INNOVATION AND STABILITY

OVERVIEW OF FINTECH

IN HUNGARY

CONSULTATION DOCUMENT

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The spread and widespread use of innovative digital solutions may considerably improve the cost effectiveness and competitiveness of the financial system. Using technological innovations, FinTech solutions may be able to trigger radical changes in the traditional financial sector.

In the summer and autumn of 2017, the MNB conducted a comprehensive study in order to survey market developments related to FinTech innovations and the perception of the regulatory environment by market participants. This research examined consumers' openness towards innovations on the one hand and the activities and future plans of market participants on the other hand, with the involvement of around 60 companies concerned.

The aim of the consultation document 'Innovation and Stability' is to present the market developments in FinTech innovations and the MNB's assessment of such developments, and to launch a consultation process on the potential regulatory framework identified with regard to stimulating innovation in a safe environment. The consultation document also introduces the planned cornerstones of the operation of the Innovation Hub and the Regulatory Sandbox.

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1. INTRODUCTION

Up until the end of the 20th century, the banking system[1] spearheaded the use of technological innovations. From the 1960s, the banking system relied strongly on progress in innovation and digitalisation. Major developments from past decades such as the bank card, the ATM and the electronic system used for processing settlements are good examples for the openness of the banking system towards innovation. By the end of the 20th century, financial services had become the first digitalised industry. As a result, the largest purchaser of IT services has long been the financial sector.[2]

In the early 21st century, the banking system lost its innovative role. The widespread use of online technologies is gradually becoming part of public awareness, and society will soon find it natural that needs are satisfied through digital channels in all areas, with financial products and services as no exception. This need will continue to increase as the so-called digital natives grow up.[3] Recent technological innovations have been incorporated into the operation and product ranges of several industries, but the banking system has not necessarily integrated these into its operation appropriately and to the extent similar to earlier times.

After the crisis, harnessing the potential of digital solutions was hampered by weakened profitability and the fundamental transformation of banks' operation. After the crisis, the rise in the share of non-performing loans and the amount of banks' losses negatively impacted profitability, which undermined the capital and income position, and tied down banks' human resources in crisis management. As a result of the crisis, consumer confidence in the banking system also weakened,[4] hindering the restoration of lending and banks' profit generation.

The potential persistence of the low interest rate environment also underlines the need to improve banks' operational efficiency. Central banks responded to the economic challenges posed by the crisis in the financial markets by introducing massive interest rate cuts, until the central bank base rate dropped to zero or lower in several countries. Lower interest rates encourage investors to take bigger risks in order to attain higher returns, and thus the post-crisis risk-aversion was replaced by the search for yield.[5] Smaller banks that depend more on deposits respond more strongly to this, choosing mergers in several cases. Larger banks react to the profit pressure from low interest rates by raising fees.[6] This further strengthens the demand for financial services outside the banking system and highlights the need to improve banks' operational efficiency.

The new technologies allow banks to operate more efficiently and reduce their costs. The earliest possible adjustment of credit institutions to innovations may be profitable, as the early

[1] In view of the role of the banking system in financial intermediation in Hungary, the consultation document primarily focuses on developments related to the banking system. Nonetheless, the opportunities and risks set out in this document as well as the recommendations pertaining to stimulating FinTech innovations should be interpreted for the financial system as a whole (insurers, pension funds, fund managers, etc.).

[2] Arner et al. (2016). The evolution of FinTech: A new post-crisis paradigm? UNSW Law Research Paper*,* No. 2016-62.

[3] EY (2016): Transforming talent, The banker of the future, Global banking outlook 2016

[4] Stevenson, B. – Wolfers, J. (2011): Trust in public institutions over the business cycle, The American Economic Review, Vol. 101, No. 3

[5] BIS (2010): 80th Annual Report https://www.bis.org/publ/arpdf/ar2010e3.pdf

[6] IMF (2017): Global Financial Stability Report 2017

use and adoption of novelties and ideas may provide a competitive edge. In developed countries, consumers are reluctant to abandon the bank they are familiar with,[7] which may facilitate banks' cooperation with innovative companies. Shortening and increasing the transparency of banking processes may also provide an opportunity to acquire new customers, and a large existing customer base may prove to be a source of useful information for charting paths of future development.[8] If banks are able to transform, they can profit greatly from innovative solutions.

However, technological innovations may fundamentally change the existing business model of credit institutions through increasing competition. Companies active in other economic sectors are entering financial intermediation through technology-enabled innovation, which spawns new business models and products. The fact that large technology companies and start-ups are entering the financial market creates a new type of competition, which depresses prices. However, the role of commercial banks in money creation and the financial intermediary system is a competitive advantage over non-incumbent firms. Nevertheless, banks' interest income is declining on account of the increasing competition in the market, which warrants rationalisation on the cost side,[9] and therefore banks need to incorporate innovations into their own business models to ensure the long-term survival of traditional actors.

New technologies may bring about huge changes in the insurance sector as well. Digitalisation is also nothing new in the insurance sector, as the online comparison of premiums for third-party liability insurance for vehicles and travel insurance premiums along with online contracts have been available for years. However, technological innovations such as the digitalisation of operating activities, the development of online administration and sales channels can substantially contribute to more efficient functioning and the improvement of customer satisfaction.

The aim of this consultation document is to explore the challenges linked to innovations related to the financial system and to identify potential regulatory responses. In the course of this, the major factors leading to the emergence of new industries and the dangers and opportunities linked to this phenomenon are presented. The theoretical framework arising in connection with this issue is summarised, and dilemmas concerning the development of the regulatory framework are addressed as well. The policy recommendation is based on the review of international regulatory approaches and the survey of Hungarian needs.

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[7] McKinsey&Company. (2016). FinTechnicolor: The New Picture in Finance. http://www.the-blockchain.com/docs/FinTechnicolor-The-New-Picture-in-Finance%20-%20Mckinsey.pdf

[8] FSB (2017): Financial Stability Implications from FinTech http://www.fsb.org/wp-content/uploads/R270617.pdf

[9] European Parliament (2017): Report on FinTech: The influence of technology on the future of the financial sector, Plenary Sitting

2. THE SPREAD OF FINTECH INNOVATIONS

The latest milestone in the innovation processes of the financial system is the emergence of FinTech. There is no uniform, widely accepted definition of FinTech (financial technology) in the economic literature. Overall, it is understood to refer to the use of innovative technology in the provision of financial services.[10] In the interpretation of the Financial Stability Board (FSB), FinTech is technology-enabled financial innovation that can produce new business models, applications or products, and these can have a profound impact on financial markets and institutions as well as financial services themselves.[11] FinTech refers to the technology-driven development of the whole financial sector, including innovation pertaining to the activities of the front, middle and back office. FinTech is independent from the nature or size of the service provider; therefore, it can emerge in both retail and wholesale markets.

Technological progress plays a crucial role in the development of the financial world. With respect to novelties, there are two types of innovation: sustaining technology and disruptive technology.[12] One feature of sustaining innovations is that they enhance an already existing technology: hence they do not have a major disruptive effect on the given business model. By contrast, the technological innovations in the disruptive group can fundamentally change existing business models: thus they are able to induce a quite substantial realignment on the market. Such developments can often lead to huge performance improvements and reduced costs. By nature, these developments are riskier and thus have a more uncertain outcome, and therefore they call for special attention from a regulatory perspective.

The willingness to invest in FinTech firms has increased considerably in recent years, but at the global level there are large differences in the spread of digital financial innovations. Although due to the uncertain identification of FinTech, there are significant variations in the available global investment data, the underlying trends are the same: up to 2015, venture capital investment in the FinTech sector grew globally, but this trend seems to have slowed down since 2016 according to some sources,[13] or since 2017 according to others.[14] The decreasing global investment sentiment may recover in the future, for example because of the expected spread of artificial intelligence. However, there are substantial differences across the various economic regions, which can be attributed to either consumers' attitude or the historical development of the financial system. In the rapidly developing Asian countries, where the financial system is less deep, FinTech services are more widespread. In North America, the development of the FinTech market is driven by outstanding investment sentiment. By contrast in Europe, including Hungary, FinTech firms are pursuing developments either in cooperation with banks or are exploiting smaller market niches; however, FinTech activities may increase considerably in the EU due to PSD2, which will be introduced in 2018.

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[10] Nicoletti (2017): *The future of FinTech, Integrating Finance and Technology in Financial Services*, Palgrave Macmillan

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

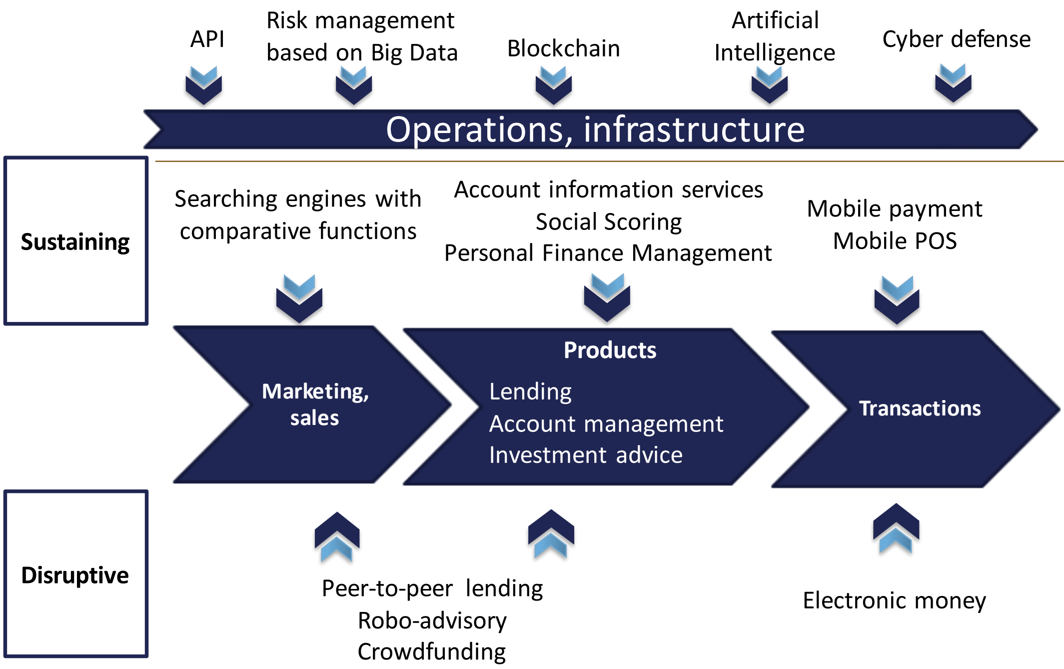
[12] https://hbr.org/1995/01/disruptive-technologies-catching-the-wave

[13] KPMG: The pulse of FinTech, 2017 Q2

[14] FinTech Global: http://fintech.global/fintech-investment-in-q2-2017-grew-over-50-compared-to-the-years-opening-quarter-despite-a-fall-in-deal-activity/

In a technological sense, FinTech innovations can cover the whole banking value chain, and therefore they can have a drastic impact on banks' business models (Figure 1). FinTech innovations can emerge as developments in a certain type of service, they can cover several banking functions, or they can modify the entire banking infrastructure. Most FinTech innovations focus on merely one element of banks' value chain with their innovative technological solutions which allow them to make the given function better, faster and cheaper. This can offer a competitive edge for FinTech service providers until banks incorporate these innovations into their own processes. However, in view of the many disruptive innovations that fundamentally change operating activities and infrastructure, special attention should be paid to the risks of technological innovation that may impact financial stability as well.

Figure 1: Banks' value chain and FinTech innovations

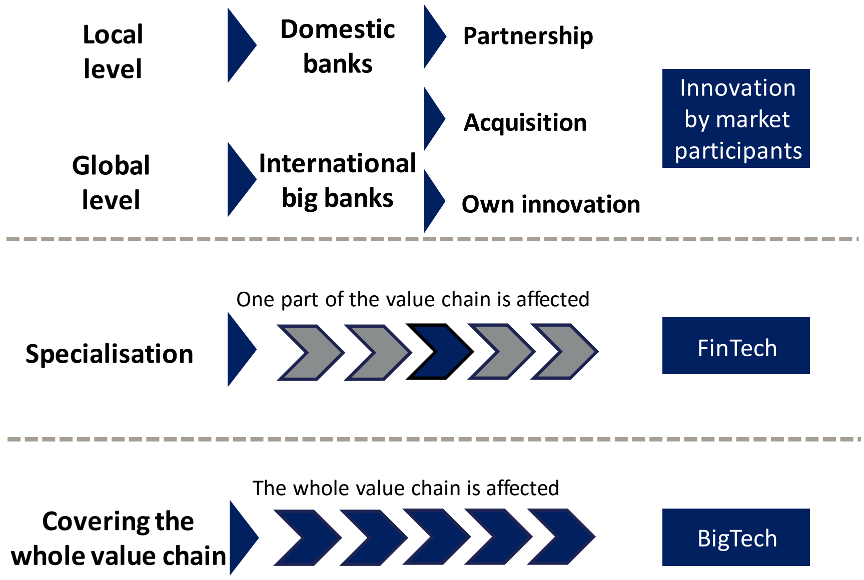


Source: MNB compilation

There are three basic paths of development with respect to the spread of FinTech firms (Figure 2).[15] One possibility is that incumbent market participants incorporate the innovation (*e.g. in the form of a partnership agreement, acquisition or internal innovation*) either at the local or the global level. As a result, innovative firms become part of the traditional financial intermediary system. The FinTech company may also decide to specialise and focus on a single element of the value chain and therefore it serves a specific customer base. In the third scenario, the FinTech firms or the global technology giants ("BigTech") cover the whole value chain and crowd out traditional banking actors. This latter possibility represents the greatest challenge for not only the incumbent market participants, but also for regulatory and supervisory authorities.

