EBA has surveyed a number of EU institutions and interviewed a number of supervisors about FinTech.

41. Based on these discussions and the industry feedback received on the EBA's Discussion Paper on FinTech, the EBA identified two main trends across these various strategies pursued by the incumbent institutions, namely:

    - digital transformation; and

    - digital disruption.

42. These two approaches differ in their underlying drivers, their strategic aims, and the scale and scope of organisational change and alteration in business models that they bring about.

43. Reinventing the existing business model is not an easy task. Legacy ICT systems seem to be a significant factor in restricting the implementation of such strategies in general, and in particular to the level of transformation that incumbent institutions wish to achieve. In some cases, digital transformation is focused only on the front end without further integration of back-end systems or infrastructures. Another approach is a gradual, long-term planned comprehensive change, which encompasses both the front-end aspect and the back-end systems of the institution. Yet another approach observed is the creation of a brand new digital arm with a fully digital customer interface and back-end systems.

[6] https://www.bis.org/bcbs/publ/d431.pdf

3.4.1 Digital transformation

44. Digital transformation involves transforming internal processes, which, by employing new technologies, aims to digitalise and optimise operations, with the goal of reducing banks' operating costs and enhancing efficiency gains. In particular, as part of their wider digital transformation strategies, some institutions aim to focus on improving efficiency by automating existing processes and shifting to digital communication with customers, which may, for example, include reducing their branch footprint.

45. Digital transformation is mainly driven internally and is typically accompanied by internal organisational changes. Usually it encompasses digitalisation initiatives and automation of processes, with changes across the organisation, from back-office operations to the customer interface. Examples of digital transformation projects can range from automated financial crime detection to optimisation processes in payment transactions.

46. In parallel, or complementary, to their innovation strategies, institutions run cost-cutting programmes in an effort to optimise their cost bases. The optimisation of the branch network is usually a project included in such cost-cutting programmes. The current trend appears to be towards either a significant reduction in the branch network, moving towards digital channels of communication and services, or striking a balance between branch footprint and digital channels by redesigning existing branches and aiming to offer all possible channels and proximity for the different types of customers.

3.4.2 Digital disruption

47. Digital disruption aims to use innovative technologies to develop a new market in banking that could potentially replace the traditional market in its current form, for example creating digital-only banks to serve online customers, thereby developing new ways of interacting with customers to enhance customer experience. From the banks' perspective, the ultimate goal of these projects is to satisfy changing customer needs and find new streams of revenues as well as to protect the existing revenue sources.

48. Digital disruption is driven by various competitive forces targeting profitable revenue sources, which are embracing digital means to approach and engage with customers, usually by offering a better customer experience, more convenient financial services and products at lower prices.

49. New entrants (including FinTech firms) appear to focus on specific parts of the banking value chain in terms of design, development and execution more cheaply, quickly and conveniently than incumbents are currently offering. Existing gaps in traditional banking products and services, such as convenience, user experience and functionality, have attracted new FinTech players to remove those frictions. As noted in Figure 2, the unbundling of core banking functions appears to be evident in the areas of payments, clearing and settlement, retail deposits and lending.

50. In certain cases, incumbent institutions have strategically decided to disrupt their own businesses by launching new digital banks in an effort to move faster and serve new or existing customers who are attracted by digital-based solutions. Other incumbent institutions seek to transform into a digital bank as a strategic imperative to remain competitive and relevant. While this could be a result of the growing hype around technologically enabled financial innovation, it is still to be seen if such strategies will be successful and meet the underlying objective for each institution.

3.5 Governance, culture and budget

a. Governance

51. Technological innovation also leads to changes in the governance and organisation to enable and embrace agility in the incumbent organisations. This is key to responding and adapting to developments in FinTech. Internal governance, organisational aspects, processes and procedures need to be able to support and embrace agility throughout institutions' operations in reaction to today's competitive environment.

52. Specifically, the general approach followed from an organisational perspective is establishing two dedicated innovation teams/functions, usually responsible for:

    (i) the overall strategic investment in other FinTech firms (e.g. FinTech start-ups); and

    (ii) the practical development of innovative solutions through sandboxing/accelerator schemes, either involving only internal resources or with the participation of external parties.

53. For the first task, a dedicated innovation investment team has been established by some incumbent institutions, which consists of primarily investment banking experts who engage closely with technology experts, where necessary. The team's main responsibility is executing the institution's investment strategy on innovation. This includes setting up and running venture capital funds, identifying and proposing potential target technological-based start-ups/companies through scouting and due diligence activities and monitoring the performance of the investment portfolio. It is understood that such investments are mostly of a strategic nature, aligned with the overall strategy of the institution. To this end, proposed investments are submitted to the institution's board of directors, or a delegated senior committee, for approval.

54. For the second task, a dedicated technology/innovation team is established and usually consists of technology experts supported by business and other key functions (legal, compliance, risk, internal audit) across the institution. This team takes forward innovative ideas and initiatives by designing, prototyping and testing them in an internal technology lab/accelerator. Such

teams are usually responsible for assessing, managing and monitoring all new technological propositions with all proposed innovative solutions also channelled to these teams.

55. A common approach noted across all institutions is establishing a dedicated technology innovation team/department (as mentioned above), responsible for the practical development of innovative solutions across the organisation. This can be:

    (i) centralised at group level, controlling and managing the individual entity-level teams; or

    (ii) decentralised with identical teams per business line/entity/jurisdiction.

56. The focus on a more customer-oriented approach is typically achieved by actively using existing and developing new communication channels. This helps to better understand customer needs and quickly respond by providing new or revamped products and services. Such an approach requires agility, and this is currently translated into the creation of the technology/innovation teams mentioned above, which leverage expertise and resources across incumbents depending on the nature, level of technicality and business requirements of the topics under development. Institutions' traditional functions come together in cross-functional projects, while a dedicated team/unit manages each project and reports directly to the board of directors.

57. Institutions are seeking ways to further optimise their decision-making processes in an effort to take a more agile approach. Such teams/functions may report directly to the chief digital officer or head of innovation (or a similar senior position), with regular reporting to the board, or a delegated senior committee, on FinTech activity and investments. In other instances, a member of the board may lead the implementation of the institution's digital strategy.

58. A top-down approach was observed in some institutions when setting innovation strategies, with top management deciding the areas to focus on and the business targets. Then the institution's staff explore and identify possible technologies, ways and methods that could be used to meet those targets and implement the institution's strategy.

