EUROPEAN CENTRAL BANK

EUROSYSTEM

Implications of digitalisation in retail payments for the Eurosystem's catalyst role

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Executive Summary

Technological innovation, regulatory reforms and the increasing digitalisation of people's daily lives have reshaped the European retail payments landscape and are set to continue to do so.

Besides its role as operator of TARGET2, the Eurosystem acts as a catalyst for EU market integration. In this capacity, the Eurosystem has been active in analysing the resulting changes in retail payments, identifying trends, developing policies, collaborating with stakeholders and fostering innovation.

To facilitate continued open collaboration with stakeholders and to drive change in a way that will benefit all EU citizens, it is necessary for the Eurosystem's stance on retail payments to evolve in line with the changing world of digitalisation. This revised stance does not mean a new role for the Eurosystem but rather the adaptation, within the existing mandate, of the current catalyst role.

The basis for this revised stance was the outcome of a fintech survey among EU central banks[1] and the ensuing policy debate within the Eurosystem. The results highlighted a number of general trends underlying the current transformation of retail payments in the European Union. These include a stronger diffusion of technologies used to initiate and process payments, as well as an increasing number of stakeholders involved, including fintech start-ups, competing – but also cooperating – in the payments market. A strong trend towards a "dilution" of payments into overall commercial transactions in the name of a "seamless user experience" was observed.

New business models driven by the use of data analytics, payment account access for third-party providers and the roll-out of real-time credit transfers were identified as factors with the potential to challenge fundamentally the traditional structures and economics of retail payments.

While generally promising to enhance efficiency and user experience, these new developments also pose a number of challenges. New innovative payment solutions might increase complexity and limit choice by restricting consumers to a particular provider's ecosystem. Thus, the emerging dominance of a small number of online platforms warrants further analysis and may become a matter of concern. The payments market, in the light of its extensive network effects, is inherently vulnerable to monopolisation. In the European Union this manifests itself through a dominance of national players in national markets and a dominance of global players in the European market. To avoid fragmentation, new solutions should, where possible, be designed with a pan-European reach in mind, rather than being restricted by having a national focus. Solutions should be able to function on a cross-border level and innovations should adapt to pan-European standards, where possible, to allow potential future growth.

[1] See the Annex for the results of the "Survey on innovative fintech solutions among EU central banks in 2017".

The increased complexity in EU retail payments, stemming from new technologies and players, not only affects market participants but also poses challenges for public authorities and regulators. There is a strong need for enhanced cooperation at the national, regional and global levels. In fact, the diffusion of payments between different stakeholders at the global level might, in the long run, raise questions about the most appropriate governance model for payments solutions that transverse national and supranational borders, and the need for respective regulators to discharge their mandates.

The EU payments market is embarking on a new era, where the pace of technological change poses a challenge to the ability of policymakers to adapt at a similar pace. The Eurosystem needs to reinterpret its framework to facilitate innovation, while keeping the core values and governance of EU payments intact. It is therefore necessary to redefine the Eurosystem's traditional catalyst role in retail payments with the following elements.

- A focus not only on payment instruments but, more generally, on payment solutions, i.e. with a stronger emphasis on the overall context in which payments are made.
- Promoting payment solutions, at the pan-European level, that offer increased "usability", i.e. user-friendly and accessible payment solutions across the European Union, which are clearly identifiable as such.
- Supporting the European Commission in building a legal framework adapted to new technologies and in fostering convergence both between different legal acts and the ways in which regulation is applied by national competent authorities.
- Fostering the development and implementation of harmonised standards and business rules/schemes as a foundation for new solutions, and not as a reaction to them. This will ensure the pan-European reach of the basic functionalities of new payment solutions without stifling innovation.
- Reinforcing collaboration with relevant fora and market players.

This enhanced catalyst stance is in addition to the role the Eurosystem currently plays in overseeing the payment systems for the euro[2]. Although this revised stance may seem to introduce several new areas of work for the Eurosystem, the Eurosystem has already begun adapting its role, complementing the significant ongoing work that is already carried out in the field of EU retail payment innovation and integration. The Eurosystem has played a key role in the realisation of SEPA and subsequent migration for credit transfers and direct debits, the continuing harmonisation in the area of card payments and, more recently, towards the creation and ongoing roll-out of Instant Payments, as well as the deployment of payment initiation services. This work has led to significant innovation in EU retail payments and will continue with the revised focus as outlined in this note.

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[2] The Eurosystem's oversight mandate covers payment systems (systemically important payment systems and non-systemically important payment systems), securities settlement systems and central counterparties, payment instruments, as well as other infrastructures and service providers. A description is given on the ECB's website.

1 Introduction

During the last two decades substantial changes have occurred in the ways consumers and businesses pay for goods and services. These changes have been largely driven by the rapid increase in e-commerce, with new payment solutions being developed to facilitate online payments. More recently, the prevalence of smartphones and mobile internet has led to the development and provision of new innovative payment solutions, also for traditional payment situations, e.g. at the point of sale (POS). These new offerings are, in some cases, provided by incumbent players in the financial industry, but also by new players with a stronger background in innovative technology. The situation is still evolving, with the implementation of new EU legislation to allow third-party access to the payment account, real-time payments and further technical innovations, such as distributed ledger technology (DLT) and artificial intelligence (AI).