[15] https://www.dnb.nl/en/binaries/Themaonderzoek%20%20uk_tcm47-336322.PDF

Figure 2: Potential paths of development with respect to the spread of FinTech firms



Source: Sabine Lautenschläger: Digital na(t)ive? FinTechs and the future of banking[16]

Box 1: Main avenues of FinTech innovations

Most technological innovations pertain to financial transactions. The most popular are the various mobile payment applications that can be used to pay for products or services without cash or a bank card. Nowadays, most smartphones have the necessary feature for contact data transfer, and therefore they can be used for payment at POS terminals. In Hungary, the most typical setup is that banks develop their own mobile payment application, which can be used as a mobile wallet instead of a bank card. Mobile banking applications have been available for a long time, and they can be used to initiate transfers. Cross-border payment solutions are also highly popular. Earlier, cross-border payments often reached the recipients through several banks, resulting in long processing times and rising fees. In the case of the FinTech service providers, which are active and hold accounts in several countries, the money paid actually never crosses borders, there is no need for settlement between separate banks, and therefore money can be transferred more cheaply and flexibly abroad.

Lending services have become available without financial institutions. New actors often act as mere intermediaries, lending indirectly, and are thus exempt from banking regulation. One special business model is online marketplace platform lending. The basis of the functioning of such a service is that as an intermediary, it provides an opportunity to private and institutional investors to extend financing to private borrowers and companies. Since online marketplace lenders operate with lower costs than traditional banks, credit can be obtained through them below bank rates, and investors can earn higher yields. Usually, a credit assessment is performed by the service providers in a proprietary system, and several investors finance the same loan. This is done either by selecting specific loans and the extent of financing, or by investing in a kind of loan portfolio.

[16] https://www.ecb.europa.eu/press/key/date/2017/html/sp170327_1.en.html

FinTech solutions facilitate the monitoring and management of individuals' finances. Banks must provide third-party licenced service providers access to the database of the current account management system through so-called APIs (application programming interfaces) based on open standards. These service providers can use the data to develop their own services, and therefore previously unseen solutions are expected to emerge. Personal finance management applications offer a convenient alternative for monitoring and managing finances. These applications allow customers to monitor their accounts at various institutions online, through an application. This way they obtain a comprehensive picture of their income, their spending on specific items, the performance of their investments, and they can identify fees previously hidden from them.

Technological progress is also transforming cross-border services. Cross-border services face several obstacles due to the structure of technology, regulation and the market. The fixed costs of services are typically high on account of regulatory compliance and the capital cost of infrastructure. However, as a result of technological progress, several processes linked to financial services may become cheaper, faster and more transparent. These technologies can make monitoring transactions more efficient, and information sharing and risk management can be automated, and the cost of regulatory compliance can be drastically reduced. Several initiatives focusing on cross-border services are already under way.

InsurTech[17] innovations can cover the entire insurance value chain or only certain elements thereof. According to international experiences, InsurTech is an important segment in FinTech solutions. The goal of the new technologies is to develop a fully digitalised process structure, incorporate artificial intelligence-based decisions in operating activities, and involve the community of consumers, which improves the availability and usability of information and data. In recent years in Hungary, several examples appeared well before the rise of InsurTech, with examples such as online comparison websites or online insurance brokers.

[17] See Annex 1

3. REGULATORY DILEMMAS LINKED TO FINTECH INNOVATIONS

3.1. Opportunities and risks inherent in FinTech innovations from a regulatory perspective

In recent years, the efforts of regulatory authorities have considerably improved the banking system's resilience to shocks. In response to the global economic crisis, the newly established macroprudential authorities, together with the existing institutions, facilitated the development of a more stable financial system. Banks' operational risks have diminished considerably, the banking system's capital adequacy and liquidity have improved, and banks' risk management methodology has been enhanced. However, the rapid rise of the FinTech industry has the potential to reverse the positive trend, despite the fact that the innovations can have a major positive impact on both the demand and the supply side. The entry of new actors, especially those representing disruptive technological innovations, to the market may exert a negative effect on the stability of the entire financial system. Therefore, regulatory authorities seek to lay down appropriate rules by taking into consideration all stakeholders, which facilitates innovation in the financial sector without jeopardising stability.

The potential spread of technology-enabled innovations calls upon regulatory authorities to act. This pressure to take measures can be attributed to the fact that over the long run FinTech innovations may significantly transform the responsibilities of regulatory authorities and central banks. The drastic decline in the demand for cash and the transformation of the organisational structure of the financial system can have a direct influence on monetary policy, financial stability and the function of the lender of last resort.[18]

Table 1: Positive effects of technological innovations on financial intermediation

Area	Potential benefit	Effect on financial intermediation
Financial stability	**Diversification, decentralisation**	▪ New products, services and business models emerge ▪ Financial system may be more resilient to exogenous shocks
Institutional operation	**Market efficiency**	▪ Heightened competition reduces prices ▪ Cost level that emerges may be sustainable and lower ▪ Information asymmetry may be reduced through increased efficiency and stronger transparency
Effects on customers	**Financial integration**	▪ Financial products become available to a broader range of customers (access to funds is easier, supports sustainable economic growth) ▪ Search costs are reduced, the time for obtaining funds becomes shorter, and allocation is more efficient in the whole system ▪ Global products and services are integrated locally

Source: Authors' work based on BIS, FSB

[18] Aaron et al. (2017): Fintech: Is This Time Different? A Framework for Assessing Risks and Opportunities for Central Banks, *Bank of Canada Staff Discussion Paper,* 2017-10

Table 2: Potential risks of technological innovations on financial intermediation

Area	Potential risk	Effect on financial intermediation
From a macroprudential perspective	**Regulatory arbitrage**	▪ Unregulated technologies appear in the financial system ▪ Efficiency of macroprudential regulation and the central bank's function as the lender of last resort diminishes
	Procyclicality	▪ Similar patterns may emerge in the decision-making of market participants, which can exacerbate the extent and impact of economic growth and market price fluctuations; this may be reflected in either stronger procyclicality or greater volatility ▪ Spillover risks may also appear through the transmission channels between sectors
	Emergence of systemic risks	▪ It may be difficult to substitute a dominant, innovative player on the market ▪ Instead of institutions, activities may become systemically important
From a microprudential perspective	**Profitability, sustainability of operating activities**	▪ Relative scope for the performance measurement of new market participants is limited, their operation is sensitive to liquidity shocks ▪ High individual leverage, high level of asset–liability maturity mismatch
	Operational risks	▪ Heightened competition may boost the risk appetite of certain market participants, corporate governance control may weaken ▪ Data quality is crucial during operation ▪ Development of a complex IT infrastructure and outsourcing limit the transparency of operation ▪ Potential cyberattacks may exert an especially large impact on the stability of the institution
Consumer protection, data protection	**Customer protection, data management**	▪ Risk of customers being misled or harmed may be high ▪ Due to the large amount of shared data, privacy risks may emerge

Source: Authors' work based on BIS, FSB

Impact on the stability of the financial system

The appearance of new products, services and business models may result in a diversified market, and alternative investment opportunities may arise with low correlation between them and other asset classes. Therefore, market concentration may diminish, and the different technologies and operational mechanisms may reduce the interconnectedness between market participants, as a result of which the financial system may become more resilient to exogenous market shocks.

However, in several cases the emergence of the new technologies may be outside the purview of regulation, which may entail uncertainties during operation and may cause issues during potential market turbulence. In financial intermediation, which is vital to the functioning of the economy, similar patterns may arise in the decision-making of market participants due to digitalisation, mainly on account of automation and the use of artificial intelligence. These effects may exacerbate the extent and impact of the fluctuations in business cycles and market prices, thereby strengthening the procyclicality of financial intermediation, and spillover risks may also appear through the transmission channels between sectors. Furthermore, if a player quickly rises within a certain technology, a concentrated market may develop, and if this dominant market participant suffers some kind of shock, its substitution is difficult due to the probably unique business model, and on account of technological progress, not only institutions but also certain activities may become systemically important.[19]

Factors influencing the operation of institutions

The operating costs of innovators are typically low, and therefore they can pursue a more aggressive pricing policy and can offer higher yields to investors. Heightened competition in the market reduces the prices of products and services, and in response, incumbent institutions can improve market efficiency by developing a sustainable, lower cost level. Innovations place great emphasis on Big Data-based analysis, and large, detailed datasets can be used in pricing, allowing prices to be developed in a manner that better matches the risk profile of specific customers. The spread of new courses of business facilitates more accurate estimation and pricing of risks, and thus information asymmetry may decline. Automated processes expedite internal procedures, and operational efficiency may also improve through the outsourcing of certain activities.

However, quantifying the relative efficiency of the industry raises problems, since the performance of a FinTech innovation is difficult to measure against an alternative market participant. This is because often a similar activity that could be used as a benchmark does not necessarily exist. Moreover, the operation of new market participants is highly sensitive to liquidity shocks, certain activities may lead to huge leverage, and the maturity mismatch between assets and liabilities may be substantial as well. As a result of declining market prices owing to heightened competition, traditional banking actors may pursue a riskier business policy to offset revenue shortfalls, which may also affect the level of systemic risks. Risk perception and assessment mechanisms may become distorted, and certain consumers who are deemed riskier may find it impossible to gain access to certain types of products due to the unreasonably high prices determined during the decisions based on the risk profile. Another negative factor in Big

[19] BIS – FSB (2017): *FinTech credit, market structure, business models and financial stability implications,* available at: http://www.bis.org/publ/cgfs_fsb1.pdf

Data-based analysis is that when data quality deteriorates, it leads to the wrong results, and the complex IT systems and increased outsourcing may entail operational risks.[20]

Effects on customers

More readily available and more comfortable solutions improve the financial integration of retail and small business customers. Financial products become available to individuals and companies that cannot establish a relationship with a bank, or for which the credit institution cannot finance a planned investment or working capital needs. Thanks to the wide range of innovations, the search costs associated with exploring the alternatives in lending and savings drops, obtaining funds becomes faster, and a transparent and comparable product base emerges. Moreover, the technological progress of cross-border services may also cause the spread of products and services that are popular all over the globe, and this may further strengthen the effect of the above-mentioned processes.[21]

It should be noted, however, that customers must place some kind of initial trust in the novel technological solution or business model, which can then be abused by the individual solutions, thereby encouraging excessive risk-taking by the customers. Issues of trust can also arise during the inappropriate management of personal data, and the unauthorised use of such data may mislead or even harm consumers and investors. Consumer protection issues are also central in the case of cross-border, foreign transactions and services as well.[22]

3.2. Possible regulatory approaches to FinTech

In order to mitigate financial stability risks, FinTech services must also operate in an appropriate framework. As shown, technological innovations create many opportunities that are worth taking advantage of, but there may be various potential risks as well. Therefore, the development of a financial system that supports innovation and continues to be stable calls for the appropriate analysis of these factors pointing in different directions. The development of an optimal framework is based on ensuring a level playing field and on encouraging the actors to take into account systemic risks in addition to their individual risks in the course of their operating activities.[23] The regulatory dilemma linked to FinTech solutions is how to strike a balance between a laissez-faire approach and a fully prohibitive regulatory stance while developing the framework (Figure 3).

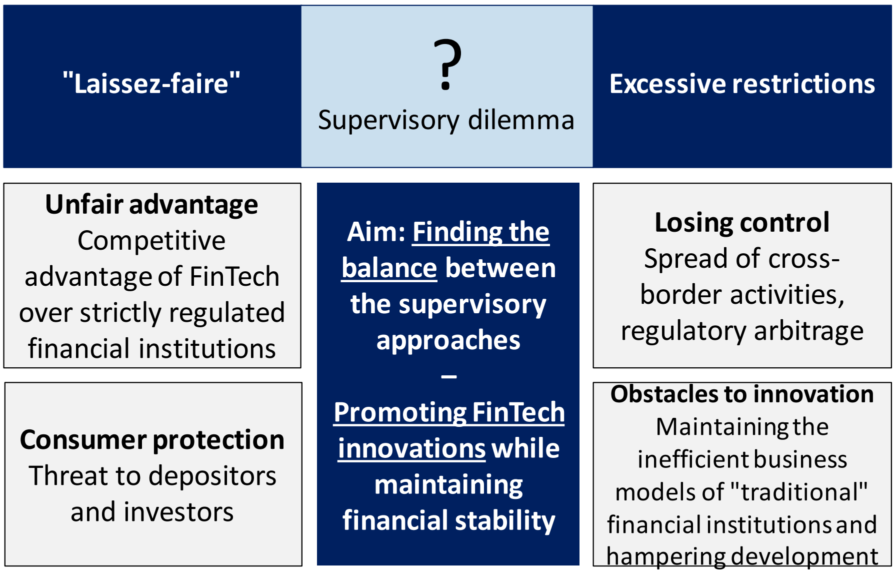
[20] EC (2017): FinTech: A more competitive and innovative European financial sector, *European Commission Consultation Document*, available at: https://ec.europa.eu/info/sites/info/files/2017-fintech-consultation-document_en_0.pdf

[21] Philippon (2016): FinTech Opportunity, *NBER Working Paper,* No. 22476

[22] BIS – FSB (2017): *FinTech credit, market structure, business models and financial stability implications,* available at: http://www.bis.org/publ/cgfs_fsb1.pdf

[23] He et al. (2017): Fintech and Financial Services: Initial Considerations. *IMF Discussion Note,* SDN/17/05

Figure 3: Regulatory dilemma linked to FinTech solutions



Source: MNB

The laissez-faire approach to FinTech innovations

The adoption of an excessively lenient regulatory approach would probably improve public awareness of new products and services under the current market conditions in a rapid manner. For example, the costs borne by consumers would nosedive, which would vastly improve digital customer satisfaction. However, this entails several risks. First, as compared to the strict regulatory requirements imposed on banking actors, FinTech firms would enjoy an unfair competitive advantage, and the lack of detailed rules also poses risks to stakeholders. If an immature solution reaches the market too soon, it may cause unexpected losses to both consumers and lenders. An excessively lenient regulatory approach may push financial intermediation into a segment where regulatory authorities only have limited influence; therefore, the effective risk management mechanism of smaller and less experienced market participants cannot develop.[24]

Complete prohibition of FinTech innovations

A complete ban on FinTech solutions may curb willingness to innovate, and the ossified, classic functioning of the traditional actors in the banking system would continue. In an excessively stringent regulatory environment, both innovations and customers may abandon domestic service providers. The utilisation of cross-border opportunities would probably further increase customers' costs in the traditional banking system, since the fact that customers preferring the new options abroad turn away from the domestic actors would be offset by higher prices.[25] As a result of the lack of new entrants, less intense competition and less efficient functioning,[26] the

[24] Zetzsche et al. (2017): Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation, *European Banking Institute (EBI) Research Paper Series*, 2017-11

[25] World Economic Forum (2016): The Complex Regulatory Landscape for FinTech, available at: http://www3.weforum.org/docs/WEF_The_Complex_Regulatory_Landscape_for_FinTech_290816.pdf

[26] Nagy, M. –Vonnák, B.: Egy jól működő magyar bankrendszer 10 ismérve (10 features of a well-functioning Hungarian banking sector), available at: https://www.mnb.hu/letoltes/egy-jol-mukodo-magyar-bankrendszer-10-ismerve.pdf

price of financial services may remain relatively expensive, and the level of innovation may be lower as well.