59. Finally, we note the role of advisory panels. This is another corporate governance measure, which aims to support the adoption of technological innovation in institutions. Usually advisory panels consist of appointed technology experts, who provide advice and guidance to the board on technology and digital strategy matters.

b. Culture and resources

60. The culture within incumbent institutions is another important factor that drives the implementation and execution of innovation strategies. The staff mindset is one of the key components that determines the level of maturity of innovation, which seems to vary significantly across institutions. It was observed that some incumbent institutions consider the current mindset to be an impediment to the implementation of their innovation strategies. As

a result, more effort and focus on staff is required to enhance familiarity with FinTech solutions and promote a more digital-focused culture.

61. In an effort to collectively embrace technological innovation across the organisation, institutions foster an innovation-friendly environment. They encourage all business lines and functions to actively propose and share new innovative ideas. Some aim to replace existing processes and procedures, while others target initiating new services and products that could be discussed, developed and tested in collaboration with the technology innovation team. In an effort to bring staff closer to an innovation and digitalisation mindset, as well as to enhance their ICT skills, some institutions have appointed a 'digital champion' in each team/unit, tasked with the responsibility of driving the transformation process within his or her team.

62. A lack of appropriate human resources, skillsets and expertise in some cases is another impediment to institutions' adoption of their innovation plans. This is often because of a limited supply and competitive demand from peer institutions, new entrants and other FinTech firms, as well as technology firms. At the moment, many institutions prefer to invest in leveraging and enhancing existing staff skills and knowledge. This is done by creating new innovation teams and delivering of a number of training courses and workshops, as well as interactions with FinTech players through their participation in internal innovation labs/accelerator programmes.

c. Financial planning and budgeting

63. When it comes to financial planning and budgeting, slight variations in two approaches were noted across institutions in terms of either treating the overall 'innovation'-related expenditure under a single budget or managing the overall FinTech investments and expenditures in two separate budgets:

    (i) one related to digital transformation or automation projects, with, most often, pre-determined monetary amounts; and

    (ii) another related to FinTech investments and/or digital disruption initiatives, which is usually more flexible and has no predefined monetary caps, but rather ad hoc funding is requested from and justified to the board when needed.

64. Measurement and monitoring are important control tools for the successful implementation of innovation strategies. These seem to be embedded in the existing internal processes and procedures of most incumbent institutions. However, institutions seem to struggle to quantify the benefits from investments in FinTech. While some institutions appear to have set a number of key performance indicators and key metrics (such as number of new customers, revenues from new sources, customer satisfaction with new products) in an effort to monitor the development of their innovation strategies, it is difficult link these to revenues and costs changes.

65. Several large banking groups have set distinct strategies per business unit in an effort to spread their R&D activities across all the business areas where opportunities may arise.

3.6 Operating model and implementation

66. Incumbent institutions aim to introduce agility into their current operations by removing any unnecessary middle steps in the development and implementation of new innovative solutions.

67. When it comes to project implementation, many institutions are moving away from the traditional waterfall/pipeline approach and embracing an agile approach, aiming for rapid delivery of projects along with an iterative and team-based approach. This is also evidenced by the growing use of internal innovation labs and accelerator programmes.

68. These internal accelerators/ technology labs, set up by a significant number of institutions, test different innovative proposals, usually in a cloud environment, in order not to compromise the institution's real-time data and operations. While standardisation of this process is currently in progress, innovative propositions are tested in a controlled environment with the participation of external partners (if the FinTech solution is developed in partnership with external parties). Some institutions have also applied a 'trial and error' approach in an attempt to test all the different available options that could potentially fit into the institution's overall direction. When it comes to the management of such projects, there is always a business owner assigned to lead and manage the development of each project.

69. The solution delivery and approval procedures of new digital products follow the existing procedures within institutions in the same way as they apply to all other products. For example, once institutions agree to move forward and partner with a new entrant FinTech firm, the existing standard procedures within each institution appear to be followed and non-binding agreements are signed between the parties. Similarly, new innovative products and services are assessed by all the relevant functions of the institution, including impact assessments on controls and regulatory expectations, before being launched to customers. In addition, institutions appear to perform cost/benefit analyses of any new innovative propositions against existing operations.

70. Before launching new digital projects to customers, some institutions have put in place a number of steps to proactively test their success by interacting with customers to test the scalability of the new product/service and setting up focus groups and/or working with sociologists to test market interest.

71. It was observed that a number of institutions intend to build new digital experiences and launch new propositions through their API platforms, as they perceive this as a business opportunity to create new value-added services and deliver an enhanced user experience.

72. When it comes to developing and implementing new technology-based solutions in large banking groups, a range of adoption approaches has been observed:

- Some banking groups centralise the development of such solutions at group level and then disseminate it across their subsidiaries.

- Other banking groups seem to follow a more decentralised approach by having dispersed innovation centres across different geographical areas, which test and develop new technology-based solutions. Once these solutions are implemented and considered successful at an entity level, they spread across the entire group, as long as they fit into the institution's marketing strategy in each jurisdiction. Under this decentralised model, banking groups are getting the advantage of the different levels of FinTech development across the geographical areas they operate in and spreading this knowledge across the entire group.

- The internal accelerators and innovation labs, in which external parties may participate, are sometimes established outside the traditional product development unit. This seeks to improve the agility of innovative development and at the same time to maintain the security of information and processes that may be shared with the external parties.

3.7 Status of adoption of financial technologies by incumbents

73. A diverse level of activity and involvement in different financial technologies has been observed across the EU banking sector, in terms of both geography and institutions. This might be driven by the diverse cultures and consumer behaviour across countries, along with the different stages of technology development.

74. The first wave of technological changes in the financial services sector, which could be considered to encompass online and mobile banking, as well as the use of biometrics, appears to have affected a significant number of EU credit institutions, which have already incorporated them into their existing processes and activities.

75. There is also a growing interest in cloud computing and early use of big data and machine-learning solutions. Moreover, many initiatives aiming to explore the blockchain technology are currently ongoing. However, the second wave of technological changes to encompass these emerging technologies is still mostly at the exploratory phase.

76. This section provides a high-level overview of the activity status of some technology-enabled financial innovations. To learn more about the prudential risks to and opportunities arising for institutions from the application of innovative technologies, please refer to the *EBA Report on the prudential risks and opportunities arising for institutions from FinTech.*

a. Biometrics

77. The use of biometrics in financial services appears to offer significant opportunities, ranging from security to mobile payment solutions, as is evident from the wide use of biometrics in a number of financial applications. Fingerprint, face, voice, iris and retina recognition have been already applied in a number of processes/services, such as customer identification and customer authentication, and they have been widely implemented by numerous institutions across the EU.

b. Open banking/APIs

78. Open APIs, along with PSD2, are perceived by a number of institutions as an opportunity to bring more tailored products to customers and offer new propositions. Through open APIs, institutions aim to ease the design and launch of new products to customers, taking advantage of the existing relationship of trust they may have built with customers, although it is yet unknown whether customers will consent to share their personal financial data with third-party providers.