Many innovations have simply targeted access channels and access devices while leaving the overall architecture of the payments industry unchanged. However, new technology and the digitalisation of the economy in general, as well as the move towards “instant” in the retail payments market and the emergence of new players, might lead to substantial changes in the payments industry in terms of services, business models and structural change. For example, the development of application programming interfaces (APIs) could lead to “open banking” and a complete restructuring of the value chain. New big-data business models may fundamentally challenge the traditional economics of payments.

This report outlines the current main trends in payment innovation and details the main challenges for stakeholders resulting from these trends. The report concludes by expanding on how the Eurosystem will adapt its current catalyst mandate in the field of retail payments in the light of the aforementioned additional elements.

2 New trends in the retail payments market

To obtain a more comprehensive overview of innovations in EU retail payments, the Eurosystem conducted a survey on a best effort basis among its members. In addition, the analysis was enriched by reviewing existing literature on the topic. While the Annex to this report sets out a detailed analysis, the following section outlines the major trends that can currently be observed in the EU retail payments market. In general, a major transformation rooted in the current surge in global digitalisation, along with the development of internet-based technologies and multi-functional technological devices, is to be expected. This general movement towards digitalisation has large-scale effects on the economy and, more generally, on society, but also has specific consequences for payments, which the trends described below outline.

2.1 Diffusion (technology)

Current internet-based technologies and multi-functional technological devices have deeply changed the way payments are made. These changes materialise at three levels (front-end devices, initiation channels and back-end architecture).

1. Front-end devices: while paper and card-based instruments were the only alternatives for making payments a few years ago, payers and payees now have a vast array of devices at their disposal, from personal computers to smartphones, tablets to wearables (wristbands, rings, etc.).

2. Initiation channels: payment orders can now be initiated in a number of ways, ranging from traditional POS chip and PIN card payments to remote internet payments (through online banking spaces or mobile apps) and contactless payment through near field communication (NFC) or QR code scanning.

3. Back-end payment architecture: current and emerging technologies might reshape the overall payments architecture, whether:

    - at the Payment Service Provider (PSP) and merchant levels with the development of APIs, in the context of the revised EU payment services directive (PSD2)[3], which may help to centralise some payment instruments and services;

    - at the global level, where new technologies and processes (e.g. DLT, AI, and cloud computing) may replace or streamline the current back-end architecture for payments (i.e. core banking payment systems, clearing and settlement mechanisms, etc.).

[3] https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en

2.2 Diffusion (stakeholders)

Providers of internet-based services and technologies, as well as large retailers, have now become involved in the retail payments market and now compete – but also cooperate – with traditional players, such as banks and payment card schemes. Technology providers and retailers are developing new universal payment solutions or closed-loop proprietary solutions based on a "platform ecosystem". At the EU level, PSD2 harmonises the provision of payment services by new PSPs (payment initiation services providers and account information services providers) that will also compete with incumbents in the payments market. Several identified categories of stakeholders (start-ups, internet and telco companies, banks and card schemes) now compete within the same market segments (especially in person-to-person (P2P), physical POS and e-commerce payments).

2.3 Dilution

Payment, especially in e-commerce, is often seen by retailers as a burdensome step that may be a barrier to business. In this respect, the payment transaction is becoming increasingly "dissolved" in the overall commercial transaction to streamline the customer's experience. This makes payment less visible for the payer ("one click" process, based on predefined settings) and results in "seamless payments". Moreover, the emergence of the "internet of things" (IoT) creates new use cases, where payment takes place unnoticeably in a general automated process. However, it is not certain whether these changes will eventually affect the underlying payment instrument or infrastructure.

2.4 Structural changes

Current developments in the retail payments market are also having a profound impact on the different stakeholders' business models. In this respect, three main market dynamics can be identified.

1. Costlessness: payments increasingly tend to be provided free of charge to the consumer. This is mainly linked to the emergence of new providers, whose core business is not payments but the collection of information on payments, which is used to offer revenue-generating alternative services[4]. Thus, in several business models, consumer payment services are not priced in nominal currency but by consumers "paying with their data". This entails a major shift in the business model of the retail payments market, as payments become a weaker source of

[4] This covers two main categories of player:
- platforms, which offer their customers fully fledged solutions (e.g. market places or social interaction platforms). To deter users from switching to another (platform) service, payments for goods or services can be directly initiated via the platform. Even if platforms rely strongly on information about their users, payment data is only a fraction of the available information.
- Companies that specialise in payment data, either by offering payment services themselves or by buying payment data from other providers (e.g. from platforms). Data are then aggregated and sold for advertising, etc.

direct revenue for PSPs and are now part – and in some case the basis – of the value chain of a larger chain. This challenges traditional fee-based business models and makes it harder for PSPs to levy fees from cost-sensitive consumers. However, the robustness of this phenomenon (i.e. costless payments as a long-term trend as opposed to a short-term commercial trigger for newcomers to reach critical mass) is yet to be assessed.

2. Banking-as-a-service: the fact that new stakeholders tend to focus on the provision of value-added services and not on the traditional payment account business may create new ways for incumbents to monetise this traditional "back-end" activity. This could be through the development of a "banking-as-a-service" (BaaS) layer, which in the European Union would be based on the access to the account provided by PSD2. In such an ecosystem, new stakeholders would be able to plug seamlessly into the existing banking infrastructure without having to replicate it, which would entail a new allocation of costs and benefits between the different players.