3.3. Importance of managing cross-border risks related to FinTech

Since the FinTech revolution presents a global problem in financial regulation, an effective, rapid regulatory response may be supported by close international cooperation. International cooperation is crucial for the development of effective financial regulation, since regulators do not currently necessarily have adequately extensive experience to develop direct, comprehensive regulation in the FinTech sector. Nowadays, regulatory practice is not exactly consistent at the international level, which may undermine national regulation and may push institutions towards regulatory arbitrage. Stronger harmonisation of national regulatory frameworks would create a level playing field for the actors and foster the widespread use of viable technological solutions with value added. The following criteria compiled in the EU may provide guidance on taking regulatory measures that reduce risks arising from cross-border FinTech services:[27]

- Technology-neutral approach that ensures that similar activities are subject to the same regulation, irrespective of the way they serve customers. In addition to fostering innovation, this helps the establishment of a level playing field.
- Proportionality that takes into account disparities between business models, sizes, systemic significance, complexity and the utilisation of cross-border opportunities.
- Enhancing integrity, i.e. the new technologies to be used in the financial system should improve market transparency without creating unexpected risks (e.g. market abuse, misleading customers, cybersecurity issues).

In several countries, efforts are already under way to facilitate cross-border cooperation. Certain national regulators have introduced bilateral cooperation agreements in connection with fostering innovation and sharing information on innovative financial services (Australia and the UK; Singapore and Canada; UK and South Korea). The development of a similar practice would be beneficial from the perspective of the Hungarian framework as well.

[27] EC (2017): FinTech: A more competitive and innovative European financial sector, *European Commission Consultation Document*, available at: https://ec.europa.eu/info/sites/info/files/2017-fintech-consultation-document_en_0.pdf

4. INTERNATIONAL REGULATORY EXPERIENCES

4.1. National regulatory solutions

In international practice, the regulation and facilitation of FinTech innovations through the use of Innovation Hubs and Regulatory Sandboxes is increasingly widespread. The aim of an Innovation Hub is to provide guidance to banks and FinTech firms in legal and operational issues related to innovations. The Regulatory Sandbox is a controlled environment for testing innovative solutions where these actors can receive temporary exemptions from certain prudential requirements. Such regulatory instruments may even resolve the regulatory dilemma described above, as a solution halfway between the laissez-faire and the prohibitive regulatory approach.

4.1.1. Innovation Hubs as a regulatory instrument facilitating FinTech innovations

An Innovation Hub is a platform provided by the regulatory authority where the developers of FinTech innovations receive guidance from the regulator and, in certain cases, from each other. In international use, its main function is to support new ideas and to provide guidance and advice. The Innovation Hub is available for unregulated and currently regulated activities as well, and both the innovations of newly established companies and the new technological solutions of existing, incumbent institutions (e.g. banks, insurers) may appear in it. An Innovation Hub is the primary platform for information exchange, where the regulatory authority's experts answer the questions from the representatives of FinTech innovations, help to interpret the legal framework, and assess the needs for amending legislation and pass on their experiences to decision-makers. Communication between actors is typically open, and mostly informal.[28]

The activities of an Innovation Hub may vary widely. Normally, Innovation Hubs are created for answering relevant, FinTech-specific questions, but several additions have been observed in response to market needs. The Innovation Hub is usually extended to the InsurTech and RegTech[29] sectors as well. As market competition affects this segment, questions related to competition rules could also be submitted. In addition to advice and guidance, several Hubs offer an opportunity for continuous contact, during which they also assist in acquiring operating licences. The Hubs monitor and support the newly established firms for a predetermined period, typically for another 12 months.

[28] BCBS (2017): Sound Practices: Implications of fintech developments for banks and bank supervisors

[29] See Annex 1

Table 3: Certain features of the operational functioning of an Innovation Hub

Main elements	Detailed description
Dedicated expert team	▪ The authorities set up dedicated expert teams for answering questions ▪ One team typically consists of 3–5 people who keep the Innovation Hub running as full-time staff, and their work may be assisted by another 10–30 people
Preliminary screening procedure	▪ In the case of the two oldest hubs operated by Australia and the United Kingdom, preliminary screening requirements were introduced in connection with the questions ▪ The aim of the screening is to make FinTech firms and incumbent institutions carefully consider through 4–5 publicly available, complex questions whether they should turn to the Hub with their question
Duration of the procedure, management of questions	▪ The duration of the reply procedure depends on the complexity and clarity of the questions, but Hubs usually respond to the inquiry in 1–2 weeks ▪ Where the screening procedure is applied, the 1-week period is typically used for the evaluation phase, and the whole process can take up to 3–4 weeks to complete. However, in the case of the regulatory authority operating the Dutch Innovation Hub, the response time is 2 working days.
Mode of contact	▪ In several countries, publicly available templates are published on the websites of the Innovation Hubs, and these templates should be usually sent to a dedicated email address ▪ In addition to online contacts, personal meetings are also available, and Hub operators organise several events where many players from the industry can share their questions with each other

Source: MNB compilation

Box 2: International examples of Innovation Hubs

<u>Existing Innovation Hubs:</u>

- In the United Kingdom, the Financial Conduct Authority (FCA), the British supervisory authority, started its own innovation project in October 2014, aimed at exploring new companies and industries and eliminating the barriers to innovation. The central element of the project was the Innovation Hub established, which has provided assistance to over 300 businesses since its inception. Going forward, the goal of the Hub is to identify new technologies and business areas and to strike the necessary balance between new consumer needs and regulation.
- An Innovation Hub was introduced in Australia in March 2015, to make it easier for the creators of FinTech innovations to navigate the regulatory framework of financial intermediation, without jeopardising investor and consumer confidence. In 2016, its scope was extended to RegTech solutions as well. By October 2017, the Hub had cooperated with 226 entities, 190 out of which received informal assistance, and 35 received an Australian service provider licence.
- In the Netherlands, the financial supervisory authority (AFM) and the central bank (DNB) created a joint Innovation Hub in June 2016. In the first year of its operation, market participants submitted a total of 216 questions, three-quarters of which were related to licensing and market entry, mostly involving the issue of the PSD2 and the blockchain technology. Owing to the involvement of the competition authority (Authority for Consumers & Markets, ACM), since June 2017 questions regarding

competition rules can also be submitted to the Hub.

- The Hong Kong Monetary Authority (HKMA) and the Applied Science and Technology Research Institute (ASTRI) announced that they would launch a joint FinTech Innovation Hub in September 2016, in parallel with the introduction of the Regulatory Sandbox. As a result of the joint operation, they provide several opportunities for the creation of new innovations based on cooperation between stakeholders. In its own facility, the Institute is willing to support solutions with a dedicated team and its IT infrastructure.
- The French supervisory authority, the Autorité de contrôle prudentiel et de resolution (ACPR) launched its own Innovation Hub in June 2016, where the developers of FinTech innovations can ask questions and request personal meetings at a dedicated email address. In its first year of operation, the market participants that turned to it covered the whole financial sector and exhibited a strong willingness to innovate. All in all, 133 innovative players participated in the personal meetings.

Planned Innovation Hubs:

- The European Central Bank published a statement[30] in March 2017 that included the goal of establishing a FinTech Hub covering the entire euro area. The aim of the future platform that will be accessible for all 19 countries would be to facilitate information exchange and share international best practices.
- In Japan, a FinTech centre has been operating in the central bank since April 2016; its declared objective is to make FinTech innovations facilitate the development of the financial system as well as the sustainable growth of the Japanese economy. The BoJ and the Financial Services Agency of Japan (JFSA) are currently working on the establishment of an Innovation Hub.

4.1.2. The concept and operation of the Regulatory Sandbox

The Regulatory Sandbox is a regulatory framework used for testing the innovative technologies of FinTech firms and traditional financial service providers (banks, investment firms, insurers). FinTech firms typically do not have sound impact assessments about the safe market implementation of products. Legislators are often unable to keep up with the rapid spread of innovative solutions, and therefore sometimes the legal background of certain newly developed services is not appropriately established. The Regulatory Sandbox provides a solution for managing the potential risks entailed by innovations without hampering innovation. It helps FinTech firms and incumbent institutions test their financial product or business model for a predetermined period, in an environment controlled by the regulatory authority, on real consumers and exempt from specific regulatory requirements. The test environment helping FinTech firms and banks also provides valuable information for the regulatory authority, as during the pilot phase the viability of the innovation and the business model can be observed in

[30] https://www.ecb.europa.eu/press/key/date/2017/html/sp170327_1.en.html

detail, and decision-makers can use their familiarity with the technology to develop customised and appropriate regulations for the new service.[31]

The framework of the Regulatory Sandbox supports the market entry of innovative companies by creating more favourable conditions for testing. Uncertainty in the regulatory environment may curb entrepreneurship among product developers and hinder the market entry of new actors. The introduction of the testing track ensures the faster, easier utilisation of new technologies, since FinTech firms can use it to enter the market with lower initial costs. The Regulatory Sandbox also favourably influences the funding of FinTech firms, as the pilot run provides reliable information to potential investors on the reception of the innovation in the market, and testing on real consumers shows whether the innovation can generate substantial demand. Feedback from consumers and access to real data may also help in fine-tuning the business model. The initial cooperation between the regulatory authority and the FinTech firm or the supervised institution using an innovative solution creates an opportunity for the satisfactory establishment of the conditions pertaining to the future normal course of business.

The regulatory authority may introduce temporary relief from certain regulatory requirements for new entrants to the Regulatory Sandbox. In the case of the companies with an operating licence or banks, three directions can be identified with respect to the types of temporary relief. According to the framework of most supervisory authorities, FinTech service providers or banks can be exempt from certain legal requirements. The substance of the exemptions is limited, and usually it cannot exceed the powers of the supervisory authority and cannot infringe on the basic supervisory objectives. Typically no exhaustive list of the types of exemptions is provided; the only exception to this is the practice in Singapore where an itemised list is published. For example partial or complete exemption can be granted from the rules of asset maintenance obligations, capital adequacy, liquidity, credit rating and cash holdings.[32] The supervisory authority may also provide letters of intent on the restriction of supervisory measures (no enforcement action letters – NAL) that remain in effect as long as the testing requirements are met, and the supervisory authority may also provide individual guidance to facilitate compliance with the legal environment.[33] For the companies without supervisory authorisation, a limited, temporary operating licence may be provided. In such cases, the request for an operating licence may be processed more swiftly, and compliance with the regulatory requirements is set proportionally to the nature of the service to be tested.[34]

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[31] For more on the concept and advantages of the regulatory sandbox, see He et al. (2017): Fintech and Financial Services: Initial Considerations. *IMF Discussion Note,* SDN/17/05., EFR (2016): *European Financial Services Paper*, September 2016, http://www.efr.be/documents/news/99.2.%20EFR%20paper%20on%20Regulatory%20Sandboxes%2029.09.2016.pdf and Arner et al. (2017): FinTech and RegTech in a nutshell, and the future in a sandbox, *CFA Research Foundation Briefs,* Vol. 3., No. 4

[32] For the list of requirements that can be subject to relief, see Monetary Authority of Singapore – Fintech regulatory sandbox guidelines, November 2016, available at: http://www.mas.gov.sg/~/media/Smart%20Financial%20Centre/Sandbox/FinTech%20Regulatory%20Sandbox%20Guidelines.pdf

[33] For more details, see the FCA notice: Financial Conduct Authority – Regulatory sandbox, November 2015, available at: https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf

[34] Australian Securities and Investments Commission – Regulatory Guide 257 Testing fintech products and services without holding an AFS or credit licence, August 2017, available at: http://asic.gov.au/regulatory-resources/find-a-document/regulatory-guides/rg-257-testing-fintech-products-and-services-without-holding-an-afs-or-credit-licence/

Temporary exemption from the individual legal requirements is assessed on a case-by-case basis, taking into account financial stability aspects. The easing of the requirements is based on the cooperation between the supervisory authority and the innovator. However, the authority running the test environment always pays special attention to ensuring that the financial stability objectives are met during testing. To this end, the supervisory authority in Singapore explicitly publishes the minimum requirements that should be fulfilled in all tests. Such a basic requirement is the protection of customers' personal information, fair business conduct and one loyal to customers, and the avoidance of money laundering and terrorist financing.

Supervisory authorities pay special attention to safeguarding the interests of the consumers that take part in the test. The existing Regulatory Sandboxes contain various safeguards for mitigating the risks and consumer losses due to testing. Typically, only voluntary consumers who fully understand the risks can access the Regulatory Sandbox. In several countries, the number of consumers, the value or frequency of the transactions and consumers' profile are regulated. In addition, covering consumers' losses may be required, as well as a mechanism for individual legal redress.