79. An open banking/API strategy has also been designed by some institutions in an effort to grasp and better manage the potential opportunities. Institutions noted that open banking/APIs has the potential to change the dynamics of the sector, with potentially greater interconnection between different actors, including entities falling outside the regulatory perimeter, and as a result potentially greater disintermediation.

80. In this context, the EBA has developed, in close cooperation with the ECB, draft regulatory technical standards[7] (RTS) specifying the requirements for strong customer authentication, the requirements with which security measures have to comply to protect the confidentiality and the integrity of payment service users' personalised security credentials, and the requirements for common and secure open standards of communication. The EBA will continue contributing to the consistent supervision of other security-related provisions under PSD2.

c. Cloud

81. The use of the cloud is an important strategic theme for institutions, which are currently investing significantly in cloud-based solutions. Compared with more traditional forms of outsourcing offering tailor-made solutions to clients, cloud outsourcing services are much more standardised, which allows the services to be provided to a larger number of different customers in a much more automated manner and on a larger scale. Although cloud services can offer a number of advantages, such as economies of scale, flexibility, operational efficiencies and cost-effectiveness, they also present challenges in terms of data protection and location, security issues and risks from concentration on limited number of suppliers. This is

[7] https://www.eba.europa.eu/regulation-and-policy/payment-services-and-electronic-money/regulatory-technical-standards-on-strong-customer-authentication-and-secure-communication-under-psd2/-/regulatory-activity/press-release

possible both at individual institution and at the industry level, as large suppliers of cloud services can become a single point of failure when many institutions rely on them.

82. In its broader work on FinTech, the EBA published in 2017 *Recommendations on outsourcing to cloud service providers*[8], which amplify existing outsourcing guidelines to promote rigour in, but also understanding of, the use of the cloud, as cloud computing is an important enabling technology leveraged by financial institutions to deliver innovative financial products and services.

d. Machine learning and big data

83. Machine learning is a sub-category of artificial intelligence, whereby a certain function is developed or improved by computer systems rather than directly by human intelligence. Machine learning appears to provide the financial sector with novel methods of performing statistical analysis and performing tasks but also provides potential advantages over traditional statistics when leveraged with big data. Institutions and relevant service providers have already started using machine learning for a variety of purposes, such as credit scoring, for which it could improve services and pricing customisation. For example, a number of new entrant FinTech firms are capitalising on this opportunity by leveraging on large amounts of data to produce challenger credit scoring model that assess creditworthiness faster and supposedly more accurately, and possibly also in cases where conventional data is not available.

84. In this context, the ESAs recently reported[9] that the proliferation of automated advice, often referred to as robo-advice, is still at an early stage and the phenomenon is not equally distributed across the insurance, banking and investment sectors, currently having greater prominence in the investment sector. The ESAs recognised the potential for growth of automation in financial advice and, among others, will continue to monitor the evolution of the market.

85. The aggregation of large amounts of data from many different sources seems to offer institutions opportunities for making better business decisions, revealing insights and behaviours faster and better than traditional methods. Many institutions are investing in exploring the potential applications of big data in their day-to-day activities, in an effort to leverage their rich datasets and discover new business opportunities and enhance productivity and efficiency (e.g. credit scoring, model testing).

8 https://www.eba.europa.eu/documents/10180/2170121/Final+draft+Recommendations+on+Cloud+Outsourcing+%28EBA-Rec-2017-03%29.pdf

9 https://esas-joint-committee.europa.eu/Pages/News/European-Supervisory-Authorities-publish-conclusions-on-automation-in-financial-advice.aspx

86. Recent work from the ESAs[10], has found that that big data brings many benefits for the financial industry and consumers, such as more tailored products and services, improved fraud analytics or enhanced efficiency of internal organisational procedures. On the other hand, financial services consumers should be made particularly aware of some of the risks posed by big data. The risks identified include the potential for errors in big data tools, which may lead to incorrect decisions being taken by financial service providers. In addition, the increasing level of segmentation of customers, enabled by big data, may potentially influence the access to and availability of certain financial services or products.

e. Blockchain

87. It became evident that the effectiveness of blockchain technology relies on the collaboration of a number of firms, as reflected by the various consortia formed, in which a growing number of institutions are working together to further explore the potential benefits of blockchain. Many institutions are investing in the development of blockchain technology (e.g. through consortia), in the light of its promising benefits, and as the technology progresses institutions are becoming more selective and targeted in their efforts. Smaller institutions do not seem to be currently planning to become actively involved in such projects but are following the developments in this area. Nevertheless, the blockchain technology has not yet reached the stage at which it can run large-scale projects, while the legal and regulatory framework is still uncertain on this aspect.

[10] https://www.eba.europa.eu/-/esas-weigh-benefits-and-risks-of-big-data and https://www.eba.europa.eu/documents/10180/1720738/Report+on+Innovative+uses+of+data+2017.pdf

4. Current relationship of incumbents with FinTech

88. As part of this analysis, the EBA has explored how incumbent institutions approach and relate to FinTech, including their interaction with new entrants and other FinTech firms. At this stage, taking into consideration the EBA's interactions with the industry, as well as the current trends in the market, four different approaches have been identified on how incumbent institutions approach and relate to FinTech. These range from investing directly into new entrant FinTech firms to in-house development of technological solutions.

89. These practices are not mutually exclusive and could be performed in parallel, as it is possible for an institution to be engaging with FinTech in all these different ways. For example, incumbent institutions are leveraging their advantage of large customer bases to launch new innovative propositions through partnerships with new entrant FinTech firms, and in parallel, through their API platforms, they could identify potential investment or partnership targets.

90. In this context, different levels of activity and paces of development in the area of FinTech have been observed across the EU, and thus, in some instances, the engagement with FinTech depends on, or is even restricted by, the speed of FinTech development in the jurisdiction in which firms operate.

4.1 Partnering with new entrant FinTech firms

91. At this stage, the predominant way of interacting with FinTech is through partnerships with new entrant FinTech firms and other firms that aim to actively follow and embrace FinTech developments (Figure 4 and Figure 5). This type of relationship appears to be preferred by some institutions, which need to catch up with the FinTech development, as they consider this as a quick way of becoming familiar with and active in FinTech.