3. Credit transfer as a competitor to card payments: the emergence and uptake of real-time credit transfers in many jurisdictions make it, in principle, feasible for consumers and merchants to use this payment instrument as an alternative to other payment instruments, especially card payments. If real-time credit transfers were, in certain payment situations, to fully replace card payments, it could potentially have a huge impact on the existing business models of PSPs, whose revenues are often largely based on card payment transactions. Moreover, in the specific context of PSD2, the emergence of payment initiation services providers could have a major impact on the card payments market (i.e. disintermediate existing players such as acquiring providers) and on the revenues it generates.

2.5 Instantaneity and continuity

In order to meet the demands of some retailers and customers who wish to be able to reuse funds they receive as soon as possible, "real-time" is expected to become the standard for payments. The importance of instantaneity is usually coupled with the need for full availability of payments 24/7/365.

2.6 Globalisation of payments

The global development of internet-based retailers operating worldwide has spurred the emergence of transnational e-commerce. Payment solutions and service providers now aim to deliver the same level of service irrespective of the payer's and the payee's location, albeit with the obligation to comply with a number of different national or regional regulatory frameworks. In this context, cross-border payments tend to become a key prerequisite both for global merchants and consumers.

3 New challenges

The different trends mentioned above bring a new complexity to the retail payments market. This new complexity affects all stakeholders, with different consequences, and raises a series of challenges that need to be addressed.

3.1 Transition and coexistence

The transition from current to new technologies will most probably be gradual and entail the coexistence of legacy and new systems, technologies and services. The interactions between these systems and the potential risks on safety and efficiency might become paramount in the coming years, for PSPs and merchants alike.

3.2 User experience and digital inclusion

As the payment transaction per se becomes more entangled in a wider process, the customer payment experience may be affected in two main ways.

1. As new market players offer several different payment solutions, users now have a growing number of payment applications that may give rise to difficulties (such as fragmentation due to, for example, the limited reach and functionalities[5] of apps, resulting in users switching between apps depending on the situation) and alter user experience. Such difficulties might therefore deter some parties, whether individual consumers or merchants, from using new payment solutions owing to higher costs, perceived complexity, supposed lack of digital skills, poor internet access, disabilities, etc.

2. As it is becoming more difficult for users to distinguish a payment from the surrounding services, incidents occurring in those related services may downgrade the perception of the payment process.

3.3 Regulation

The current trends generate several high-level legal issues.

1. The adaptation of regulation to new players, technologies and processes: diffusion – both in terms of technologies and stakeholders – and dilution of the payment into a longer chain of value-added services might make the application

[5] For example, the fact that users may need to have several apps on their phone, depending on the choices made by merchants for making payments (specific solution, in-house app, etc.), which could lead to an “app overload” for users.

of the usual legal concepts (consent, liabilities, etc.) more difficult, and the adaptation of these concepts as they relate to payments may be necessary.

2. The effects of regulation on market structures need to be considered: regulation may not only generally affect the acceptance of new technologies, but regulatory requirements, such as strong customer authentication and the associated exemptions (e.g. white-listing and transaction-risk analyses), may affect some PSPs more than others, thus influencing market structures.

3. Interaction between regulators: the fact that payments now involve new players from a number of fields (internet, telco, etc.) and at different levels (local, national and global) makes interaction between different regulators, whether at the national or international levels, a key issue. It also highlights the need for convergence in terms of legislation, e.g. to balance security and competition aspects, and for better collaboration between the different players.

4. Data protection: in a general context where payments are increasingly less visible, disseminated between global stakeholders, and where users' personal data is a growing source of revenue for market players, data protection – with a special focus on data privacy – is to become a pivotal issue for regulation.

3.4 Public authorities adapting to new challenges

As current trends are reshaping the retail payments market, public authorities would need to consider how to adapt to these developments in the following three main ways.

1. Analytics: new complexity in payments makes traditional payment categories[6] used by public authorities, for analysis, less effective. New players tend to build cross-channel and cross-instrument solutions, or even solutions based on still-to-be categorised underlying technologies such as blockchain and crypto-assets. Public authorities need to capture this new payment activity by reassessing their current analytics and adapting where necessary.

2. Market representation: as the retail payments market is now greatly influenced by new, non-traditional players, the representation of retail payments market stakeholders in public fora may need to be adapted so that these fora remain relevant.

3. Skill and resources: public authorities need to ensure that they are capable of dealing with the developments in the retail payments market. To do so, adequate resources are crucial, quantitatively and qualitatively, for example through enhancing the technology skills at their disposal.

[6] i.e. POS/remote, internet/mobile, but also payment instruments such as cards, credit transfers, direct debits, etc.

3.5 Influence

As payments become increasingly disseminated between different stakeholders at the global level, national and regional public authorities might not, in the long run, be able to fully supervise, oversee or regulate providers that operate remotely in their jurisdictions. They may find themselves in situations of dependency that challenge their mandate and/or sovereignty. In the future, public authorities may face more situations where they have to find a new balance between competition, efficiency and control over critical stakeholders.