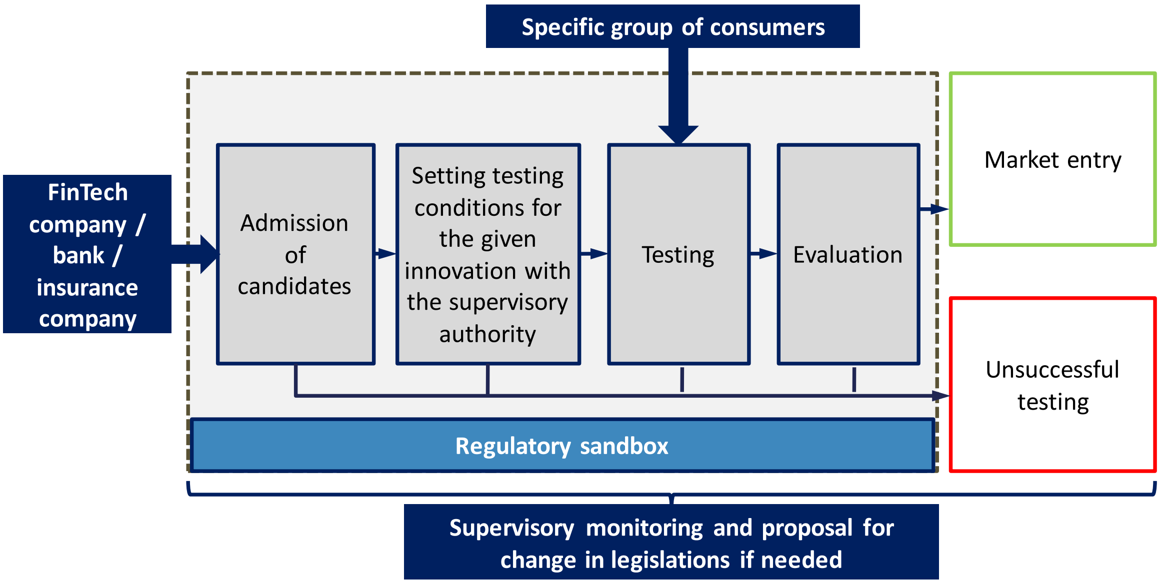
The Regulatory Sandbox can only contain the FinTech firms and incumbent institutions which meet the criteria established by the regulatory authority. The authorities expect clear design documentation from potential testers, with straightforward objectives, a schedule and a feasibility study. Applicants must typically prove that

- the functioning of the suggested financial service is based on a unique, new or developing technology,
- the suggested financial service provides additional value to consumers or a solution for an existing problem,
- the applicant wishes to launch normal operation after testing on the territory of the given jurisdiction,
- the innovation is ready for testing.[35]

Testing follows a predetermined schedule, and the outcome does not necessarily entail actual market entry. The cornerstones of the Regulatory Sandbox are determined together by the applicant and the authorities, including the aim and duration of testing, and the reference values of the key performance indicators in a successful and an unsuccessful test. During testing, detailed reports should be prepared for the regulatory authority on the status of the project, any operational problems and the measures taken to eliminate such. The assessment of the test's success also requires that detailed evaluations be submitted. After successful testing, actual market entry may follow, and in such a case all regulatory requirements become compulsory to meet. The time to be spent in the Regulatory Sandbox varies from country to country, but typically ranges from six months to one year.

[35] While countries lay down similar criteria, Malaysia created the most detailed list for eligibility. For more details, see Bank Negara Malaysia – Financial Technology Regulatory Sandbox Framework, October 2016, http://www.bnm.gov.my/index.php?ch=57&pg=137&ac=533&bb=file

Figure 4: Schematic flowchart of the operation of the Regulatory Sandbox



Source: MNB compilation based on international examples

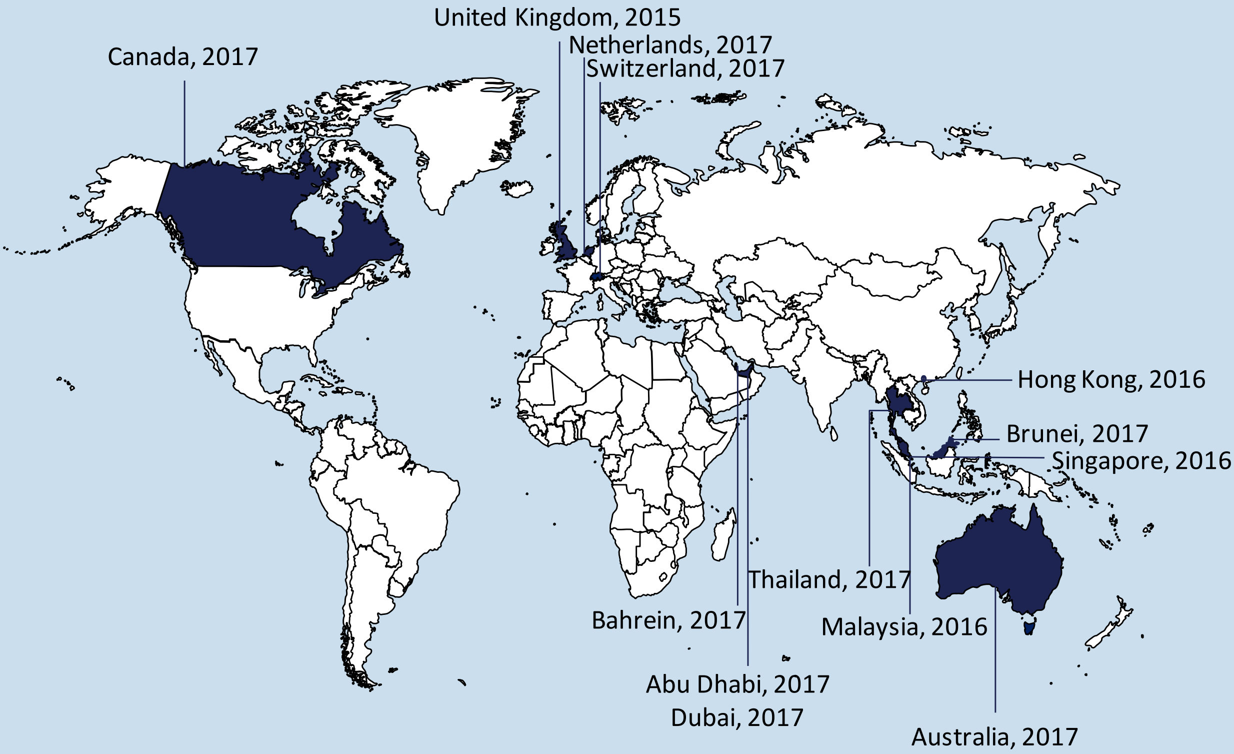
In contrast to the Regulatory Sandbox, the industry sandbox is an environment based on the cooperation of industry actors where testing occurs with the help of simulated consumer behaviour. An industry sandbox operated through the cooperation of industry actors may be a way to promote innovation processes, as it provides a platform for testing ideas outside the market and without real users. Participation in the industry sandbox provides help in validating the viability of the innovative services, since industry players can test the opportunities for cooperation between their information and administrative systems. By sharing data, application programming interfaces and reference architectures, innovators and data owners search for marketable solutions to complex problems. The industry sandbox may act as a preliminary filter before the Regulatory Sandbox operated by the regulatory authority, since the former is a more widely available test environment.[36]

Box 3: Initial international experiences with the operation of the Regulatory Sandbox

Regulatory Sandboxes are becoming widely used all over the world. The concept of the Regulatory Sandbox originates from the United Kingdom, from 2015. In addition to the British example, the Netherlands and Switzerland operate such a regulatory framework in Europe. In the summer of 2017 Lithuania launched an official consultation on introducing it. In the past two years, ten countries, including Russia, the United States and India, have indicated that they were considering a Regulatory Sandbox.

[36] In the United Kingdom, the launch of the industry sandbox was preceded by long discussions in the industry in 2016–2017. The document summarising the result of the consultation is available at: http://industrysandbox.org/report-view/

International examples for Regulatory Sandboxes and the date of introduction



Source: MNB compilation

Experiences with the Regulatory Sandbox are still limited. The first controlled test run was launched in the United Kingdom in 2016, and 42 FinTech solutions took part in the two rounds of testing that have been completed; another 18 applications have been accepted for the third round that will be launched soon. The profile of the companies that were found by the FCA to be ready for testing varies widely; most of them offer opportunities linked to the issuance of electronic money, personal finance management and InsurTech services. The FCA places special emphasis on the transparent operation of the Regulatory Sandbox, as the experiences can provide relevant information for the new entrants, the funders and the business partners as well. In connection with the initial experiences, the FCA underlines that there were several businesses among the rejected companies that were unable to prove that they were ready for testing due to the immaturity of their concept or administrative shortcomings. In Hong Kong, 23 ideas have been tested so far, and most of them were linked to biometric identification. The other countries operating Regulatory Sandboxes are still in the initial phase: until the summer of 2017, four, two and three companies' applications were accepted by the regulatory authority in Malaysia, Bahrain and Australia, respectively, while in Singapore one firm is conducting a test.

4.2. Current approach to FinTech regulation in the EU

FinTech innovations are of special significance to the EU, since they can strongly promote the capital markets union. According to the expectations, these innovations will lead to even more players in the market, heightened competition, the development of more efficient solutions, and the reduction of the costs of investors and companies. In addition, in view of the innovative solutions that have emerged so far, the transformation of the credit and capital markets is also possible. However, Member States can limit the EU-wide, large-scale implementation of the activities with their different rules reflecting their risk tolerance and created in the room for manoeuvre permitted by EU regulation. Therefore, it was suggested that it might be worthwhile to develop a proportionate legal environment that supports the facilitation of FinTech solutions at the EU level in line with the above-mentioned objectives, and to promote the market entry of non-bank players and the development of new credit and capital market solutions in order to foster competition and reduce costs.[37]

The EU legal environment regulating FinTech solutions is still quite fragmented. The main reason behind this is that no EU-wide FinTech strategy has been developed that sets the basic regulatory objectives and approaches. The future creation of an EU-wide FinTech strategy also raises the question to what extent the potentially more flexible Member State regulations will be able to take hold.

Most of the currently effective EU regulation does not take into account the timeliness of FinTech innovations (Figure 5).[38] One reason for this is that the FinTech phenomenon is quite novel from a regulatory perspective, as the issue of regulating various technological innovations has gained prominence in recent years due to the inherent increase in risks. However, a large portion of the legislation was drawn up before this period and has not been updated since. The other reason is the nature of the regulation: at the EU level, legislators have basically always wanted to introduce separate legislation for keeping technological innovations and the institutions using them in a regulated framework, and therefore no comprehensive regulation has been developed.[39]

At the EU level, a dedicated working group has been established to examine FinTech activities and channel the appropriate attitude into the behaviour of regulators, supervisory authorities and other actors. In 2016, the European Commission organised an internal working group with the objectives of facilitating the development of a regulation that also takes into account FinTech aspects, reviewing the existing regulation from the perspective of whether it is able to face the challenges of the digital age, and utilising the opportunities in FinTech solutions, while also identifying the inherent risks. Within this framework, the working group pays special attention to protecting consumers and investors, providing cross-border supervision, and supporting Innovation Hubs and Regulatory Sandboxes in Member States.

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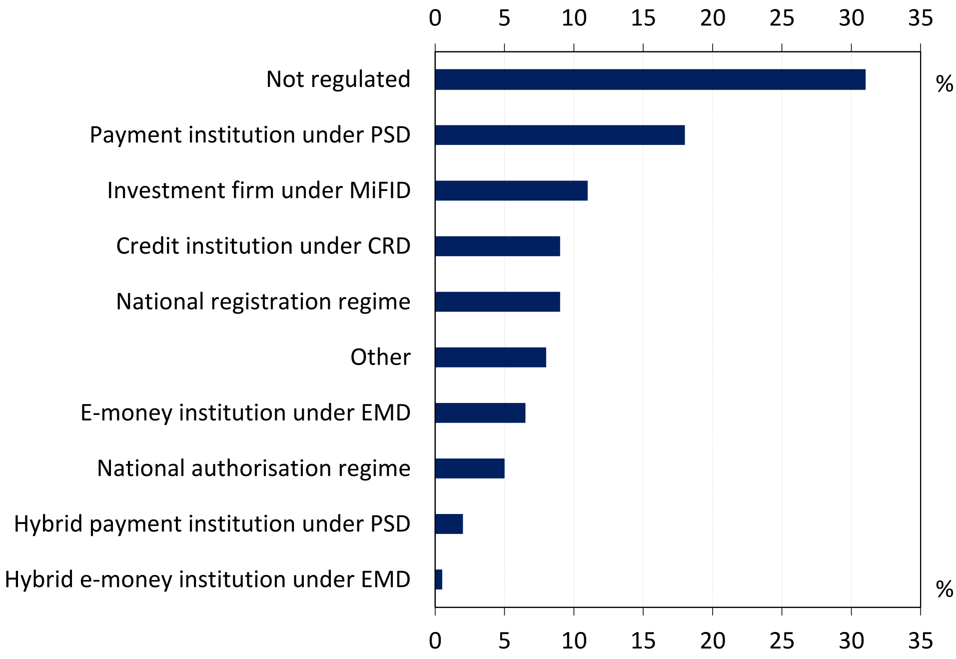
[37] https://ec.europa.eu/info/sites/info/files/factsheet-cmu-mid-term-review-june2017_en.pdf
https://ec.europa.eu/info/publications/mid-term-review-capital-markets-union-action-plan_en
https://ec.europa.eu/info/sites/info/files/communication-cmu-mid-term-review-june2017_en.pdf

[38] EBA Discussion Paper on the EBA's approach to financial technology (FinTech)

[39] BCBS: Sound Practices: Implications of fintech developments for banks and bank supervisors

Figure 5: Regulatory status of European FinTech innovations (July 2017)



Source: EBA Discussion Paper[40]

4.3. Key EU legislation from a FinTech perspective

However, some EU laws are already in close interaction with FinTech innovations, but in several cases a comprehensive review supporting the above-mentioned objectives has not been performed. The regulations that have been drawn up as a result of innovation and that take into account FinTech aspects as well include the PSD and the e-money directive, the PSD2 and the AMLD2 which amend these two laws, as well as the GDPR. However, in addition to these, other regulations pertaining to financial markets cannot be disregarded when a comprehensive financial regulation strategy is drawn up: the CRD IV/CRR, Solvency II, AIFMD, UCITS IV, MiFID II, EMIR, MAD/MAR, PRIIP, CCD and others may all have to be reviewed along the above-mentioned objectives.