***Figure 4**. You currently do not have any ongoing relation with FinTech firms*

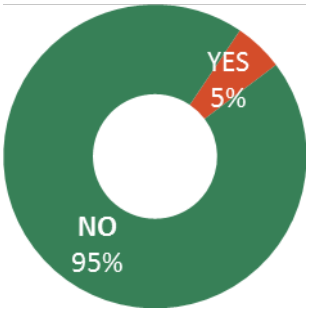
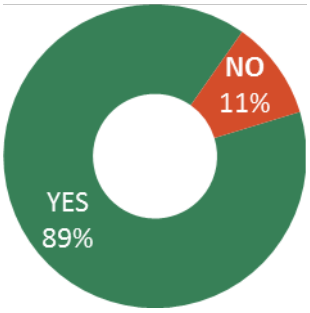


***Figure 5.** You plan to have a relationship with FinTech firms in the future*



Source: EBA RAR H2 2017

92. Depending on the area of interest, institutions engage with selected new entrant FinTech firms, which appear to offer propositions aligned with their innovation strategies. In most cases, new entrant FinTech firms are motivated and actively approaching institutions in an effort to form alliances and collaborate on developing innovative propositions.

93. Smaller new entrant FinTech firms appear to provide institutions with innovation expertise, while, from their side, incumbents provide finance and market reach. Therefore, this type of relationship allows incumbent institutions to accelerate their FinTech developments.

94. From the incumbents' perspective, the element of trust is an important component when it comes to forming potential partnerships and cooperation with new entrant FinTech firms. Institutions are concerned about the nature, identity and level of responsibility of new entrant FinTech firms, and therefore they emphasise the importance of proper due diligence processes to verify the accuracy and reliability of new entrant FinTech firms' propositions and level of development. Incumbents seem to conduct their existing third-party due diligence processes as they would with any other third party.

95. In an effort to engage with the new entrant FinTech firms, institutions are launching a series of 'open-invitation' FinTech events, such as hackathons, competitions, challenge programmes and other networking events, whereby they invite the FinTech industry to participate in an open competition/challenge and develop technology-based solutions in a selected business topic/area. Through these interactions, institutions are seeking to identify potential partners and explore opportunities in specific topics.

96. As indicated in Figure 6 and Figure 7, the significant majority of incumbent institutions form commercial partnerships or participate in non-commercial partnerships (such as research or knowledge sharing) with FinTech firms, supporting the current trend towards the approach adopted by incumbents.

Figure 6. *You form commercial partnerships (e.g. joint ventures) with existing Fintech firms to offer new products/services*

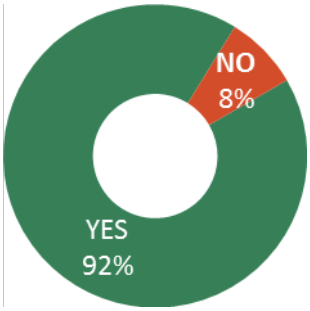
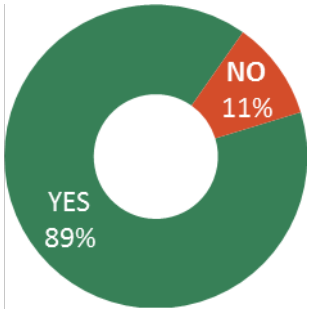


Figure 7. *You participate in non-commercial partnerships with FinTech firms (research, share knowledge, e.g. through FinTech incubators/accelerators)*

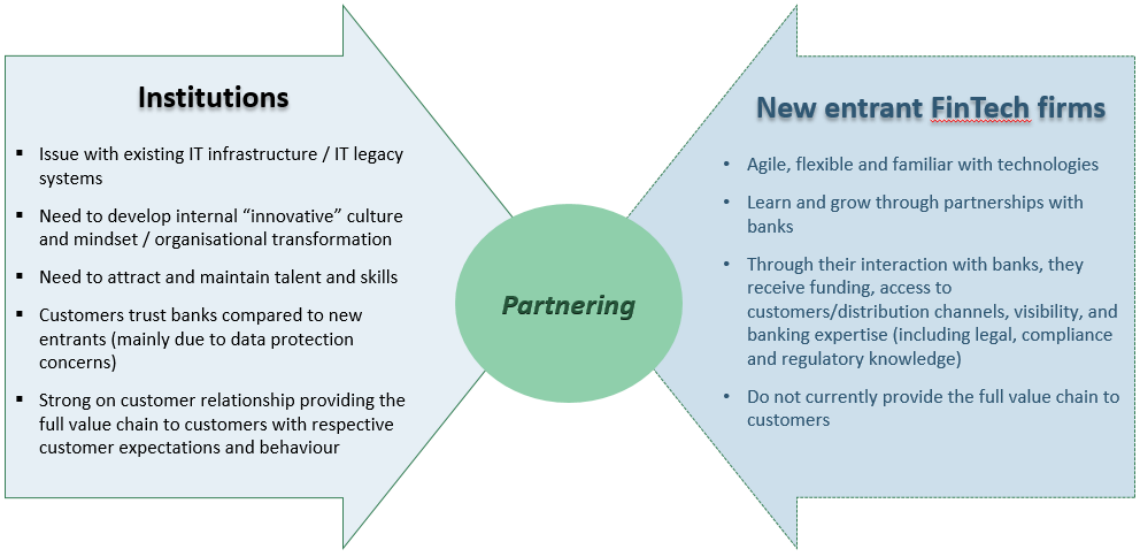


Source: EBA RAR H2 2017

97. Both incumbent institutions and new entrant FinTech firms are keen to form partnerships, as currently it appears to be a 'win-win' situation, with institutions offering capital/funding, banking expertise (including legal and compliance knowledge), brand visibility and a broad customer base.

98. Most of the time, new entrant FinTech firms approach incumbent institutions to explore their appetite for collaboration and the possibility of mutual objectives. Frequently, institutions provide dedicated spaces (e.g. internal incubators, accelerators) to facilitate collaboration and leverage on the innovative solutions offered by new entrant FinTech firms.

Figure 8. *Key drivers that encourage partnership between incumbent institutions and new entrant FinTech firms*



4.2 Investing in new entrant FinTech firms

99. Most incumbent institutions appear to take a rather strategic view when they invest in new entrant FinTech firms. There is growing interest in investment around new entrant FinTech firms, with potential investors naturally seeking a positive return, either through a successful partnership or through acquisition of the new entrant FinTech firms in which they invested. However, such investments from incumbents do not seem to be short-hold investment targets, as return on investment is not the primary driver for these investment decisions.