3.6 Competition issues

In general, the legal and regulatory framework needs to strike a proper balance to ensure safe and sound service provision, while not stifling innovation. With its extensive network effects via “platformification” and first-mover advantages, the structure of the payments market is vulnerable to monopolisation, with large technology companies offering innovative payment solutions, exploiting the market power generated in their primary domain of business. It has to be ensured that the open and competitive framework in the EU payments market will allow pan-European players and solutions to thrive and does not unduly favour large, global companies with wide networks.

4 Implications for the Eurosystem's catalyst role

The Eurosystem aims to promote safety and efficiency in the field of payments, which allows the smooth transmission of monetary policy across the euro area. This mandate is enshrined in Article 127 of the Treaty on the functioning of the European Union, which defines the promotion of the "smooth operation of payment systems" as one of the basic tasks of the European System of Central Banks (ESCB[7]). In fulfilling this task, the Eurosystem acts, among other things, as a catalyst for change, promoting efficiency in payment systems and in the field of retail payments.

The activities in the context of the catalyst role now need to be enhanced so that market developments relating to digitalisation can be properly addressed. In this respect, several new aspects brought about by the developments in the retail payments sector need to be considered so the Eurosystem, in the future, can effectively carry out its catalyst role.

4.1 Refined approach – focus to include electronic payment solutions

The Eurosystem will not only target payment instruments but, more generally, payment solutions, i.e. mono or multi-instrument ecosystems. Developments beyond the payment per se, particularly in the area of pre- and post-transactional services[8], as well as general trends in technology, will be analysed in terms of the implications these factors may have on payments. This new analysis acknowledges the fact that payments are now ever more dependent on an overall ecosystem of value-added services. Moreover, this approach will be complemented by an analytical framework with a stronger emphasis on business segments (P2P, B2B, C2B and B2C), as opposed to payment instruments (e.g. cards) or traditional payments (remote payments and POS payments).

In this context, the Eurosystem has already analysed the comprehensive payment offerings of some of the technology giants, while the Euro Retail Payments Board

7 The Treaty on the functioning of the European Union refers to the ESCB rather than to the Eurosystem, since it was drawn up on the premise that all EU Member States would eventually adopt the euro. For Member States that have not yet adopted the euro (through derogation or opt-out), certain Treaty provisions referring to the ESCB are not applicable, which means that the general Treaty reference to the ESCB in practice refers mainly to the Eurosystem.

8 Such services would encompass (indicative list): identification of the parties, management of already registered payment data, choice of payment instruments, electronic invoicing, ex-ante compliance process, etc. for pre-transaction services. Notification to parties, reconciliation, electronic receipt, management of complaints/cancellations/returns, related commercial offers, ex-post compliance processes, delivery, etc. for post-transaction services.

(ERPB)[9] has been active in these areas, providing recommendations on mobile P2P payments and e-invoicing.

4.2 Promoting usability for payment solutions

The Eurosystem will encourage market players to build usable payment solutions. In this context the term “usability” has different meanings. First, “usability” means “visibility”, in the sense that the Eurosystem will support, as much as possible, payment solutions that are clearly identifiable by users, especially in the current context of growing complexity. Second, it refers to the fact that the Eurosystem will support, where relevant, the development of “user-friendly and accessible” payment solutions. Third, the Eurosystem will, in its analysis, take into account the overall market dynamics of payment solutions in terms of their impact on users, the payments market and, more generally, society as a whole.

4.3 Supporting current and future regulation on payments

While the legal and regulatory framework continues to evolve, new technologies may challenge existing regulations. The Eurosystem supports the European Commission in building a legal framework adapted to the new technologies. The Eurosystem also supports the European Commission in fostering convergence between different legal acts and their application by the national competent authorities. Furthermore, the Eurosystem may continue to deliver opinions on draft national and Union legal acts within its competence, and may even consider using its regulatory powers to facilitate pan-European innovation and to prevent fragmentation.

4.4 Fostering the emergence of pan-European solutions

As was the case for the creation and implementation of SEPA payment instruments, the role of the Eurosystem will be to push for the development and implementation of harmonised standards and business rules/schemes that ensure a pan-European reach for the basic functionalities of new payment solutions. The fintech survey has shown that many innovative solutions provided by start-up companies start at the national level. Nevertheless, for these new solutions to succeed, they should, where possible, be designed with a pan-European reach in mind, rather than being restricted in their growth by having a national focus. Solutions should therefore be able to function on a cross-border level and innovations should adapt to pan-European standards, where possible, to allow potential future growth. The Eurosystem is of the view that pan-European solutions are needed in view of competitive offers from global players.

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9 The ERPB is an ECB-chaired body that brings the supply and demand sides of the payments market together at the executive level with the objective of contributing to and facilitating the further development of an integrated, innovative and competitive market for euro retail payments in the European Union.

4.5 Collaborating with other relevant fora and players

In line with the high-level objectives mentioned above, the Eurosystem will reinforce collaboration with relevant fora on payments issues. The Eurosystem will also regularly collect input from market players other than the traditional players in the payments market, i.e. retailers, large technology companies, internet providers and telcos. The Eurosystem has already had, for example, two meetings of the Eurosystem e-commerce payments forum with the aim of bringing together relevant stakeholders to discuss opportunities for, and barriers to, a pan-European e-commerce payments market. This type of collaboration will continue and will be enhanced.