- **Reviewing the payment services directive (PSD2):** With the PSD2, legislators aimed to continue the development of the internal market for secure electronic payments and to make a wider range of services available to consumers. As a result of the new directive, customers can now provide access to their account data to account information service providers and give payment orders to payment initiation service providers other than their account-servicing institution. This paves the way e.g. for a comprehensive analysis of customers’ consumption habits, as well as their risk level and indebtedness. In addition, the directive also creates a new opportunity in the area of customer identification, since pursuant to the directive, the customer identification service of the account-servicing payment service providers can be used by payment initiation service providers as well.
- **General Data Protection Regulation (GDPR):** Although the PSD2 regulates data security details, the data protection framework of the liberalised market is stipulated in the GDPR,

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

ensuring through strict requirements and severe sanctions that the protection of personal data are not undermined.[41] The EU-wide need to comply with the GDPR may guide FinTech companies and financial institutions towards solutions based on artificial intelligence. The efficient processing and lawful management of the huge amounts of other data that are relevant from a personal and a business perspective poses a great challenge to institutions in view of the GDPR. It is time-consuming and costly to do this without innovative solutions, and the negative impact of human error is also large.[42]

- **Reviewing the directive on preventing and combating money laundering and terrorist financing (AMLD2):** The aim of the AMLD2 is to strengthen the protection system against money laundering and terrorist financing in the EU, and to enable the use of certain automatisms with respect to the customer identification process to reduce abuses.[43] This may make the implementation of Member States' money laundering laws more efficient, and support the appropriate enforcement of data protection rules. The AMLD2 provides adequate guarantees to make customer due diligence and the establishment a business relationship without appearing in person explicitly possible in a safe and secure manner determined by the supervisory authority, through a previously audited electronic communication device. This is subject to the condition that it should ensure that the identification of the customer be at least equivalent to personal identification.[44] Furthermore, by eliminating repeated customer identification procedures, the directive makes it compulsory for service providers to accept customers who have already been identified somewhere else, and it also foresees a central record of banking and payment account data.

[41] http://fintechzone.hu/gdpr-konform-psd2-kihivas/

[42] http://fintechzone.hu/fintech-legaltech-mesterseges-intelligancia-gdpr-kihivasok/

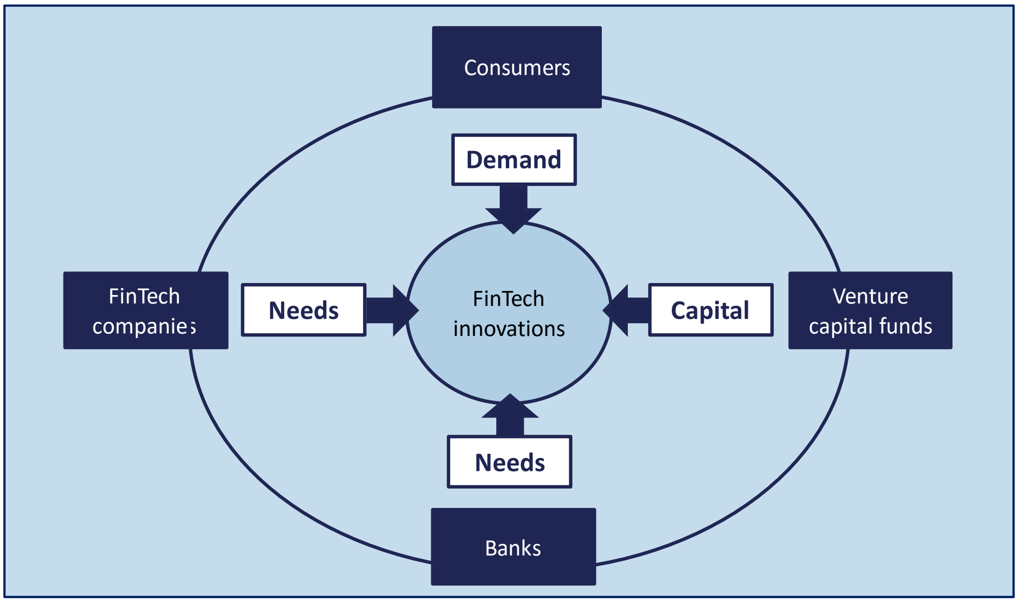
[43] https://www.pwc.com/jg/en/publications/pwc-global-fintech-report-17.3.17-final.pdf

[44] Since 19 July 2017, the following MNB Decree contains the detailed rules on online customer identification: MNB Decree 19/2017 (VII. 19.) on the detailed rules concerning the implementation of the Act on the Prevention and Combating of Money Laundering and Terrorist Financing, as applicable to service providers supervised by the MNB, and concerning the minimum requirements for the development and operation of the screening system under the Act on the Implementation of the Financial and Economic Sanctions Imposed by the European Union and the UN Security Council

5. OVERVIEW OF FINTECH IN HUNGARY

In order to obtain a comprehensive overview of market needs, in the summer of 2017 the MNB launched a market survey on FinTech innovations and their potential regulation. Market needs were surveyed taking into account the motivating factors underlying FinTech innovations through various channels (Figure 6). The MNB prepared a targeted questionnaire to assess the attitude and proposals of market participants developing and offering FinTech innovations. After evaluating the 50 questionnaires that were returned, the MNB provided an opportunity for personal consultation with the FinTech firms and banks with the most promising vision and most experience. The next phase of the questionnaire-based survey covering the insurance, pension fund and intermediary sector was launched in December 2017. FinTech firms' funding opportunities were assessed based on interviews conducted with venture capital investors. The exploration of consumers' attitude towards FinTech solutions was supported by focus group interviews, and a questionnaire focusing on the attitude towards digital financial services.

Figure 6: Stakeholders participating in the MNB's FinTech survey



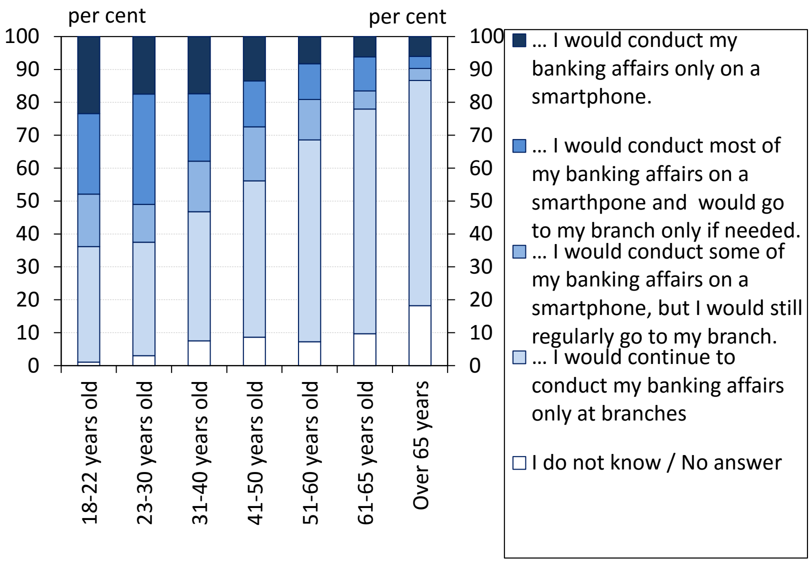
Source: MNB

5.1. The Hungarian population's openness towards FinTech innovations

A substantial portion of consumers are already interested in FinTech innovations. A major portion of consumers, approximately 15–20 percent, are already very open towards FinTech innovations. Thus, in terms of the active population, 1 million consumers can already generate potential demand for novel solutions. Among the young, online banking and administration are popular, and close to one in four 18–22 year-olds would conduct their banking exclusively over a smartphone if the conditions for this would be available. The ratio of those exhibiting rejection is also lower among the younger generations: while close to 70 percent of those aged over 65 reject banking over a smartphone out of hand, the corresponding figure among 18–22-year-olds is 35 percent (Figure 7). Privacy concerns are also raised in connection with robo-advisors, because certain applications use data that some customers are unwilling to share. People mostly inform themselves about investment opportunities from advertisements in the media and banks' brochures, and if they invest, their choice is often based on recommendation by friends or acquaintances.

Interested consumers are attracted by the fact that FinTech innovations make certain financial services more efficient, faster and cheaper. Most concerns focus on privacy, as financial services based on modern technology are deemed less secure, and consumers are unwilling to divulge certain types of data. Based on the interviews, consumers also perceive a risk regarding the excessive automation of technological services that they will stop thinking and carefully considering a situation. Shying away from the unknown is also a general phenomenon: people find the services they already use more attractive.

Figure 7: Consumers' openness towards e-banking
(If all banking services were available on a smartphone...)

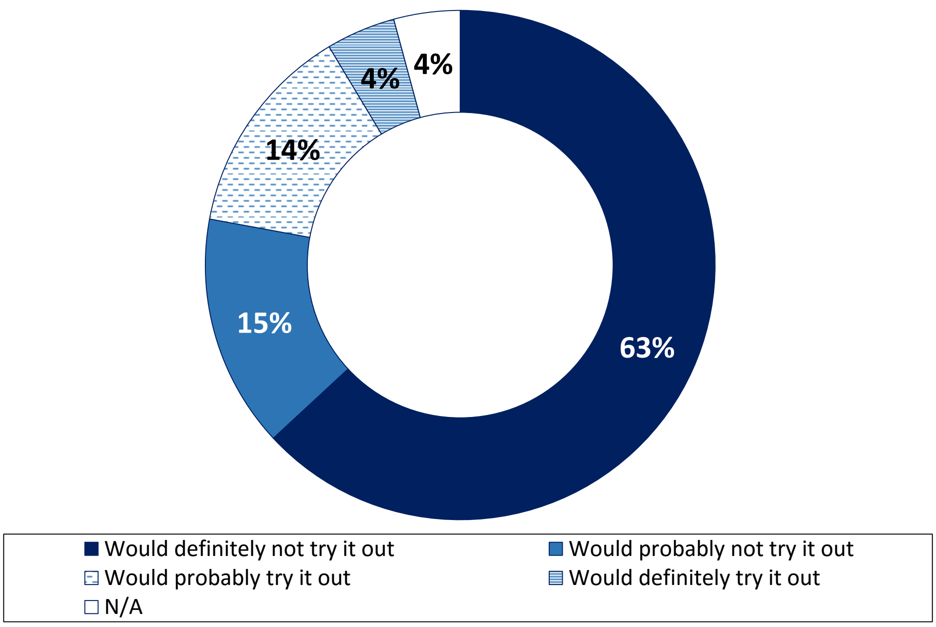


Source: Századvég, MNB

Confidence in banks is an important factor with respect to the expected future of innovations. A mere 15 percent of respondents expect administration in branches to completely disappear in the next 20 years. Based on the focus group interviews, it is clear that the population considers FinTech firms as competitors to banks, but people prefer banks in financial services. Respondents are basically wary of new services, brands and firms. Start-ups are regarded to be unstable, and the history of respondents' own banks as well as the established trust represent a sort of guarantee. According to the surveys, physical access beyond the online sphere and the Hungarian language phone or personal contact are central in shaping the attitude towards innovative services. When using a financial service of greater significance, personal contact for establishing the necessary trust is vital. Moreover, a large part of consumers believe that if they go to a branch, they will receive an answer to their question immediately, i.e. access to information is much easier.

The existence of legal safeguards significantly influences the population's attitude towards financial services. Accordingly, 63 percent of respondents would definitely not try a service that these legal safeguards do not cover, even if it entailed some kind of advantage (Figure 8). Legal safeguards are more important to the older generation, while other demographic features do not influence this. The interviews confirmed the result of the survey: according to the interviewees, certain disruptive technologies, such as marketplace platform lending or crowdfunding, may be able to compete with banks under certain guarantees. As long as the legal safeguards do not exist, the acceptance of these services is determined by the general trust among people.

Figure 8: Consumers' attitude towards financial services without legal safeguards



Source: Századvég, MNB

5.2. Attitude of venture capital firms to FinTech

According to venture capital firms, the small size of the FinTech market and the current regulation do not yet strongly support the inception of new ideas in Hungary. In recent years, several venture capital funds have invested in FinTech firms and they have seen many solutions. The composition of the team in FinTech initiatives is important to the decision-makers in venture capital companies, but there are few experts with strong sales skills, i.e. the IT, financial and sales skills rarely go hand in hand in new FinTech firms. Incubation, i.e. tending to companies, is performed by a 3 to 6-member expert base, and a capital injection of between HUF 20 million and HUF 500 million. Big Data solutions are an interesting facet of innovations, but this is not restricted to the field of finance.[45]

All venture capital funds would find it progressive if an Innovation Hub and a Regulatory Sandbox were set up. They believe that an Innovation Hub would greatly facilitate investment decisions, since the lack of legal and regulatory knowledge is a general problem among start-ups.

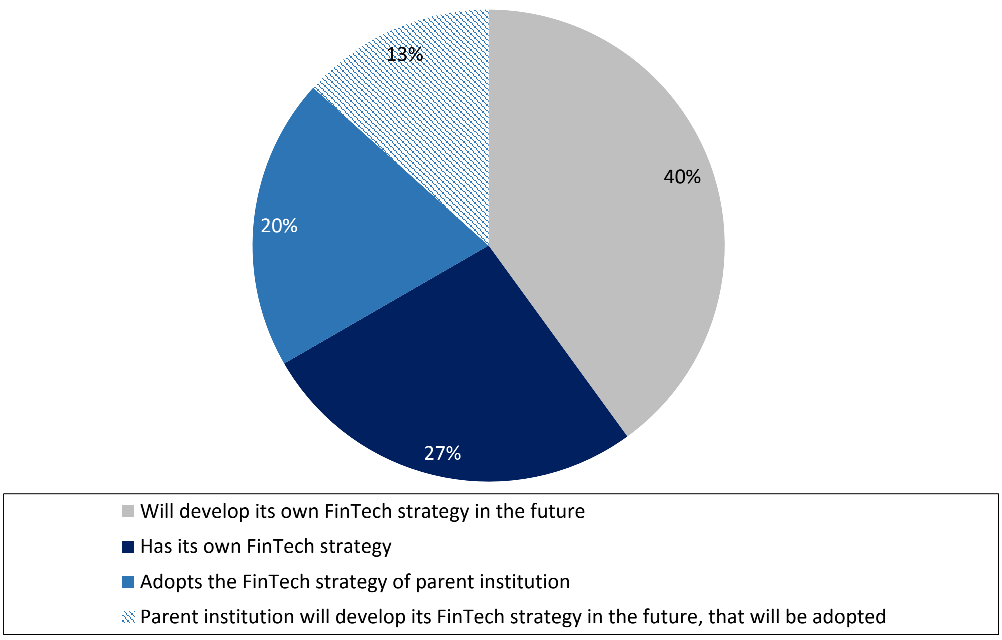
[45] Századvég survey

Newly formed companies could be better prepared for their consultation with venture capital funds after receiving guidance. In addition, the efficient functioning of the Regulatory Sandbox may also improve investment sentiment, since it makes it possible for many start-ups to quickly obtain information on their business model that is useful in the venture capital companies' decisions on the allocation of capital.