100. Two main approaches were identified for how incumbents invest in new entrant FinTech firms: (i) via venture capital funds and (ii) via direct acquisitions.

101. Figure 9 indicates that indirect investment (via venture capital funds) is more prevalent, with 76% of respondent incumbent institutions claiming that they have invested in FinTech firms. Comparing Figure 6 and Figure 10 supports the current trend towards incumbent institutions favouring partnerships with FinTech firms over direct acquisitions.

a. Through venture capital investments

102. One of the approaches followed by institutions, to keep up with the technology innovation, is to acquire shareholdings in new entrant FinTech firms through venture capital funds. This may be considered riskier than collaborating with such firms, a possible interpretation of Figure 8, while at the same time potential benefits may also differ.

103. A number of institutions have invested through venture capital funds, or through setting up digital funds, in new entrant FinTech firms; such investments are purely exploratory and of a financial character or having a strategic planning aspect. Shareholdings in new entrant FinTech firms are usually in line with institutions' strategic plans whereby, for example, majority stakes could be acquired in spin-off entities and/or minority stakes purchased in external companies.

Figure 9. *You invest in Fintech firms (e.g. venture capital)*

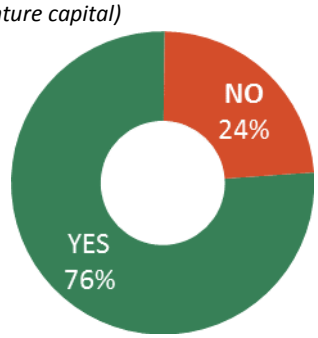
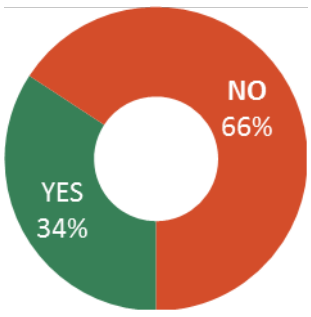


Figure 10. *You acquire existing Fintech firms to offer new products / services*



Source: EBA RAR H2 2017

104. Figure 9, in combination with interactions with incumbents, indicates that institutions seem to be willing to become minority stakeholders in new entrant FinTech firms, usually requesting to participate in their control, for example through a seat on their boards.

105. Alternatively, from the perspective of new entrant FinTech firms, collaboration with incumbent institutions or direct acquisition may be preferred rather than institutions taking minority shareholdings, as that could potentially the limit firms' independence and the flexibility required for development and creativity.

b. Through direct acquisitions

106. An alternative path for venture capital investment is the direct acquisition/buyout of new entrant FinTech firms in an attempt by incumbent institutions to supplement their traditional banking operations with new technology-based products. However, such acquisitions may not always fit in with institutions' individual strategies.

107. The consequent integration of the newly acquired new entrant FinTech firms into the banking group may not always be a perfect fit from business and other perspectives. It has been observed that some acquired new entrant FinTech firms are kept separate and independent within the banking group to avoid undermining innovative thinking and agility.

108. According to Figure 10 and industry interactions, activity levels in terms of direct acquisitions are low, possibly because of the early stage of FinTech development, which may explain the institutions' caution over ending up with inflated assets on their balance sheets, as well as the compliance aspects that may arise from such acquisitions. This trend could grow as institutions develop their own technology-based products and implement short-/medium-term innovation strategies.

109. When it comes to the identification of potential FinTech investment targets, a mixture of experts are involved ranging from business analysts to IT experts. This includes dedicated teams for screening potential FinTech targets. However, the results of their internal 'filtering' processes, in combination with the uncertain level of trust to new FinTech firms, seem to narrow their acceptable investment options. In the EU, the focus of recent acquisitions appears to be in the area of online banking, payments and retail credit.

4.3 Collaborating with other stakeholders

110. Another way to approach FinTech is by institutions collaborating with peers (other banks) and other stakeholders through participation in consortia to develop and test new technologies. This type of relationship also includes engagement with academic and research institutions to explore potential FinTech opportunities and challenges.

111. Given the nature and status of FinTech development, certain technologies, such as blockchain, require the collaboration of a number of stakeholders to be promising, resulting in the creation of consortia.

112. A number of interested parties, seeking to further explore and understand the potential benefits of specific technologies for business applications, work together as part of a consortium, as they pursue the same goals. Several alliances/consortia have been set up (e.g. R3, Enterprise Ethereum Alliance) in which a number of institutions have joined forces to set standards to enable the development of new innovative solutions. Some examples include consortia of banks working on blockchain applications with the aim of cost reduction (e.g. in trade finance).

113. By joining forces and efforts, institutions are becoming able to leverage on their brand strengths, infrastructures and customer bases, while at the same time reaping the benefits of having an agile FinTech firm to deliver the necessary solutions. This is perceived as another way to reduce the threat from external competition.

114. In such alliances/consortia, the level and membership status of each institution can depend on the annual fee paid, while funding, governance and commitment are usually the key critical elements for success. Nevertheless, alliance with peer institutions is not an easy task within the financial services sector, given its highly competitive nature.

4.4 Developing FinTech solutions internally

115. With the aim of organic reinvestment and setting the grounds for embracing emerging technologies and new technology-based solutions, a number of institutions have initiated a cross-business transformational process through increased investment in ICT, digitalisation projects and significant internal development in this respect.

116. Institutions are motivated to explore the potential benefits of FinTech, and there is a growing focus on the R&D of new and emerging technologies, as they wish to better understand the propositions and costs/benefits of potential applications. R&D is usually conducted through internal accelerators in which a dedicated team continuously observes and assesses the FinTech developments in the market and, having in mind the institution's revenue sources, tries to identify the best potential FinTech propositions that fit the institution's strategy and profile.