Annex: Detailed analysis of innovation in EU retail payments

A. Methodological approach and results of fact finding

In order to arrive at a sound basis for analysis, in 2017 the ESCB surveyed its constituent central banks on innovative fintech solutions. The survey was updated and enhanced in 2018. This analysis classifies fintech as technology-enabled innovation in financial services and focuses on fintech solutions related to retail payments. This means that a functional rather than an institutional approach is used to classify fintechs. Fintech solutions therefore do not necessarily have to be provided by start-ups, but can also be offered by banks, telcos, card schemes and other providers.

To categorise existing solutions, five general categories were predefined: P2P payments, POS payments, e-commerce payments, cross-currency payments and other services. With respect to their institutional background, the fintech solutions were assigned to one of the following categories: start-ups; big Internet[10] or telco companies and international payment providers; card schemes; banks or banking associations; and others. While a fintech solution cannot be assigned to more than one of the institutional background categories, it may offer multiple services[11] and therefore can be represented in more than one of the service categories.

In addition to these categories, information on the business model, business segment, underlying technology, underlying payment instrument and classification according to the PSD or other regulation related to payment services was collected. This allows greater insight into the market in terms of different criteria.

This survey was conducted on a best effort basis, with the challenge of assessing the actual market impact of individual fintech solutions due to a lack of turnover data, especially for start-ups, as well as the fact that some solutions are in an early stage of their expected life cycle. Moreover, assessments sometimes had to be based on limited information. Therefore, the survey does not claim to be complete or exhaustive.

a) General observations

The following analysis shows that most innovations target the front-end of the payment value chain.[12] In particular, many innovations concern the access channels and access devices, e.g. by implementing mobile device-based solutions linked to established payment schemes, leaving the back-end of the payment value chain unaffected. For instance, many upcoming innovative solutions are mobile app-based,

10 See González-Páramo (2017), p. 12.
11 See IMF (2017), p. 12.
12 For a stylised overview of the payment process, see “Report on Innovations in retail payments”, Committee on Payment and Settlement Systems (CPMI), 2012.

replacing desktop computers as the main access devices. While the proliferation of multifunctional smartphones and app-based programming open up opportunities for new solutions and services, accelerating the speed of innovation, typically they still rely on the traditional payment "railways" of credit transfers, direct debits and card payments.

b) Institutional perspective

Altogether, almost half (45%) of reported fintech solutions are offered by start-up companies. Not surprisingly, banks and banking associations account for roughly one-third of reported fintech solutions, while the remainder is allocated to the other groups.

In the field of P2P, physical POS and e-commerce start-up companies are operating at the same level as incumbent players. They offer more than 40% of the aforementioned innovative fintech solutions. Banks and banking associations follow closely behind. Remarkably, start-ups have a significant share in the field of innovative cross-currency solutions. As the current correspondent banking model is widely perceived as profitable and constitutes a relatively high market barrier, current players may have little incentive to devise new fintech solutions in this field in the absence of competitive pressure. Therefore, in this domain we can identify fintech start-ups as real competitors to banks.

Most solutions are offered nationally.[13] However, the updated survey findings suggest that some start-up solutions are beginning to expand into other markets. Pan-European interoperability may become an issue if solutions expand into or are used in other jurisdictions. Of the offerings available, it is worth mentioning that large internet companies and telcos are active in most market segments and cover broad geographical areas.

c) Analysis of service categories

The reported solutions mainly targeted the areas of P2P payments (32%), POS (25%) and e-commerce (25%). The remaining 18% were attributed to cross-currency services or other services.

P2P payments: The ubiquity of smartphones in conjunction with the increasing availability of different apps has considerably increased the significance of mobile devices in users' daily lives, granting them more choice and greater convenience. As a result, a large number of P2P solutions offered by banks, start-ups and large technology companies have emerged. These solutions mainly address national markets in non-interoperable systems. By processing the transactions in their own systems (e.g. in the case of e-money issuers), these solutions are often perceived as providing real-time payments. This perceived instantaneousness comes at the cost of

[13] See Basel Committee on Banking Supervision (2017).

non-interoperability between these closed-loop solutions. The availability of P2P payment solutions generally varies, in terms of functionality and the ultimate availability of funds, between EU countries. Fintech start-ups tend to offer these solutions free of explicit charges. Revenues are often not generated via payment fees but rather by the use of data that such providers gather in the provision of their services. Furthermore, services are mostly provided on a 24/7 availability level, which is especially important in P2P payments, where cash as the major alternative can be used around the clock without perceivable cost.

POS payments: The emergence of proximity technologies in mobile phones and other wearables has radically changed the way payments can be initiated and accepted at the physical POS. Thus new market entrants are able to compete with incumbent providers.[14] Banks and banking associations are the leading providers of POS solutions, although there are several start-up companies in the sector as well. Both seem to address mainly national markets. However, some new offerings for payment acceptance are available in more than one country.[15] Second, internet and mobile network operators (MNOs), fewer in number but with a broader geographical scope and larger customer base, seem to be focusing on mobile wallets in combination with NFC technology. To offer these services, some of them collaborate with banks or card schemes. Some solutions, such as GooglePay or Apple Pay, are currently active in approximately five EU markets, with further expansion planned. PayPal has, to date, enabled NFC payments only in the United Kingdom, but has announced plans to extend this service to other countries. For the time being, the main instrument underlying POS payments is the payment card or, in some cases, e-money. International card schemes have supported the innovation of physical POS solutions by enabling contactless technology on the card issuance and acquiring side.

