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Impact of the EU regulations on the payment services

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Abstract

Motivation: Legislation in payment services domain is broad, exhaustive, and detailed. Fostering innovation is one of several primary goals of the legislation. The impact of a series of regulations on the payments market, particularly the Second Payment Services Directive (PSD2), requires a comprehensive assessment of their effects on legislative efficiency and the development of European payment service providers.

Aim: The paper aims to explore the vectors and strength of the impact of EU payments legislation on the market for payment services with a focus on innovation.

Results: The major impact vector of the payment legislation is stimulating the supply of payment services. An important instrument in this domain is standardization and interoperability with legislation on open banking (PSD) and Single Euro Payment Area being flagship use – cases of such instrument. Open banking legislation (standardization) resulted in the development of a new class of services unlocking new value for demand side. SEPA legislation (interoperability) resulted in availability of significantly more efficient and productive flows of funds within the EU. In both use – cases the impact vectors demonstrate strong feedback and positive reinforcement. Instant payments developed on the building blocks of SEPA



enable open banking account – to – account payments to compete with payment cards and similar instruments with acquirers being able to narrow down substantially the risks they are exposed to when engaging in traditional merchant payments. Open banking payments in turn stimulate SEPA payments. Altogether the use case of EU SEPA and open banking legislation proves that legislation addressing interoperability and standardization is paramount to steer payment market towards mutually reinforced innovation. Careful consideration and selection of policy mix in this domain results in highly efficient transmission mechanism.

Keywords: EU payments legislation, open banking, SEPA payments, innovation, financial market

JEL: E42; G11; G21; K22, K24, O33

1. Introduction

EU legislation on payment services is exhaustive. Both level-1 (directives, regulations) and level-2 (delegated regulations, guidelines, and other legal instruments of European Banking Authority, etc.) are specific for payment services, detailed and broad. EU regulations address most relevant dimensions of payment services, including:

- a) access to the market of payment services (licensing of payment services providers: Second Payment Services Directive¹ (PSD2), E – money Directive² (EMD), Capital Requirements Directive³ (CMD))
- b) supervision of payment services providers (PSD2, EMD, CRD, AML Legislation⁴ (AML))
- c) delivery of payment services and execution of payment transactions, including obligatory disclosures, entering contracts, handling payment orders, fees and charges, currency conversion, liability for unauthor-

¹ Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC.

² Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC.

³ Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

⁴ Directive (EU) 2015/849 of the European Parliament and of the Council of 20 May 2015 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, amending Regulation (EU) No 648/2012 of the European Parliament and of the Council, and repealing Directive 2005/60/EC of the European Parliament and of the Council and Commission Directive 2006/70/EC, Regulation (EU) 2015/847 of the European Parliament and of the Council of 20 May 2015 on information accompanying transfers of funds and repealing Regulation (EC) No 1781/2006



ized transactions and for non-execution or incorrect execution of payment service (PSD2 with Level – 2 legislation, Payment Account Directive⁵ (PAD), AML, SEPA Regulation⁶(SEPAR), Interchange Fee Regulation⁷ (MIFREG), Cross Border Payments Regulation⁸)

d) structure and activity of organizations, systems and schemes that arrange providing payment services by multiple providers, including obligatory participation in such organization in specific cases (MIFREG, SEPAR, Settlement Finality Directive⁹ (SFD)).

The key purpose of EU payments legislation is protection of interests of payment services users. Next priority is fostering competition among payment services providers and innovation in payment services (Polasik et al., 2020; Butor-Keler & Polasik, 2020). All actions and instruments serve the overarching goal of creating an effective internal market for payment services.

In response to developments in payment services the EU payment regulations have recently become more sophisticated and pursue complicated sub-goals. This is the case of legislation that implements standardization of delivery of some services or of specific parts of the value chain and legislation delivering complete set – up of a payment product. Legislation on Single Euro Payments Area (SEPA) ensures interoperability of the payment services providers of the European Economic Area through participation in dedicated platforms enforcing connectivity (reachability) and harmonized technical and business conditions of executing traditional account – based payments. Legislation on open banking (directive 2015/2366 on payment services in the internal market (PSD2) that substituted directive 2007/64/EC (PSD1)) is the most advanced illustration of this approach. PSD2 requires that providers of payment accounts ensure efficient and fully functional interfaces accessible from internet (machine to machine interface, mostly APIs – Application Programming Interface) whereby other providers authorized by the holder of the payment account, may download information about the account and about transactions registered in the account and initiate a transaction from

⁵ Directive 2014/92/EU of the European Parliament and of the Council of 23 July 2014 on the comparability of fees related to payment accounts, payment account switching and access to payment accounts with basic features.