Figure 11. *You develop your own products/services in house using new technologies without cooperating with FinTech companies*

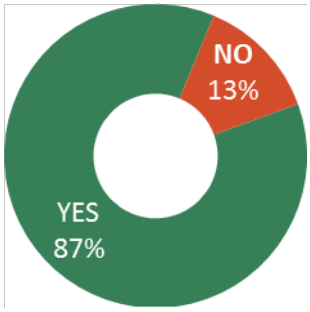
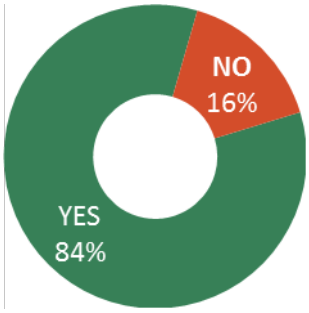


Figure 12. *You set up/ sponsor FinTech incubators/accelerators*



Source: EBA RAR H2 2017

117. Internal innovation labs/incubators have been established in a number of institutions (Figure 12) aiming to trigger internal motivation to find potential solutions to replace existing time-consuming, inefficient or ineffective procedures and processes. Under such programmes, staff have the opportunity to put forward proposals, which may be selected, through an application process, for testing and development in the internal accelerator. Usually within 3 months' time, the assumptions of the selected proposal have been validated and pilot tested. Based on the results, successful approved solutions are rolled out across the institution. In this way, subject matter experts, who are closer to the day-to-day business operations and can more easily identify areas for improvement, have the opportunity to actively contribute to the institution's overall digitalisation plan and bring innovation into its daily activities.

118. Through the establishment of internal dedicated teams, with a mixture of skills and backgrounds, institutions aim to bring their business and IT functions closer together and leverage technological development.

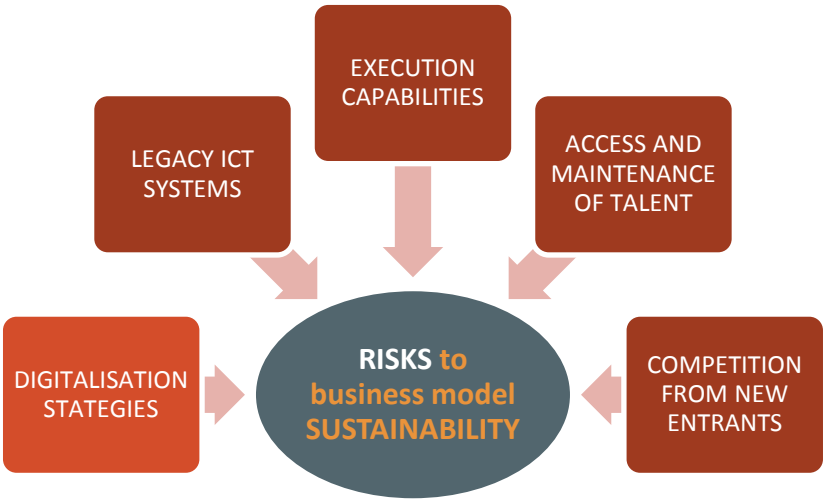
119. Incumbent institutions are developing specific responses in certain focus areas, such as customer experience and aggregating data and services, improving their own customer experience and building their own networks.

120. Some institutions leverage their large customer bases to collect useful feedback (e.g. customer surveys) on customer needs and accordingly inform their processes and services offered through solutions developed in house.

5. Risk factors impacting the sustainability of business models

121. Many institutions are currently rethinking their business models, including their structure, operating models, processes and procedures, as a result of all the changes arising from technological development and changes in customer behaviour. These changes should ensure that business models remain viable and sustainable in the context of the new technological landscape.

122. There are a number of factors that could potentially threaten the sustainability of incumbents' business models. As a result of the analysis performed, the EBA has identified five factors, that might significantly affect incumbent institutions' business models from a sustainability perspective. These relate to (i) digitalisation strategies that incumbent institutions pursue to keep up with the pace of a fast-changing environment, (ii) challenges arising from legacy ICT systems, (iii) operational capacity to implement the necessary changes, (iv) concerns over retaining and attracting staff and (v) increasing risk of competition from peers and other FinTech firms.



123. All five risk factors are presented and discussed separately in more detail. The digitalisation/innovation strategies, including their quality and incumbents' ability to properly implement them in a timely manner, are considered to be the first and most important factor that determines the progress of incumbent institutions towards embracing the current challenges.

5.1.1 Digitalisation/innovation strategies

124. In terms of the level of adoption of innovative technologies, engagement with FinTech, and having in mind incumbents' current digitalisation/innovation strategies, along with their respective stage of development, incumbent institutions seem to fall into three groups:

***(i) Proactive/front-runners*:** institutions with ambitious innovation strategies, highly targeted transformation projects and growing investments in FinTech. Although some institutions may have set aggressive strategies, which usually have unclear impact and risk assessments, in an effort to achieve the first-mover advantage, others have set clear, well thought out and comprehensive strategies and targets with a strong research orientation and the necessary focus on governance, organisational aspects, operations and risk management.

***(ii) Reactive*:** in this group, there are two sub-groups, with (a) some institutions perceived as followers of the technological developments and taking a 'wait and see' approach, with carefully defined strategies and a steady pace of internal changes and (b) other institutions that appear to react to peer pressure and take a 'go with the flow' approach combined with the concern of being left behind. Such an approach could lead to irrational decisions and inadvertently bring new/amplified and unknown risks to the business.

(iii) ***Passive*:** in this group, we usually see institutions left behind in terms of technological developments because of other significant priorities (e.g. high non-performing assets levels). Nevertheless, they are slowly trying to catch up, as customers have started asking for a change in their banking products/services. However, in this group, we also see some conservative or more traditional institutions, which are usually reluctant to change.

125. Based on this categorisation, potential risks may arise for those incumbent institutions that will not be able to react adequately and in a timely manner and adapt to a dynamically changing environment and will remain passive observers of the financial innovation trends. Similar risks may arise for institutions that are aggressive front-runners or alter their business models without a clear strategic objective in mind, backed by appropriate governance, operational and technical changes.

5.1.2 Legacy ICT systems

126. The complex legacy ICT systems of incumbents restrain their agility and flexibility to progress dynamically through the current technological development. Significant efforts, time and capital investments are planned by most institutions to tackle this issue. However, they still remain behind the technological ICT capabilities of new entrants in terms of agility and time

to deliver new product solutions or to update user interfaces to maximise customer experience and convenience.

127. The ability to open up their APIs and integrate third-party providers raises the challenge of linking legacy ICT systems with APIs/interfaces. This requires adaptation of the old systems to APIs and new technologies. A number of banking groups with diverse geographical presences face the additional issue of integrating their core banking systems across their entities before they can proceed to develop their APIs.

128. With the implementation of GDPR on 25 May 2018, and the growing use of cloud computing, as well as the increased number of cyber-attacks, customer data management is another important challenge for institutions, mainly because of the current state of their core IT architecture.