E-commerce payment solutions: In the European Union, e-commerce continues to grow.[16] This growth attracts new and old players alike, which is reflected in the results of the survey. A high and increasing number of non-traditional PSPs (start-ups) have entered the e-commerce market. These mostly rely on traditional payment schemes, such as SEPA Direct Debit (SDD) or credit cards. There are a number of internet or telco companies offering payment solutions in the European Union, most of which cover a large part of the EU payments market. With the exception of Facebook, all of the four major internet companies offer at least some form of online C2B payments.

The traditionally international focus of large international card schemes makes it relatively easy for them to cover multiple markets. Online credit card payments are common across the European Union, sometimes without the need for a dedicated solution. Such solutions, provided by international card schemes are the only solutions operating in multiple markets. Owing to their lack of interoperability, national card schemes are currently not able to provide solutions on a cross-border basis. Although

14 See, for example, FSB (2017).
15 This might be due to the economies of scale that are necessary to produce the hardware for these solutions efficiently.
16 €407.4 billion in 2015 (a 13.4% increase on 2014), according to Ecommerce Europe (2016). Data cover B2C transactions on goods and services in the EU28.

banks have been active in most markets, there is still no visible pan-European approach.

Cross-currency payments: Cross-border trade and other cross-border transactions (such as remittances) are growing rapidly as a consequence of increased globalisation. Cross-currency payments are intrinsically inefficient because there is no single ubiquitous global payment system. Infrastructures are therefore often not able to transfer data between each other seamlessly, even when common global standards exist. This leads to an inefficient process with increased costs[17] and processing time. In the light of these challenges new fintech players, providing cross-currency payment services at competitive prices, have emerged in the European Union. These players are usually licensed as electronic money institutions and act in direct competition to the correspondent banks. Owing to these services being used by increasing numbers of people, scale effects may result in further enhanced affordability and usability. The main solutions are based on closed-loop services, which effectively eliminate the cross-currency aspect within the system and rely on the domestic clearing and settlement infrastructure. This approach requires service providers to have a payment account in all the jurisdictions they wish to operate in, which may limit reachability and increase complexity, risk and operational cost. Possibly on account of the profitability of existing correspondent banking arrangements, there seems to be little incentive for banks to offer their own innovative cross-currency arrangements. Only a few cross-currency solutions were reported to be offered by banks.

Other services: The trend towards digital business processes has given rise to the emergence of complementary solutions that aim to support the digitalisation of the relevant steps before and after the actual payment process. These services are offered mainly by banks and start-up companies, with PayPal being the only BigTech offering auxiliary services to its customers. The most important fintech solutions reported are related to e-identification/authentication and e-signatures/authorisation. In this field, start-ups, incumbent PSPs and governments have individually or in cooperation developed solutions that facilitate the online acquisition of new payment service users (PSU) (e.g. video chat-based identification), enabling them to engage conveniently and securely in digital business interactions. For PSPs, this means that PSUs can authenticate themselves (even in some cases to a third party), sign documents and authorise payments remotely. Other complementary solutions use a PSU's personal data to enable services such as account information aggregation and financial planning. In addition to the above, a variety of further solutions were reported, including optical character recognition tools to process paper-based documents, such as invoices, and electronic bill presentment services. Many of the start-ups providing value-added services offer their services directly to, or in cooperation with, incumbent PSPs rather than in competition with them.

Multi-channel services: In line with the general preference of customers for using the same payment solution in different payment situations (i.e. multi-channel use), some providers offer solutions for multiple channels. P2P, POS and e-commerce solutions

[17] In the area of remittances, for example, the transaction costs for sending $200 are, on average, 7.4% globally, according to the World Bank (2016).

are the most noticeable clusters. Altogether, more than 11% of all 232 reported solutions can be used for all of the most common every day transactions: P2P, POS and e-commerce. However, only a very limited number of providers offer these services in multiple EU countries. Even more solutions – 26% of them – can be used for e-commerce payments and P2P or POS transactions. Most of these cross-channel services are offered by banks and start-up companies, but internet, telco and international companies also seem to be interested in offering services that cover different channels. Card companies mostly provide solutions that can be used for both POS and e-commerce payments.

It is not clear from the data if fintech companies provide these various solutions directly to their customers or whether they provide them via platforms.[18] Some new banks – sometimes referred to as "fintech banks" or "neo banks", with business models rigorously adapted to the digital age (e.g. no physical branches) – have already started to offer online platforms to their customers, where they can use the services (such as securities trading or cross-currency transactions) of other (external) financial service providers. However, this idea is not as new as it seems. In the past, banks offered products from related insurance or trading companies. That said, with API[19] banking[20] this idea was moved forward into the online-only banking platform.

B. Potential driving factors for future developments

Having analysed the current market for payment solutions, this section discusses presumably fundamental and perhaps disruptive changes that might take place within the next few years.

a) Customer security impacts of PSD2

Among the developments that will severely impact the market for payment services, the PSD2 stands out as the most prominent. The new security requirements included in the text of the PSD2 and the European Banking Authority's Regulatory Technical Standards (e.g. strong customer authentication (SCA)) will oblige all PSPs to step up security around (online) payments. It has to be seen what effects the increased security requirements will have on fintech solutions in the market, especially at the POS, where speed is of the essence. One possible outcome could be an increase in SCA-specialised fintech solutions (i.e. offering authentication services, e.g. based on biometry or big data).