5.3. Banking actors' attitude towards FinTech solutions

Over 40 per cent of institutions have a strategy for FinTech innovations, but the other Hungarian actors also plan to develop such a strategy in the future (Figure 9). Several banks are characterised by strong dependence on their parent bank, and therefore their strategy is fundamentally determined by the attitude of their parent bank. Foreign parent banks without a dedicated FinTech strategy plan to develop their own strategy just as the Hungarian actors, and that strategy can be later adopted by the Hungarian subsidiaries. The surveys also showed that institutions that operate as a Hungarian subsidiary of a foreign institution typically have enough leeway within the existing strategy to evaluate and implement the innovations and developments necessary for the bank.

Figure 9: Current situation of banks' strategies regarding FinTech cooperation



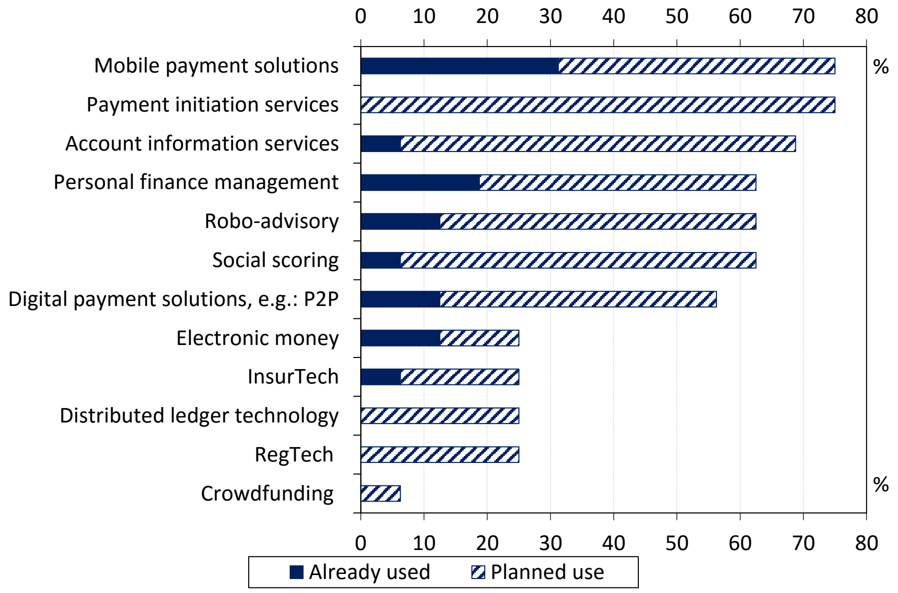
Source: MNB market consultation

Banks believe that they will continue to play a central role in financial intermediation. The overwhelming majority of FinTech firms are in regular contact with banks or have turned to banks since their inception. This is due to the fact that in addition to financial support, banks can also provide assistance through the expertise gained during their operations and can therefore provide help in development in a wider range of fields than venture capital funds. Access to banks' extensive datasets is crucial for newly established FinTech firms in developing operational conditions, and banks have thorough knowledge of the detailed legal requirements pertaining to the industry, which is vital for their functioning. Banks' systemic thinking can probably also provide more accurate guidance on potential operational and financial risks.

Traditional banking system actors mainly foresee partnership solutions with respect to FinTech innovations. Banks' motivation is based on their need to be familiar with efficient solutions and adopt them as soon as possible, and the flexibility observed in the attitude of FinTech firms and their ability to make decisions quickly may facilitate technological progress in the banking system. One major element of cooperation is the provision of a business model which is sustainable over the longer term. Banks consider their own mentoring role with respect to innovations to be important and claim that many FinTech solutions that could be used efficiently in banking operations have a short-term, narrow-minded strategy. Banks believe that cooperation and the development of incubation programmes can facilitate long-term thinking, and as a result of that, innovations can become part of the traditional banking system. For several institutions, the low number of available FinTech solutions in Hungary hinders the utilisation of the opportunities for cooperation, and in some institutions the complexity and lack of flexibility of core systems may limit the complete adoption of a promising FinTech solution.

Currently, few innovative products are integrated into banking operations, but future plans are promising (Figure 10). At present, the focus on digitalisation covers the development of online and mobile banking platforms and thus the range of transactions that can be completed via these channels is continuously expanding. Several banks already use some sort of mobile payment solution, and personal finance management (PFM) is also a popular product. Banks have started preparing for the introduction of PSD2, and the establishment and development of the account information and payment initiation services is under way at most institutions. Based on the whole banking sample, altcoins and crowdfunding seem to have the least perspective, which is mainly due to banks' conservative risk management policy. However, the surveys have shown that if an appropriately defined Hungarian regulatory environment is established, there would be demand for these products as well.

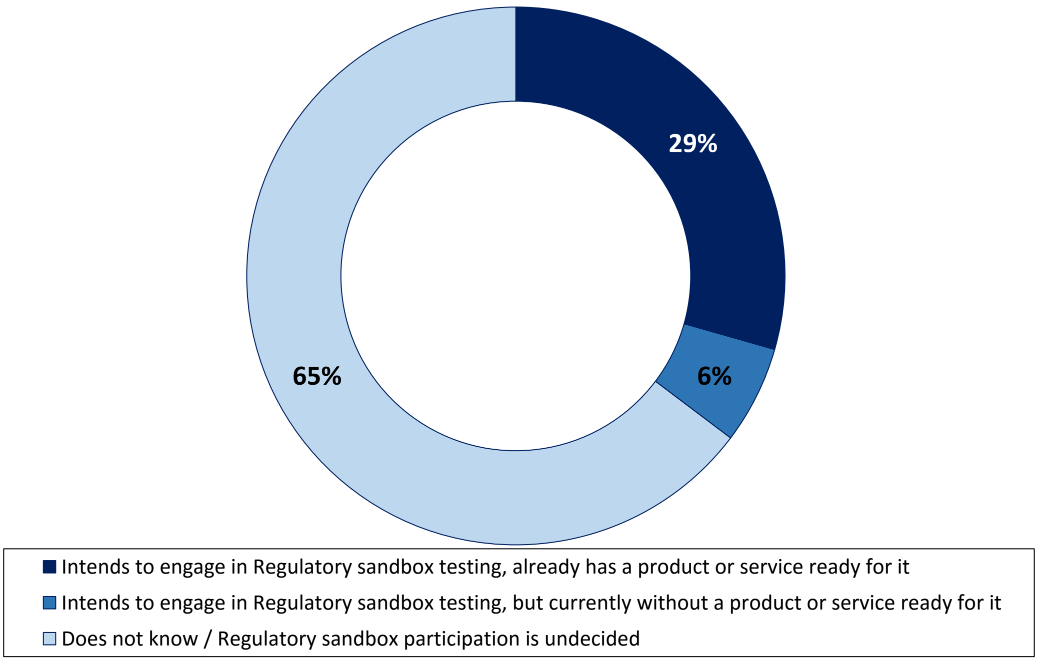
Figure 10: Types of existing and planned FinTech innovations among banks



Source: MNB market consultation

According to the surveys, on the side of banks, there is demand for the establishment of an Innovation Hub and a Regulatory Sandbox. However, some uncertainty also surrounds the Regulatory Sandbox, as 65 percent of the institutions have not decided whether they wish to participate, whereas 29 percent of the respondents would be willing and able to launch a testing phase with an innovative product or service even within a short period of time (Figure 11).

Figure 11: Banks' opinion on setting up a Hungarian Regulatory Sandbox



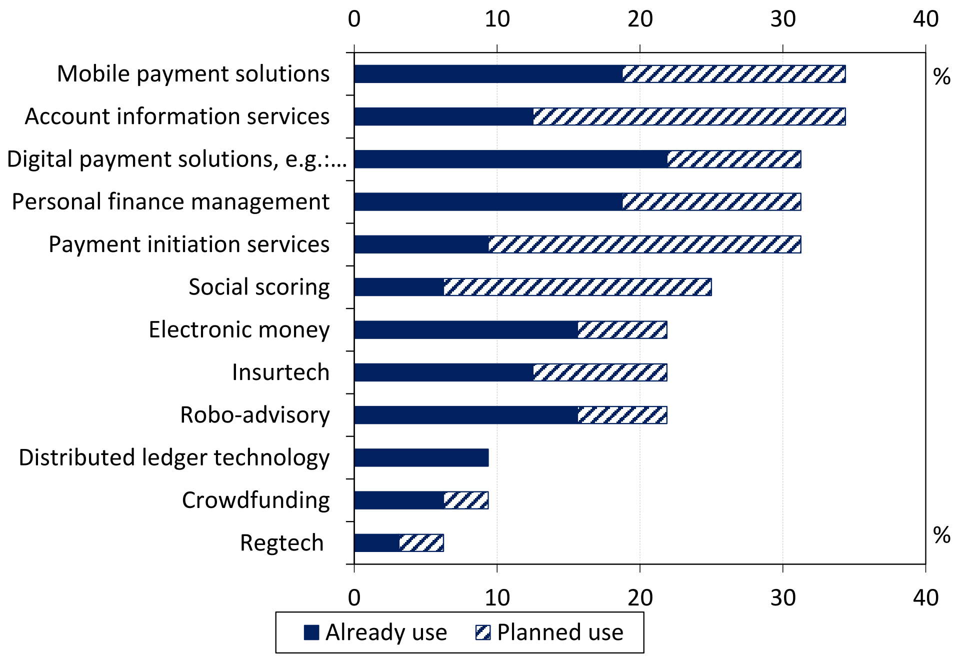
Source: MNB market survey

5.4. Expectations of Hungarian FinTech firms

Most FinTech firms already cooperate with traditional banking actors. FinTech firms typically do not feel rejected by banks. The market consultation confirmed that there are different types of cooperation. Over one-third of the Hungarian companies in the MNB's sample indicated that they are in a partnership with a bank, i.e. they are participating in a bank's incubation programme or acting as suppliers to a bank with an agency agreement. Banks obtain FinTechs' know-how through acquisition fairly rarely. Openness on the part of the FinTech firms will typically continue, as half of the sample plan further cooperation. Complete rejection of cooperation was only indicated by three companies altogether.

In the case of FinTech firms, most existing services are linked to different forms of digital payments (Figure 12). Hungarian businesses are active in several segments, and their activities may affect almost the entire spectrum of the financial sector. The overwhelming majority of developments implemented by the companies so far include various digital payment solutions. Innovations providing online wealth management services (personal finance management – PFM) used for optimising investment strategies are also typical. On account of the growing retail and corporate demand for FinTech solutions, FinTech firms are very open towards further developments. There is also considerable interest in the new services introduced by PSD2. Over 20 percent of the respondents participating in the MNB's market consultation believed that account information and payment initiation services have a perspective. Social scoring solutions based on the digital footprint that assist credit ratings also form an important portion of the planned developments.

Figure 12: Types of existing and planned FinTech innovations among FinTech firms

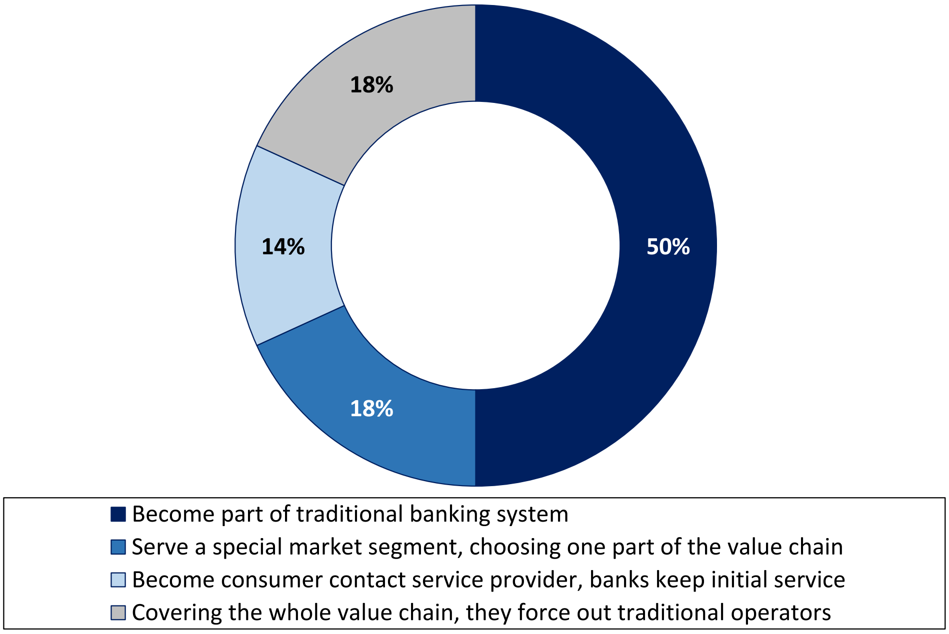


Source: MNB market consultation

Note: The percentage values show the proportion to the whole sample. Multiple answers were possible.

According to one-half of the respondent FinTech firms, they can become part of the banking system in the next five years with their innovations (Figure 13). The direction of FinTech firms' future development is not straightforward, and several paths of development may be taken after their initial dynamic rise. The overwhelming majority of Hungarian FinTech firms believe that they will integrate into the banking system through their innovations. Many also believe that Hungarian FinTech companies can remain specialised actors, serving a special customer base, while continuing to affect only a special element of the value chain. Several businesses deem it likely that they will build up a scope of activities covering the whole value chain together with each other and other companies, crowding out traditional banking actors. In line with these responses, both business-to-business (B2B) and business-to-customer (B2C) solutions are popular among Hungarian actors. The former can exert its beneficial effects through the strengthening of ties to suppliers and the optimisation of operating activities, while the latter can serve the needs of consumers who are open towards the existing and continuously expanding innovation. No respondent to the MNB's market consultation believes that the rise of FinTech firms is only temporary, and that the innovations represented by them will disappear in the next five years.