5.1.3 Execution capabilities

129. Incumbent institutions will have to adapt their internal culture and behaviour to become a more technologically driven environment, which currently appears to be an obstacle to achieving or progressing with their innovation strategies. The scalability as well as the acceptability of new products and services could be negatively affected if unchanged cultures and behaviours persist. The transition from traditional to digital combined with limited budget availability (mostly due to pressure on profitability) are additional challenges to institutions aiming to achieve a digital-friendly banking culture.

130. Continuous monitoring and evaluation of the progress made is another challenge for institutions. Quantifying the benefits from the overall investment in FinTech is not a straightforward exercise, as direct revenue streams, the impact of cost reduction and other measurements are not yet simple to put in place. However, a number of key performance indicators (KPIs), such as customer satisfaction or customers' interest in new products, are monitored to assess acceptance and success rates. It is important to ensure that the metrics used are aligned with strategic objectives.

5.1.4 Access and maintenance of talent staff

131. It was observed that access to ICT expertise and technology talent is becoming a scarce resource for institutions, as the current growth in technology-based projects creates an increasing demand for technology talent at a pace that outweighs the supply. Top front-end and back- end developers, artificial intelligence and big data specialists are in exceptionally high demand, and institutions need to find ways to attract and retain their key personnel. This competition for talent appears to be a wider challenge across the FinTech sector with many institutions considering providing adequate training and the necessary skills for their current workforce in an effort to address this issue.

132. Appropriate human resources and adequate expertise is a challenge for institutions, as the lack of skillsets could prevent incumbents from progressing as fast as they might want to. In the short- to medium-term perspective, it will be important for client-facing employees as well as senior management to better understand the changes introduced by FinTech and be better placed to inform and guide clients.

5.1.5 Competition from the new entrants, other FinTech firms and technology providers

133. The increased competition observed, partially because of new entrants leveraging FinTech, pose a significant risk that could negatively affect incumbent institution's profitability. In the context of FinTech, this might result in reduced income from fees and commissions for incumbents, primarily in the retail and payment business segments, raising the need for adapting business models to ensure sustainable profitability.

134. The growing competition could also be seen as an opportunity for institutions as they seek to leverage FinTech developments to provide improved and enhanced customer experiences in an effort to maintain existing and gain new customers. This could motivate staff, shift the focus onto customer needs and result in better products and services for customers and enhanced transparency and simplicity (giving control to the users), as well as allowing customisation of services to meet customers' needs.

135. Incumbent institutions noted that BigTech firms have the potential to become significant competitors in the provision of financial services (mainly due to their size and exposure), as is already evident from their increasing footprint in the financial sector.

136. The ongoing FinTech development within the financial services sector brings a number of opportunities for, along with challenges to, the sustainability of their business model that incumbent institutions need to take advantage and overcome respectively. Concerns around the impact on institutions' current relationships with customers and effects on existing margins/returns set additional pressure to incumbents to adapt and take a strong position in the technology-enabled financial innovation arena.

137. Incumbent institutions need to review the emerging trends and risk factors discussed and consider their impact on the sustainability of their business models. In doing so, it is important to critically assess the current financial, technological and customer relationship situation, with the aim of establishing whether these bring competitive advantages or are dragging forces when compared with peer institutions and potential new entrant competitors.

6. Conclusions

138. In line with the priorities set out in the EBA FinTech Roadmap, the EBA has conducted an analysis of the current impact of FinTech on incumbent credit institutions' business models, aiming to enhance knowledge sharing among regulators, supervisors and other stakeholders. It focuses on the current landscape, observed trends and the main FinTech-related factors affecting the business models of incumbents, without envisaging or intending to model scenarios for potential future development. The report is based on facts and observations collected by the EBA through its engagement with the supervisory community and the industry, within the broader activities of the EBA FinTech Knowledge Hub.

139. In general, incumbent institutions are keen to embrace new and emerging technologies in their operations and activities, without necessarily involving other FinTech firms, as they are capable themselves of developing new products and services. The use of new technologies to improve customer experience and operational efficiency is growing in the banking sector, and seems likely to continue, possibly at an accelerated rate.

140. The EBA has identified four broad drivers that shape and induce changes in incumbents' business models, namely (i) customer expectations and behaviour, (ii) profitability concerns, (iii) increasing competition and (iv) regulatory changes.

141. The findings from the EBA's risk assessment exercise suggest that the payment and settlement business line appears to be most affected by the new entrants and has a negative impact on incumbents' revenues. New entrants and other FinTech firms are becoming active in non-capital-intensive business areas such as cross-border transfers, micro-payments or card payment. As a result, retail banking is the second most affected business line, as the arrival of new entrants has significantly increased competition in the retail banking segment.

142. However, new technologies also bring new opportunities; for example, new business models in the retail payments market are enabled by mobile wallets. Promising opportunities seem to arise in commercial banking and trading and sales business lines. This is possibly due to the potential benefits of new technology-based propositions such as commercial banking aggregator models, SME tools, the use of robo-advice, and the application of better data analytics.

143. In the light of the technological evolution, incumbent institutions have rolled out innovation and digitalisation transformation strategies in an effort to grasp the FinTech agenda and explore its potential. Based on information collected, the EBA identified two main trends in digitalisation projects pursued by the incumbent institutions: (i) digital transformation and (ii) digital disruption. Digital transformation involves the transformation of internal processes, and it aims to digitalise and optimise operations. Digital disruption is a change to the traditional

market in its current form by creating a new market enabled by the use of innovative technologies, which includes new ways of customer interaction in order to enhance customer experience.

144. Technological innovation also leads to changes in the governance and organisation of incumbents to enable adequate response and necessary adaptation to the evolving FinTech development. Many institutions have created core innovation teams that leverage expertise and resources across the institution with strong support from their top management. The culture within incumbent institutions is another important factor that drives the implementation and execution of the innovation plans. It was observed that some incumbent institutions consider the current staff mindset to be an impediment to the implementation of their innovation strategies.

145. When it comes to the implementation of digitalisation/innovation projects, many institutions are moving away from the traditional waterfall/pipeline approach and embracing an agile approach aiming to achieve rapid delivery of projects along with an iterative and team-based approach. This is also evidenced by the growing use of internal innovation labs and accelerator programmes.

146. The benefits from FinTech investments do not seem to have materialised yet when it comes to cost reduction and revenue growth/returns as institutions struggle to quantify and trace the outcomes of innovative solutions. This could indicate that the effects of FinTech on incumbent credit institutions are not material at this stage.