⁶ Regulation (EU) No 260/2012 of the European Parliament and of the Council of 14 March 2012 establishing technical and business requirements for credit transfers and direct debits in euro and amending Regulation (EC) No 924/2009.

⁷ Regulation (EU) 2015/751 of the European Parliament and of the Council of 29 April 2015 on interchange fees for card-based payment transactions.

⁸ Regulation (EU) 2021/1230 of the European Parliament and of the Council of 14 July 2021 on cross-border payments in the Union (codification).

⁹ Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems.

such account, provided that provider authorized by holder has authorization or registration by a relevant competent authority of a state of European Economic Area. Payment services providers responded to the developments above with self-regulation whereby technical and business standards have been agreed among providers. This has in turn led to the setting up and stable development of new classes of services relying on opportunities unlocked by these developments.

2. Literature review on the impact of EU payment legislation

Payment services are flip – side of trading activity of human beings (Ram-bure & Nacamuli, 2008). Unlimited diversification of trade leads certainly to multiple dimensions of functioning of the payment market. The common denominator is massive participation of end-users who are professionals neither in financial nor payment services. The primary goal of the payment services legislation is therefore the protection of users against known risks and losses. The policy mix addressing this need is broad and evolving with developments in payment services. The mix includes instruments protecting users against high risk or high impact threats, including protection against ineffective execution of transactions, untransparent and / or excessive fees and charges, fraudulent transactions, obstacles in enforcing liability of providers, etc (Brener, 2019). The community of users is diverse and their demand for payment services is essentially only as elastic as their demand for underlying goods and services. The needs of these stakeholders and the results that the policy agenda exerts on them are difficult to identify and assess. This is why the mix of legislative instruments is the result of personal experience of concrete policymakers rather than objective factors enabling prior and/or subsequent assessment. Therefore, the instruments will not be discussed here.

Second key goal of payments legislation is efficiency of payment services. The main impact vector in this domain is strengthening the supply of payment services. Payment legislation constantly broadens the scope of payment services providers (Kasiewicz, 2018; Polasik et al., 2020), promotes competition, and fosters innovation (Romanova et al., 2018; Butor-Keler & Polasik, 2020). The key specific vectors in this domain of contemporary EU payments legislation (2007 onwards) are listed below in order of strength of the impact weighed by identifiability of the impact:

- a) significant increase of the pool of providers of payment services (non-bank payment services providers)
- b) significant increase of the pool of providers with access to networks (non-bank providers participating in their own name in card and payment schemes)



- c) significant increase of providers providing payment services outside of the territory they are registered (passporting)
- d) increase of essentially same service provided in multiple markets by same provider (a service designed in one jurisdiction may be provided uniformly in other markets)
- e) increase in transactions benefiting from obligatory interoperability of payment services providers (SEPA legislation)
- f) enabling value – added payment or data services “on top” of payment account services (open banking – user can turn to competitors of user’s account provider to obtain services closely linked to the payment account).

Impact vector of standardization and interoperability has demonstrated transmission mechanism and results exceeding far legitimate expectations. While traditional vectors of impact on supply side (easing regulatory requirements, opening access to infrastructure, etc.) have mostly good results, the room for their development (e.g., aligning the rights of non-bank providers with the rights of credit institutions) and the potential for their impact is significantly limited due to their “hardcore” nature. A consensus is difficult to establish among stakeholders and takes a long time to implement and enforce. Building another conventional successful payment service provider remains a titanic challenge. Legal instruments aimed at standardization and interoperability have completely different nature. Their potential for driving innovation is the subject of the analysis below based on use cases referred to above, i.e. SEPA legislation and open banking legislation. An important outcome of implementing the PSD2 directive and SCA requirements is the increase in online payment transaction security levels (Gounari et al., 2024). This is evidenced by the decline in fraudulent transactions, as revealed in a joint report by the EBA and ECB (European Central Bank, 2024).

3. Methods

The methods employed in this study are interdisciplinary in nature. The first part is based on an analysis of European Union legal regulations and examining the effects of their national implementation. The second part focuses on the evaluation of the economic, institutional, and market impacts of the regulations, drawing on findings from original empirical research. The date for assessment of the long-term effects of open banking regulations in the European Economic Area stems from findings of an empirical study conducted in late 2020, funded by National Science Centre grant No. 2017/26/E/HS4/00858. The study’s was conducted in collaboration with major European payment industry associations, including the European Banking Federation (EBF) and the European Payment Institutions Federation (EPIF). Responses



were collected from 202 experts across 30 countries, covering all EU countries plus the UK, Norway, and Switzerland. The sample includes representatives from all institutional groups within the payment sector: banks, non-bank payment institutions, payment schemes and clearing houses, FinTech firms, payment technology providers, as well as experienced consultants and central bank supervisors. The recruitment, data collection, and analysis processes ensured that results reflected the opinions and forecasts of experts within Europe's PayTech community.