18 For more information on platforms in payments, see Section B.
19 For more information on APIs, see Section B.
20 N26 is currently the main start-up to offer API banking services.

b) API and open banking as a possible key to reducing market-entry barriers

Another clear objective of PSD2 is to allow the co-existence of third-party providers and banks in the provision of payment and payment-related services. This is expected to become the basis for new API-based services. This possibility for service offerings may be used by many players including start-ups and incumbents. However, the consequences of these efforts are difficult to assess at the current juncture. Moreover, the medium-term consequences will also depend on the extent to which the market is able to agree on a harmonised interface. A number of possible developments that may result from the opening of transaction accounts to third parties are outlined below.

New business models: It is challenging to predict what kind of new services might be created. Payment initiation services may only form a minority of solutions, as for many kinds of service offerings, providing account information services may be more attractive. On this basis, it is also likely that new services using existing data, designed to better manage the financials of consumers, will be developed (e.g. offering advice on cheaper insurance contracts).

Lower barriers for the entry of new players: Enabling a common technical approach for interacting with customer accounts should help break down market barriers and simplify the entry of new players into the payments market without jeopardising the required security levels.

Risks for incumbent players: Incumbent players would need to invest in new interfaces for access to accounts, while being faced with downward pressure on earnings. In addition, they could be confronted with weaker customer relations (leading, for example, to consumers' greater willingness to switch providers), with the risk that they are reduced to infrastructure providers for fintech services. On the other hand, they may grasp the opportunities of PSD2 as well and start providing third-party services themselves, thus enhancing the competitive landscape in that business field.

Opportunities for payment ecosystems: API-based IT infrastructures may facilitate the technical cooperation of different players. On account of APIs, established players have the chance to link innovative third-party solutions to their platforms and thus provide added value by offering their respective innovative services to customers.[21] Consequently, banks would be able to leave some parts of the value chain to third-party providers. In the extreme, this could lead to a rather complex network of interdependent service providers.

Taken together, these developments should lead to an increase in competition, possibly resulting in a reduction of fees for merchants, provided that (i) customers are willing to use new providers, and (ii) a pan-European standard for APIs is achieved by market consensus.

On the one hand, it could be expected that fintech solutions will gain further importance, since APIs facilitate links between new solution providers and

[21] See DB Research (2015).

incumbents. On the other hand, we might see further consolidation among incumbents owing to investment needs (for the technical interfaces and the set-up of new business models) and the pressure on earnings.

Lastly, the regulated access to customer payment account data by third parties could lead to questions regarding data and consumer protection. In this context, policymakers and regulators might want to reflect whether there is a need to ensure, via customer awareness measures, that payment account holders make informed decisions about who is granted access to the information in their payment account.[22] That said, the regulated access to payment accounts by third-party providers could increase market competition between classical PSPs and new competitors.[23]

c) Instant Payments as a potential game changer

Banks and infrastructure providers across the euro area are working on speeding up the payments infrastructure. Instant Payments could give incumbent PSPs the possibility to create an attractive and cost-effective payment option[24] and compete with new fintech providers in P2P at the POS and in e-commerce. Although some fintech solutions already offer a "real-time feeling", Instant Payments will ensure real-time clearing from bank account to bank account outside closed-loop or e-money solutions. It could therefore be expected that fintech solutions in the area of P2P will become less attractive over time. Nonetheless, it is clear that convenience and reach remain an issue. Fintech solutions that allow comfortable submission of payments (e.g. by using a mobile phone number instead of an IBAN) and have a pan-European reach could have a significant advantage if these issues are not solved by the banking community. The work of the Mobile Proxy Forum to create a Proxy Lookup service should be an important step towards supporting the convenience of P2P payments based on credit transfers.

More generally, Instant Payments offer chances for non-bank fintech solutions as well, e.g. in e-commerce transactions. In this area, for example, the availability of an instant credit transfer would make guarantee models superfluous, thereby facilitating the work of fintechs as intermediaries between the consumer and the merchant and potentially giving them additional scope to gain market share by offering user-oriented value-added services. In general, there is much debate on the use of Instant Payments at the POS. However, in order to offer a real alternative to cards and cash, front-end solutions will have to be provided that ensure reach, security (through SCA) and superior speed at the checkout. At present, there are initiatives from market players that aim to foster a standardised Instant Payments reachability of merchants at the POS but it is not currently clear to what extent Instant Payments will substitute traditional payments at the POS. However, it seems likely that the current business model of traditional acquiring services (including network provision) will certainly be put at risk. Whether this is to the benefit of banks (regaining some of their lost market

22 The General Data Protection Regulation came into force on 25 May 2018 and is expected to provide more certainty in this area.
23 See González-Páramo (2017), p. 20.
24 See González-Páramo (2017), p. 16.

share), merchants (as a sort of payment initiation service) for an instant payment credit transfer or fintechs/BigTechs (as front-end providers) remains to be seen.

d) Impact of new technology: artificial intelligence and distributed ledger technology

Considering technical developments and regulatory requirements, as well as the increasing amount of information available online and in stakeholders' databases, AI-based products and solutions are emerging in different sectors of the retail payments market. These products are used mostly for data analytics, but also for more specific usages, whether for anti-money laundering and counter-terrorism financing screening (especially for Instant Payments), natural language processing (for automated document scanning, robo-advising, etc.) or enhanced payment order routing. As large-scale AI applications in the field of payments are still scarce, the impact of such technology is still difficult to evaluate, but the overall benefit of AI – or at least its promises – would be a gain in efficiency through the automation of currently burdensome and often manual processes.