147. A diverse level of activity and involvement in different financial technologies has been observed across the EU banking sector, in terms of both geography and institutions. The first wave of technological changes in the financial services sector, which could be considered to encompass online and mobile banking, as well as the use of biometrics, appears to have affected a significant number of EU institutions, which have already incorporated them into their existing processes and activities. There is also a growing interest in cloud computing and early use of big data and machine-learning solutions. Moreover, many initiatives aiming to explore blockchain technology are currently ongoing. However, the second wave of technological changes to encompass these emerging technologies is still in an exploratory phase.

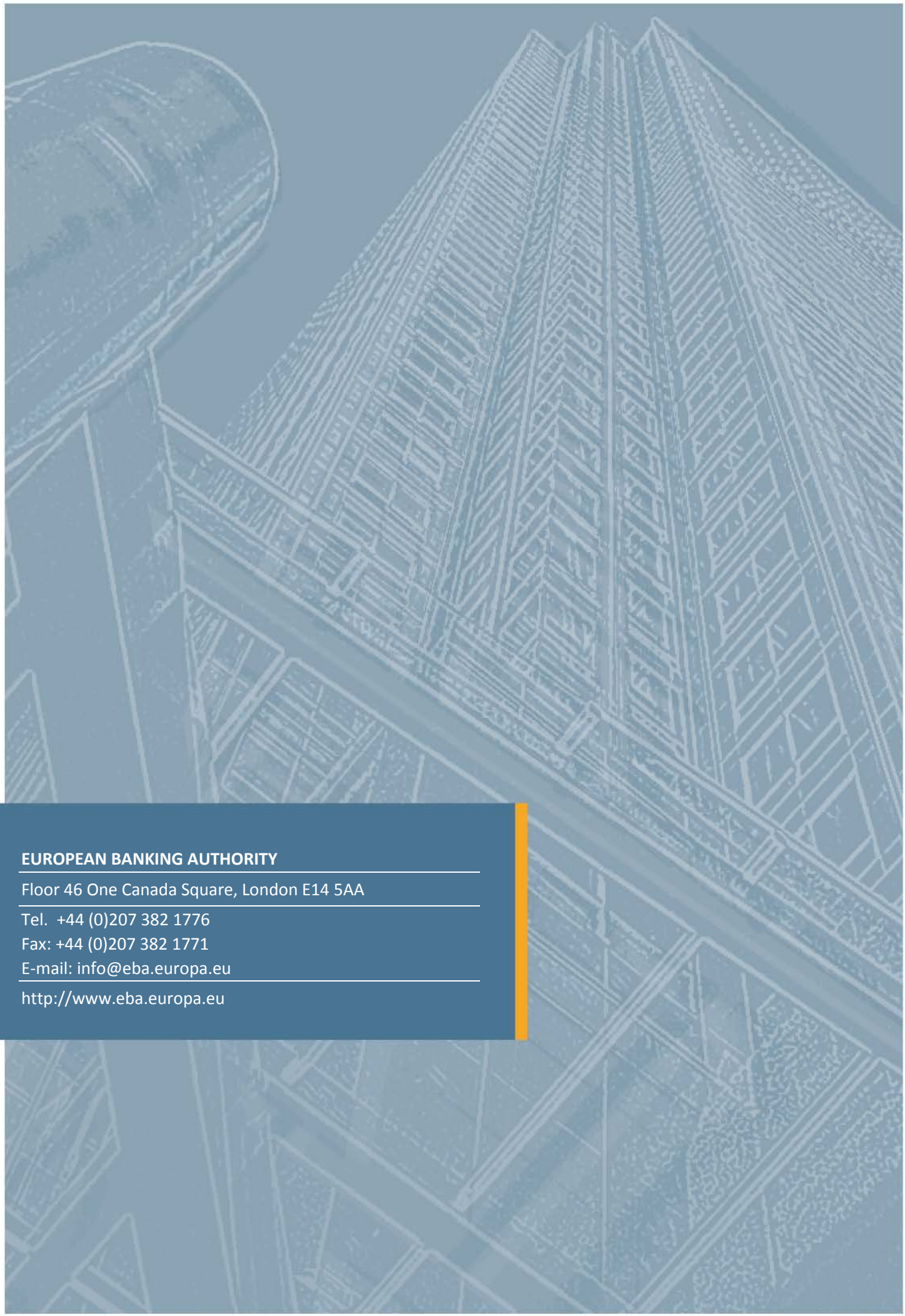
148. At this point, the predominant type of relationship between incumbent institutions and FinTech is partnership and collaboration with FinTech firms, as there is a shared interest in embracing emerging technologies. Incumbents provide FinTech firms with capital/funding, banking expertise (including legal and compliance knowledge), brand visibility and a broad customer base. On the other hand, FinTech firms bring innovative ideas, a more customer-centred approach and familiarity with emerging technologies.

149. While the current trend is for incumbents to form partnerships with FinTech firms, it is yet unknown how these partnerships will be integrated within institutions and how these will be translated into monetary terms. However, more active involvement of BigTech companies in the provision of financial services is a step that could alter the existing financial intermediation ecosystem.

150. At this stage, FinTech firms do not seem to be in direct competition with incumbent institutions, despite the fact that some FinTech firms are reaching maturity in terms of scale of operation and profitability. Nevertheless, the competition among incumbents appears to be growing as a result of the fast-paced technological development and many institutions competing to achieve the first-mover advantage.

151. The EBA identified five main factors related to FinTech that might significantly affect incumbent institutions' business models from the sustainability perspective. These relate to (i) digitalisation/innovation strategies that incumbent institutions pursue to keep up with a fast-changing environment, (ii) challenges arising from legacy ICT systems, (iii) operational capacity to implement the necessary changes, (iv) concerns over retaining and attracting staff and (v) increasing risk of competition from peers and other entities. The digitalisation/innovation strategies, referred to in point (i), including their quality and incumbents' ability to properly implement them in a timely manner, are considered to be the first and most important factor that determines the progress of incumbent institutions towards embracing the current challenges. Furthermore, as profitability is still insufficient to guarantee long-term sustainability (as per the November 2017 EBA risk assessment report), how incumbent credit institutions will cope and remain competitive remains a challenge.

152. In the context of its ongoing monitoring of financial innovation, the EBA will continue monitoring the impact of FinTech on institutions' business models. Taking into consideration the public feedback received on its FinTech Discussion Paper, it will consider expanding the focus of the analysis to cover the wider FinTech ecosystem, engaging with the wider FinTech ecosystem in the context of the EBA FinTech Knowledge Hub, and possibly conducting similar work on a regular basis to further understand the evolution of these developments over time.



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