4. Results

4.1. Standardisation & Interoperability

A flagship use–case of EU payments legislation that implements standardization is PSD2's open banking. The directive has been transposed into national laws of the EEA states¹⁰ and is thus binding on payment services providers (PSP). PSD2 demands unconditionally from all providers of payment accounts that offer online access for customers that such providers develop an interface accessible by other providers that essentially mirrors functionalities of the customer interface in terms of access to information and ability to initiate transactions. The goal is that the holder of the payment account can make use of the account not only through account's native online frontend but also through frontend the provided by the competitors of account servicing PSP (ASPSP). The underlying rationale is that financial institutions other than ASPSP (ASPSP's competitors, so – called "third party providers" – TPPs) that aggregate information from many accounts may offer better and/or more comprehensive service than single ASPSP.

In fact, the approach above builds upon the mechanism of accessing an online service through a third – party application deploying in the backend the mechanism of so – called web scraping. This mechanism has been widespread in IT space for decades and started to gain traction in payment space in the early 2010s (Zhao, 2022). Services to initiate a payment transaction from account or of personal finance management or of assessment of credit-worthiness based on flows on the payment account proliferated in some EU markets at that time. Providers of such services used the technique of emulating users' presence in ASPSP's online front – end to initiate transactions or access information from the account. In this mechanism the user (account holder) is required to indicate in the app of the provider (website, mobile application) the bank operating the account and providing login credentials directly to the provider. The web scraping provider's back-office in turn uses the credentials to connect to bank's website and emulates user presence on

¹⁰ European Economic Area.



the website without the user leaving the app of the web scraping's provider. The advantage is that the web scraping's provider needs no formal cooperation with none of the ASPSPs. The downside is that the user discloses security credentials which they should not do. The other downsides are the direct consequence of using a human-to-machine interface for the purpose of machine-to-machine communication. The web scraping provider has the "teach" their software what is the structure of each website of each ASPSP. Any change to ASPSP's website leads mostly to disruption of the service until the back-office software is re-programmed to understand the new structure of the website. Altogether the scaling of such a service tends to be very challenging and constantly exposed to significant legal risks which are difficult to mitigate. Having noted the situation, the EU legislator responded in PSD2 with obligatory machine – to machine interface to a payment account accessible by licensed third parties free of charge and with no agreement with ASPSP.

Open banking building blocks – The primary building blocks of the open banking include:

- a) Providers of payment accounts ensure efficient and fully functional interfaces through which other providers requested to do so by account holder may download information about the account and transactions registered in the account and initiate a payment transaction from such an account.
- b) Third party must be licensed (authorized or registered) by a competent authority of an EEA state to access a PSD2 interface of an ASPSP. Technically the relevant license is noted in the digital certificate that each such third party must obtain.
- c) ASPSP makes available the interface to TPP free of charge. Access must not be dependent upon entry into the agreement between TPP and ASPSP.
- d) ASPSP ensures parity in terms of data and functionality, i.e., makes available in the interface information available in customer's online interface and enables initiation of payment transaction which the customer may initiate in the online interface.
- e) ASPSP must neither create obstacles for TPPs nor discriminate access to payment account through TPP vis a vis access through customer's interface, e.g., charge significantly higher fees for a credit transfer initiated through a TPP than for credit transfer initiated through customer's interface or execute the former longer than the latter.
- f) ASPSP must tolerate that TPP relies on customer's authentication procedures deployed by the ASPSP which includes all authentication modalities available to customer (redirection, embedded, decoupled; in practice the redirection mechanism dominates) (Omarini, 2018).