While the fact finding on fintech innovations in EU retail payments gave no indication that DLT-based fintech solutions are of much relevance yet, there is still a possibility that this new technology might gain ground. Market experts regard payment authorisation, clearing and settlement as the most relevant uses for blockchain technology in financial services,[25] as the technology might offer certain advantages (e.g. improved transparency, security and resilience).[26] However, it is still not safe to say to what extent the potential advantages could be realised through the application of DLT. Although different uses are conceivable (e.g. cross-border payments, securities settlement and micro-payments in an environment of autonomous devices (IoT)), realistic business cases in retail payments still seem to be rare. This may be due to the fact that, even if certain intermediary functions can be executed by a DLT system, trusted intermediaries might still be needed owing to the specific requirements in the financial sector, e.g. the need for prompt action to deal with frictions or unforeseen events.[27] Frictions might also be of relevance when it comes to interoperability: As of now, it seems that different DLT solutions are being explored and used for proof-of-concept studies. This might lead to different implementations of DLT and, as a result, interoperability issues between different DLT systems. Similarly, interoperability between legacy and DLT systems may also become an issue. Therefore, standardisation seems to be of critical importance for the broad usage of the technology.[28] For the time being, DLT still seems to be several steps away from being a mature technology. However, given the early stages of its development, it is currently not possible to seriously assess the long-term impact of this new technology.[29] Ongoing monitoring might therefore be considered useful.

25 See Capgemini (2017), p. 30.
26 See Deutsche Bundesbank (2017), p. 39.
27 See Mills et al. (2016), p. 18.
28 See Mills et al (2016), p. 25.
29 See Deutsche Bundesbank (2017), p. 49.

e) Payments as part of platforms and as a source of "Big Data"

While the digitalisation of everyday life and the steadily increasing use of the internet offer consumers many possibilities, it might be challenging for them to keep track of all the different offers available. Consequently, internet platforms that match the interests of consumers with those of producers and service providers are likely to further gain in significance. For platforms that already act as an intermediary between supply and demand, integrating the payment process into their offerings may be a natural step.[30]

Owing to their significant market penetration, digital expertise and financial power, the big internet companies appear particularly well positioned to enter new fields of business in the provision of payments services. These companies have set a benchmark by delivering personalised digital customer interactions, which consumers may now also expect in other areas of their everyday lives, e.g. financial services.[31] As a prominent example, in e-commerce Amazon set up its own online payment platform (Amazon Payments) and enables customers to carry out one-click payment transactions – a service that Amazon is also offering to other merchants.[32] In the future, there is the possibility of traditional PSPs being reduced to providers of back-end core processing services for big internet platforms that dominate the front-end customer relationship. This could result in a further platformification of financial services. [33]

However, with platforms expanding into more and more markets and connecting a growing number of users, the risk of becoming "too interconnected to fail" might arise. Additionally, the exponential nature of the new digital infrastructures allows them to go from "too small to care" to "too big to fail" in a very short period of time, requiring authorities to have a far-reaching and future-looking perspective.[34] All in all, a further integration of payments into platforms is a likely future development and this sector should also be closely monitored.

Alternatively, some banks are also trying to set up their own "ecosystems". This is based on the idea that banks already have access to plenty of data. In fact, most transactions made by consumers are mirrored in a financial entry on their accounts. So far, this data has hardly been utilised by banks, in part due to concerns about data privacy issues. However, in the future banks might try to extend the reach of their "platforms" by integrating service offerings of providers from other industries.

f) Potential impact on e-money

When it appeared in the late 1990s, e-money was seen as a means of payment with a promising future[35] and was tackled by EU regulation, in particular Directive

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30 As already seen, for example, in the cases of Uber, Apple and Facebook in the United States and Alibaba in China.
31 See Capgemini (2017), p. 11.
32 See the World Economic Forum (2017), pp. 38-39.
33 See Capgemini (2017), p. 36.
34 See González-Páramo (2017), p. 30.
35 See, for example, Monthly Report, ECB, November 2000, p. 55.

2000/46/EC on electronic money institutions. However, the uptake of e-money was never as high as expected. In fact, e-money nowadays only plays a niche role compared with credit transfers and card payments. In 2016, only 2.3% of total transactions in the European Union were e-money-based transactions.[36]

With the emergence of Instant Payments and DLT used by PSPs, the role of e-money might decrease even further. However, according to the fintech survey, a significant number of services are still e-money-based. Whether e-money will be around in the future remains to be seen. On the one hand, Instant Payments might replace e-money-based solutions in the area of P2P, POS and e-commerce payments, by eliminating its key advantage of instant fund transfer in a closed-loop system. On the other hand, there are applications, for example, in the context of IoT, where very high numbers of low-value payments may leave a niche for e-money, or the potential advantages of automated payments based on smart contracts may create opportunities for token-based e-money solutions.

[36] See the Payments Statistics section of the ECB's Statistical Data Warehouse.

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