Figure 13: Future of FinTech innovations in the next five years according to FinTech firms

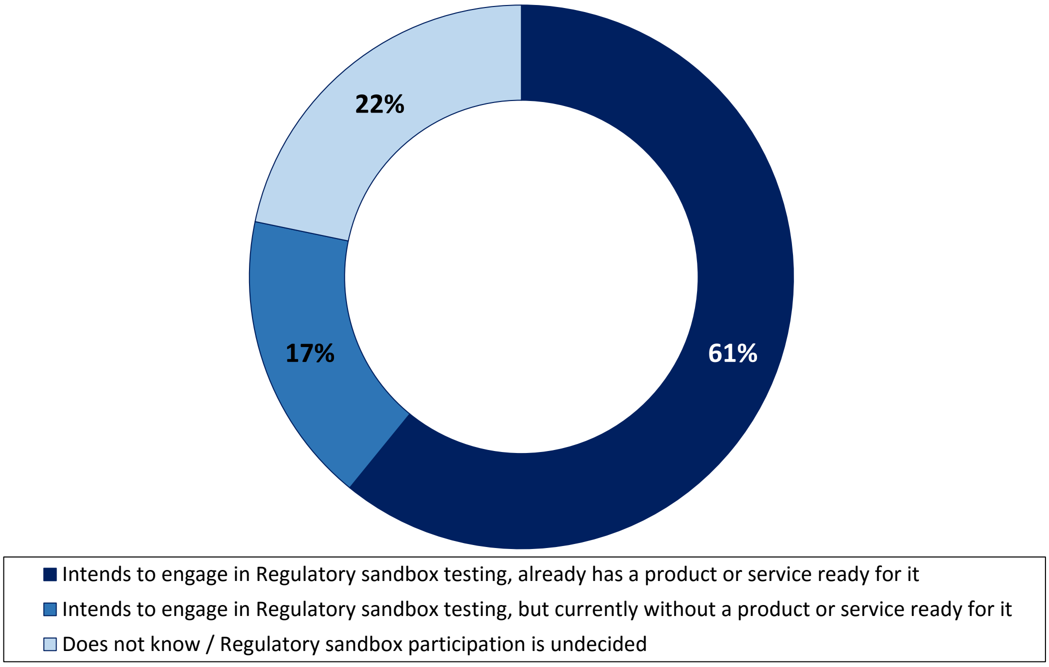


Source: MNB market survey

Note: The percentage values show the proportion to the total number of respondents.

FinTech firms are fundamentally open towards regulatory initiatives to stimulate innovation. According to the result of the consultation, the active involvement of regulators and supervisory authorities is necessary to promote competition or cooperation between various market participants and new entrants. The establishment of an Innovation Hub ensuring a common platform for participating companies and the development of a Regulatory Sandbox framework necessary for testing is supported by the overwhelming majority of respondents, and 61 percent of them already have a product or service ready for testing (Figure 14). They also believe that it is necessary to set up a comprehensive information website where the most important information regarding the licensing of FinTech innovations is available.

Figure 14: FinTech firms' opinion on setting up a Hungarian Regulatory Sandbox



Source: MNB market survey

5.5. Main regulatory constraints indicated by industry players in connection with the spread of FinTech innovations

According to the feedback from market participants, the general regulatory environment cannot be considered supportive. While PSD2 introduces substantial facilitations, a certain part of the Hungarian legislation does not reflect the benefits provided by online solutions. In the opinion of market participants, the "modernisation" of industry laws would be an important step on the road towards establishing an appropriate legal background for the operational framework. Supervised institutions also strongly prefer a level playing field with respect to banking and FinTech actors. Based on the feedback from the market, the main hindering factors in regulation are the following:

- **Online loan contracts:** Based on the feedback from industry players, there is uncertainty in the legal interpretation with respect to online credit and money loan contracts. While the legal barriers to opening an account online have been eliminated, the provisions pertaining to credit and loan contracts without appearing in person entail legal interpretation risks and thus also operational risks due to the current rules of the Credit Institutions Act that are not exact enough.[46] Market participants have also called for

[46] Section 6(1)40 of Act CCXXXVII of 2013 on Credit Institutions and Financial Enterprises defines credit and money loans: commitment of a credit line for the debtor based on the written loan contract between the lender and the debtor, in exchange for a commission, and the lender's commitment if certain contractual terms are met with respect to entering into a loan contract or conducting other lending activities. Nevertheless, Sections 279(1)–(3) of the Credit Institutions Act stipulate special rules, in accordance to which the credit institution may enter into a payment service framework contract or a contract for accepting deposits in an identified electronic manner, and the financial institution and the customer may agree in writing (including in documents containing an at least advanced electronic signature) or in an electronic contract to enter into a

enabling the use of electronic stamps, amending the law on credit provided to consumers with respect to written contracting, the central accessibility of income data to lenders, and the complete electronic management of Land Registry procedures.

- **Online customer identification:** Thanks to the new Money Laundering Act,[47] and the MNB decree containing the detailed rules of online customer identification,[48] customers can be identified by banks online since 20 July 2017. Market participants believe that the regulator should gradually eliminate more and more barriers to banks' digital customer service. The provisions of other industry laws, especially the Credit Institutions Act, should be reviewed, in connection with the applicability of the audited communication devices and issues related to biometric identification methods.
- **Developing the detailed rules of PSD2:** Several key questions are still unanswered in connection with PSD2, and therefore the development of innovative solutions is problematic. In this context, market participants would find it very helpful if the compulsory API[49] set was defined, and if this was accessible in a central, uniform format.[50] Market participants would also find it extremely useful if new customer identification solutions were authorised in addition to the current video-based identification.
- **Barriers to entry linked to licensing:** One major hindrance for FinTech firms is that they have to meet conditions often involving considerable costs in order to obtain their operating licence. This creates a very disadvantageous situation during the initial period after the introduction of the service or product, and therefore it makes the market entry of new players very difficult or even impossible. The main problem is compliance with personal and material conditions, such as the requirements related to the necessary capital or the employees and executive staff. Furthermore, getting to know the workings of the legal environment to be applied to the product or service also makes market entry difficult for companies planning to appear with a new idea.
- **Burdens related to reporting and data management:** Due to the initial costs incurred in connection with the development of the IT infrastructure and the operational costs, compliance with the reporting and data management requirements related to the activity subject to licensing is another barrier to entry.
- **Broader access to existing information sources:** In connection with introducing the innovation to the market, another problem faced by new entrants is that several opportunities to obtain information (e.g. access to CCIS information) are only provided to

contract in specific issues in an identified electronic manner for financial and auxiliary financial services. The contracts concluded in this manner for financial and auxiliary financial services are considered written contracts for the purposes of the Credit Institutions Act.

[47] Act LIII of 2017 on the Prevention and Combating of Money Laundering and Terrorist Financing

[48] MNB Decree 19/2017 (VII. 19.) on the detailed rules concerning the implementation of the Act on the Prevention and Combating of Money Laundering and Terrorist Financing, as applicable to service providers supervised by the MNB, and concerning the minimum requirements for the development and operation of the screening system under the Act on the Implementation of the Financial and Economic Sanctions Imposed by the European Union and the UN Security Council

[49] application programming interface (based on open standards)

[50] On 27 November 2017, the European Commission approved the regulatory technical standards (RTS) on strong customer authentication. The RTS is expected to take effect at the end of March 2018, and the market's self-regulating developments point towards an API access based on a uniform standard (Berlin Group, NextGenPSD2 initiative).

a smaller group of market participants, which renders the testing of many products impossible in the current legal framework.

6. LEGAL PROPOSALS FOR STIMULATING FINTECH INNOVATIONS

Developing the regulatory framework stimulating FinTech innovations may be beneficial from a national economy aspect and also from the perspective of the financial system's competitiveness. Development of the appropriate regulatory responses may entail the positive effects of improving cost effectiveness in the financial sector through FinTech innovations over the longer term, greater stability and the potential increase in the consumer surplus. Overall, the economy's long-term performance and competitiveness may be substantially influenced by how Hungary treats the appearance of FinTech innovations. FinTech investment activity in Europe, especially in the Central and Eastern European region, is low in a global comparison, but this can be significantly improved by the establishment of a conducive regulatory environment. The innovation process may be fostered by the fact that Hungarian IT service providers can offer competitive value from the perspective of the quality and flexibility of execution and pricing.

Based on the MNB's market survey, there is strong demand on the market for the regulatory support for FinTech innovations. There is a group of institutions in the Hungarian market with innovative ideas and an appropriate funding background that exhibit great interest in the establishment of an Innovation Hub and a Regulatory Sandbox in Hungary. Based on the feedback received, in the case of a major portion of the innovative ideas, useful help may be provided by the creation of an Innovation Hub, i.e. a platform that presents the supervisory or regulatory stance through a legal interpretation or a statement, or eliminates the uncertainty surrounding these (see, for example, online loan contracts). However, in the case of some innovative solutions at the idea stage, the efficient assessment of the business model's viability requires a safe testing environment. The Regulatory Sandbox may help the innovators in this, as they could test their FinTech solutions under constraints and for a predetermined period with real users, enjoying temporary exemption from certain regulatory requirements.

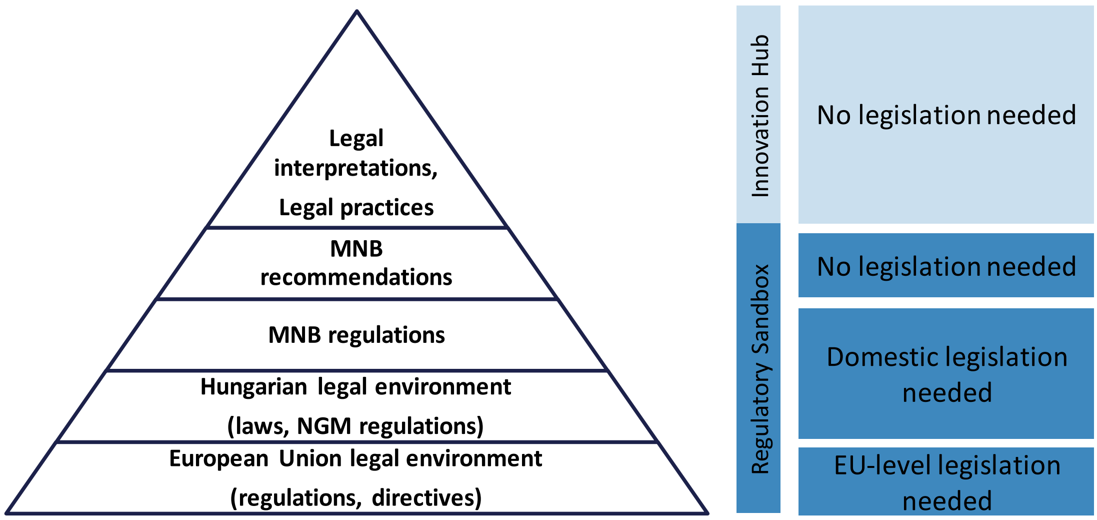
Regulatory support can efficiently stimulate innovative efforts at several levels of the regulatory hierarchy even in the short run (Figure 15). The legal and legal interpretation environment hinder innovation, since they often do not fully adapt to technological innovations. Three closely linked solutions are possible to resolve this issue:

1. Questions regarding legal interpretation and legal practice may be answered within the framework of the Innovation Hub operating in close cooperation between the regulatory authority and market participants. In the case of several market participants, this may stimulate innovation by eliminating the current difficulties in interpretation and providing clear regulatory guidance with respect to certain innovative solutions, while at the same time it may provide an important source of information to the authorities in the Hub for future licensing and developing regulatory directions stimulate innovation.
2. In more complex cases, innovative efforts may be stimulated through a test run in a Regulatory Sandbox by granting temporary exemptions from legal or regulatory

requirements, while, of course, taking into consideration financial stability perspectives. The different levels of the legal hierarchy allow for varying levels of flexibility with respect to potential exemptions; however, based on the feedback from the market, in several cases even exemption from the recommendations amendable directly by the MNB and from the MNB decrees may be enough help to facilitate efficient testing.

3. Certain legal provisions may require amendment to keep abreast of digital progress, and guidance for this may be provided by the general signals from market participants (see Chapter 5), and the experiences from the Innovation Hub and the Regulatory Sandbox. However, in several cases, for example in the case of regulation at the level of law, this solution can only be implemented over the longer run. Moreover, other legal provisions are based on EU-level requirements, and thus no exemption can be granted for some of these within the competence of Member States.

Figure 15: Regulatory environment for FinTech innovations



Source: MNB, authors' work

6.1. Development of an Innovation Hub

The development of an Innovation Hub would enable direct contact between the regulatory or supervisory authority and Hungarian FinTech players. The establishment of such a network would yield several benefits for both market participants and the regulatory authority. In connection with innovative ideas, market participants could use clear guidance and statements to more easily identify the actual legal hurdles that need to be faced in the case of the given innovation. Thanks to the structured, direct flow of information, the feasibility of ideas improves, and several solutions can be implemented in which market participants would not invest resources without explicit support from the regulatory or supervisory authority. From the perspective of the regulatory and supervisory authorities, an Innovation Hub would facilitate an early overview of the technologies inherent in the new products and services, and the more comprehensive examination of highly complex business models. Due to the knowledge gained, the MNB and other regulatory institutions that are planned to take part in the Innovation Hub as well as the voluntary external actors would be informed of the opportunities and potential risks inherent in the FinTech innovations. This would have a positive overall effect on the timely identification of the supervisory and regulatory challenges. Moreover, information exchange in the Innovation Hub may also make the applicants to the Regulatory Sandbox more prepared for testing.

The Innovation Hub may be based on an online platform or, more precisely, communication through that platform, connecting the regulatory authority and market participants. It would have the following major functions:

- **Information repository:** The expectations identified in connection with the provision of the individual financial services (relevant laws, MNB recommendations, other MNB requirements) would be compiled in a well-structured and searchable manner and become publicly available. In order to reduce costs and ease access to information necessary for meeting the eligibility criteria to be presented later, the applicants could access in a structured form the questions already raised in the Innovation Hub, the responses and guidelines related to them.
- **Communication hub:** The Innovation Hub platform could serve as a communication and information sharing interface for the entire FinTech ecosystem (international and Hungarian FinTech firms, banks, insurers, law firms, venture capital funds, etc.), ensuring the free flow of information and supporting the establishment of potential new connections between FinTech stakeholders.
- **Regulatory support platform:** Industry actors could receive guidance and statements in connection with their innovation via the Innovation Hub directly from the regulatory or supervisory authority, and the authorities may even assist them in the licensing process. If in the case of a FinTech solution requesting a statement from the regulators is not the best channel, the inquiring party can be directed towards several other actors, for example towards an innovation lab or an expert providing voluntary help on the topic, depending on the nature of the question (see the communication hub function).
- **International cooperation platform:** Based on international experience, the establishment of a relationship with the regulatory authorities spearheading the facilitation of FinTech innovations may be an important element in stimulating FinTech innovations in Hungary. As a first step, cooperation agreements on information exchange may be warranted. This cooperation may help the competent Hungarian authorities in obtaining direct information on various regulatory practices, experiences linked to existing FinTech innovations and the identified risks. After that, the form of closer cooperation to support the entry of Hungarian FinTech firms to the international market should be considered. The creation of an international network in the region may also foster the efficient management of the risks arising from cross-border services.

According to the preliminary plans, the Innovation Hub's regulatory support function could be used if certain eligibility criteria are met. Those using the platform could access this function after filling out a public template containing several questions.

- **Efficient functioning to support innovation requires that applicants be screened in advance.** The main objective of the regulatory support platform is to offer specific assistance to institutions whose product or service may have a significantly innovative effect, while providing considerable benefits to users and the market as a whole. Moreover, applicants should have a basic knowledge of the main laws and requirements pertaining to the innovation based on their own analysis. Those accessing the platform must show and declare that they meet these preliminary criteria by filling out a standardised online form.
- **The MNB would also set requirements pertaining to content when the regulatory support platform is accessed.** When accessing the regulatory support platform, applicants would briefly present their company, the product in question, its status and the expected schedule of potential introduction, in order to facilitate orientation. Substantiating compliance with the eligibility criteria detailed above is closely linked to the presentation of the related innovation. After applicants present the support received from various earlier platforms and its results, they have the opportunity to detail their special question or problem requiring a complex set of supervisory and regulatory aspects. Naturally, the MNB would treat the information it is provided with during the regulatory support process as a business secret.

Table 4: Preliminary cornerstones of the operation of a Hungarian Innovation Hub

Dimension	Proposal
Preliminary screening of applicants (eligibility criteria)	▪ Significant innovative content[51] ▪ Consumer and investor benefits ▪ Familiarity with the main laws and obligations
Content requirements in connection with using the service	▪ Substantiation of full compliance with the criteria ▪ Identification of the technology used, brief presentation of the innovative idea ▪ Presentation of the current phase of the inquiring party's product or service, and the planned launch date ▪ Information on whether the inquiring party has an operating licence or a registered address in another country ▪ Presentation of whether the inquiring party has already contacted other authorities in connection with its product or service ▪ Detailed presentation of the question or problem

Source: MNB compilation

[51] The definition of the innovative content requires the examination of several dimensions and a case-by-case assessment; however, the requirement of the fintech strategy of the Monetary Authority of Singapore pertaining to tangible benefits to consumers may be a good starting point, just like the criteria of the Intellectual Property Office of Singapore with respect to new solutions.

6.2. Establishment of a Regulatory Sandbox

In addition to mitigating risks, a Regulatory Sandbox would stimulate the spread of FinTech innovations in Hungary. In the Regulatory Sandbox, temporary exemption may be granted from certain legal requirements based on a case-by-case evaluation, thereby ensuring that the business potential and the risks and shortcomings of the existing regulatory environment are assessed appropriately. Of course, when considering the temporary exemption, it should be borne in mind that this should not entail financial stability risks. Two main avenues can be identified in international practice in connection with how the requirements pertaining to testers are reviewed for the test period. The supervisory practices related to supervisory sanctions may be revised, or the legislators may become actively involved so that exemptions based on legal exceptions are available in the Regulatory Sandbox. We believe that the former approach may entail substantial risks from the perspective of overall market discipline and the predictability of FinTech investments. By contrast, the option for temporary exemptions stipulated in law may significantly improve consumer and investor confidence in the Regulatory Sandbox and thus also Hungarian FinTech innovations in general. Nevertheless, it should be emphasised in connection with this approach as well that the evaluation system must be consistent, and the same conditions should apply to the solutions using the same business model in the same test round.

Participation in the Regulatory Sandbox should be offered to both traditional, licensed financial service providers and the new entrants to the field. In most existing frameworks, FinTech firms and incumbent financial institutions can both enjoy the benefits of the Regulatory Sandbox. Licensed financial service providers can participate on their own, but according to our survey, they are less interested than FinTech firms. Supervised and unsupervised institutions can also participate in the Regulatory Sandbox together (partnership) if a licensed bank cooperates with a FinTech firm. In theory, the participants can include independent unsupervised FinTech firms as well, but in their case, testing would only be possible if a so-called temporary licence has been issued, and this is not provided for in the current legal environment.

When determining the entry criteria, the main factor to consider should be the enhancement of the financial system's competitiveness. According to international practice, there are typically no major differences between the entry criteria. The conditions should be defined in as much detail as possible and made verifiable. In the same test period and pertaining to the same service, the conditions should be fundamentally the same to ensure a level playing field. However, the specific conditions in connection with the accepted innovations are prescribed on a case-by-case basis in view of the often completely unique business models and the potentially very different risks. This requires a close cooperation between the tester and the regulatory authority right from the submission of the application. The criteria should not be too strict; however, the use under Hungarian jurisdiction is a crucial requirement with respect to the market entry after successful testing (of course, international expansion and use should not be prohibited). Innovators should be expected to have solutions with a significant innovative content that provide added value to the financial system and the expected consumers. The appropriate preparedness of the applicants is an important requirement, and this can be supported by prior participation in the Innovation Hub.

The preliminary suggested test period in the Regulatory Sandbox is half a year, which may be extended for another half a year. In order to manage risks and provide an opportunity for assessing business potential, restricting the number of acceptable applications in the test period and the acceptance of the applications in testing groups may be warranted, if the number of applicants necessitates this. This also ensures that the testing of the various innovative solutions is spread out over time. With respect to the optimal testing horizon, many Hungarian FinTech firms would consider 1–3 months enough, while most financial institutions proposed half a year, which is consistent with international practices. During a half-year test period, an adequately large user base can be developed, which may even lay the foundation for longer-term operation, and this horizon also provides an opportunity for exploring and managing potential operational anomalies. Furthermore, all Hungarian actors agreed that the optimal horizon may vary depending the nature of the product or service to be tested, and its effect on the course of business, and therefore a case-by-case decision may be warranted in this case, too. In certain instances, an opportunity should be provided for extending the test period for another half a year based on adequately substantiated reasons.

The protection of the users of the innovations under testing is a central element in the Regulatory Sandbox. According to the market survey, both banks and FinTech firms expect users with financial awareness for testing their products, i.e. users who are aware of the risks and are able to manage the potential losses. Therefore, the profile of the users should be limited accordingly, and further safeguards, for example a maximum number of users or transaction size, should be incorporated into the process. The narrower user base involved in the testing phase should be informed thoroughly, and as a part of this the expected risks and the practice to be followed if they occur should be presented in advance. In the case of certain business models, after considering the risks, other safeguards may be necessary, and the potential losses should be covered by the institution testing the FinTech solution. The institutions taking part in the survey believe that the most appropriate instrument for such cases would be a predetermined loss provision.

Table 5: Preliminary cornerstones of the operation of a Hungarian Regulatory Sandbox

Dimension	Proposal
Participants	▪ Supervised institutions (bank, insurer etc.) ▪ Supervised institution and a FinTech firm through a partnership ▪ In the case of a legal amendment (after the introduction of temporary licences): unsupervised institution alone (FinTech start-up)
Participation criteria	▪ Intention to use the innovation under Hungarian jurisdiction (of course, not prohibiting international use) ▪ Significant innovative content[52] ▪ Consumer and investor benefits ▪ Appropriate preparedness for testing
Test period	▪ 6 months ▪ Ensuring an option for extending it if warranted (+ 6 months) ▪ In predetermined test rounds, at the same time for the institutions in the given test round
Protection of service users	▪ Participation of users with financial awareness ▪ Detailed information to users ▪ Limiting the number of customers and the capital that can be invested by them ▪ Loss provision if warranted, maintaining safeguards

Source: MNB compilation

6.3. Suggested schedule for potential regulatory measures

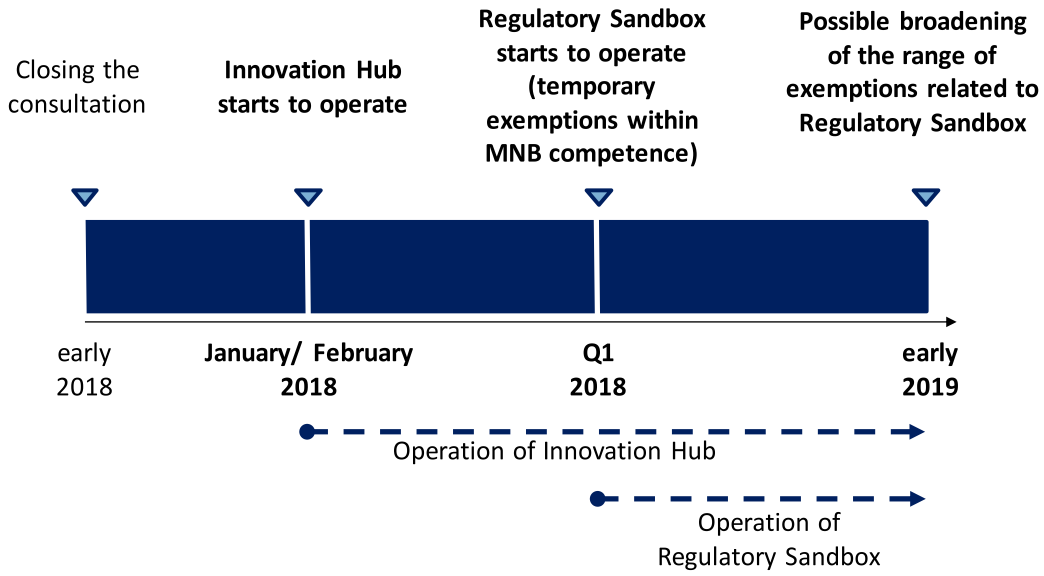
While adjusting legal requirements in accordance with changing market conditions is a continuous regulatory task in connection with FinTech innovations, the establishment of an Innovation Hub and a Regulatory Sandbox framework calls for a concrete schedule, taking into account the time needed to assess the opportunities and create the necessary legal framework. The usual dynamic nature of digital technologies and rapid market development should be taken into account. Accordingly, the MNB considers that the following preliminary schedule is feasible in connection with these regulatory measures (Figure 16):

1. The concept of the framework can be finalised in early 2018.
2. The establishment of the Innovation Hub does not require a legal amendment; therefore, it should be set up as early as possible. After the necessary IT and resource issues are addressed, the Innovation Hub may start operating in January or February 2018.

[52] See the previous footnote

3. The exemptions granted in the Regulatory Sandbox can be applied at multiple levels of the regulatory environment. As a first step, the temporary exemption in the Regulatory Sandbox can occur with respect to the regulatory requirements that can be directly influenced by the MNB. In 2018 Q1, the relevant detailed framework of the Regulatory Sandbox can be developed, and market participants may even start applying to the Regulatory Sandbox.
4. With the involvement of the legislator and based on the experiences gathered in connection with the Innovation Hub and the Regulatory Sandbox, the development of the general legal background can start in 2018 Q2, during which period temporary exemptions could be granted to institutions successfully applying to the Regulatory Sandbox with respect to a broader range of Hungarian laws.

Figure 16: Preliminary schedule of regulatory measures



7. ANNEX: MAJOR FINTECH INNOVATIONS[53]

Big Data: Huge dataset created by digital devices and information systems. Its analysis requires special expertise. It provides a deeper insight into customers' habits, therefore almost all elements of the banking value chain can use it.

Blockchain innovations: The blockchain is a public ledger in which all value changes can be monitored, since transactions are shown chronologically. The blockchain is a public and distributed ledger technology (DLT). The history of transactions is public, and it is stored by computers independent from each other, without a central server. This makes the ledger more transparent and controllable. A ledger distributed among financial actors could simplify and make more efficient syndicated lending, securities settlement systems and even cross-border payments.

Crowdfunding: Crowdfunding is a solution in which several individuals finance start-ups with relatively low capital contribution. It is based on large social networks (*e.g. social media*), which provide ease of access. Crowdfunding may potentially improve entrepreneurship by expanding the group of investors. The most widespread forms of crowdfunding include the donation or gift-based model and the equity model.

Payment solutions: Financial innovations enable the separate management of payment services that had been tied to the banking system, and these services can be significantly cheaper or faster than solutions offered by banks. They include mobile payment solutions and remote remittance systems.

InsurTech: This means the use of technological innovations in insurance, with the aim of increasing savings and efficiency. InsurTech is mainly engaged with solutions, such as completely customised service packages and dynamic pricing, that are facilitated by the use of data from devices connected to the Internet.

Artificial intelligence: Information systems that perform certain activities requiring intelligence more efficiently than the human brain and traditional devices thanks to artificial learning. Big Data plays a role in its training and operation as well.

RegTech: The so-called "regulatory technology" enables supervised institutions to use FinTech solutions to comply with certain regulatory and reporting requirements, making legal compliance more efficient and cheaper.

Robo-advisory: Robo-advisers are digital platforms providing automated, algorithm-driven financial planning services, with minimal human supervision. The process starts with the compilation of the information available about the customers (*financial position and future goals*) and ends with the provision of advice and/or automatic investments based on such data.

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[53] Based on FSB (2017): Financial Stability Implications from FinTech and BCBS (2017): Sound Practices: Implications of fintech developments for banks and bank supervisors

Personal finance management: Enables the management of account data from various banks on one platform. The FinTech service provider collects information directly from the account-serving institution.

Peer-to-peer lending: The essence of peer-to-peer (P2P) platforms is that they connect savers and credit applicants without the involvement of banks for a relatively low fee, thereby reducing the spread between loan and deposit interest rates. Their most important advantage is that they may mitigate the costs of financial intermediation (*e.g. there is no need to build a branch network*).

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