Legislation requires no standardization – PSD2 legislation requires explicitly neither that the interface is an API (application programming interface) nor that it is a machine – to – machine interface. The only indirect reference to this requirement is the obligation of ASPSPs to ensure that set of routines, protocols, and tools needed by TPPs for allowing their software and applications to interoperate with the systems of the account servicing payment service providers (article 30 sec. 3 of the RTS SCA & CSC¹¹) and the requirement to use the certificate for electronic seals or for website authentication for the purpose of identification. While literally PSD2 requires standardization (“Account servicing payment service providers shall ensure that their interfaces follow standards of communication which are issued by international or European standardization organizations”, art 30 sec. 3 of the RTS SCA & CSC), no specific requirements are defined. The benefit of following a standard is limited to an exemption provided for in EBA Guidelines on the conditions to benefit from an exemption from the contingency mechanism under Article 33(6) of Regulation (EU) 2018/389 (RTS SCA CSC). Where the ASPSP is implementing a standard developed by a market initiative the results of the conformance testing developed by the market initiative, attesting compliance of the interface with the respective market initiative standard may be referred to instead of attestation of ASPSP’s interface and some of the information that the ASPSP is required to provide may instead consist of information regarding which market initiative standard the ASPSP is implementing, whether or not it has deviated in any specific aspect from such standard. ASPSP essentially can design and develop interface that is completely from competitor’s interface as long as any such interface provides read/write access to payment account. The only “standardized” dimension is the payment services which have been significantly aligned in terms of basic functionality and economics over time by market forces. Considering above, under PSD2 interpreted literally TPPs are not in significantly better position than when emulated the user in ASPSP’s interface. They need to “teach” their back-office software of each ASPSP’s interface individually and monitor changes of each interface safe for the PSD2 interface is no longer a human – to – machine interface.

Despite limited if not absent incentives for standardization the community of TPPs and ASPSPs immediately turned to developing standards of PSD2 interfaces. The most widespread are Berlin Group, STET, Polish API, UK’s Open Banking. They focus mostly on technical standards of the interface and to some extent on business conditions. Except for small communities the

¹¹ Commission Delegated Regulation (EU) 2018/389 of 27 November 2017 supplementing Directive (EU) 2015/2366 of the European Parliament and of the Council with regard to regulatory technical standards for strong customer authentication and common and secure open standards of communication.



industry has elected not to develop common API. This translates into state of play in EU open banking in which each ASPSP has individual interface with individual and divergent TPP onboarding and management mechanism, however with deeply aligned core functionalities of the APIs, scope and format of account data and user authentication modalities. While no uniform and centralized access to accounts is in place, the cost of launching and operating open banking services by TPP significantly decreased vis a vis costs of services based on web scraping (emulation of user on ASPSP's website).

4.2. The results of PSD2 in the view of experts

The result of the PSD2 approach is a new but stable generation of digital services that builds upon payment accounts. Primary stream is related to payment initiation services (PIS). Open banking payments are domestic and cross-border transactions from payment accounts in e-commerce grow with no need that the payer has additional payment services like payment cards or similar instruments on top of their payment account. In this domain PSD2 results in generating new streams of transactions and switching payment volumes from payment instruments linked to payment accounts. This contributes to efficiency and productivity of payment services (eliminating an additional intermediary level between payer and merchant and limiting the number of products that the payer holds). Other streams are related to account information services. Assessment of creditworthiness based on cashflows in the payment account and client onboarding based on information about an account holder (i.e., with no need of video verification) is another stable stream of new services which hardly existed before PSD2. Both streams seem stable and firm. Despite no centralized access and incomplete standardization, this kind of move towards standardization has provided sufficiently fertile ground for investment and commitment toward new classes of services. Indeed, the 2021 study "The impact of the development of Fin-Tech and legal regulations on innovations in the payment services market of the European Union: strategies of the financial sector and consumer needs" specifically reveals that significant majority of the market stakeholders expects that most credit institutions will provide at least one open banking service with almost half of respondents believing that credit institutions will be the actors that will provide most of these services (see chart 1). Technology providers is the group of respondents that sees a major role to play by the banks in this space and envisage that most that these new flows and streams will be significant part of the business of credit institutions (see chart 2). Half of the respondents believe that open banking payments will be available in the physical point of sales with acquirers being most certain (70%) of it (chart 3). The high game changing potential of open banking services is confirmed by credit institutions the absolute majority of which (80%) are convinced that



BigTech will finally engage in financial services through participation in the ecosystem of open banking (chart 4).

Open banking services that emerged post-PSD2 demonstrate not only high inherent streams but significant potential for development and cross – stream synergies. The experience that policy makers and market actors acquired from the design and implementation of open banking infrastructure has become an enabler of extending open data approach beyond open banking and payment accounts. 8 years after passing PSD2 the EU has made the first move towards open finance. In June 2023 draft legislation of financial information data access has been published¹². This legislation assumes that most financial institutions must develop an interface and access industry – led data sharing platforms to make available information about credits, deposit, insurance other than life insurance, pensions, financial instruments and tokens, results of regulatory assessments. While fixing known failures the legislation builds up completely upon successful developments in open banking. Open banking benefits significantly from developments in payments infrastructure and reinforces such developments. The more productive and efficient the underlying payments are the more value is in payment stream of open banking vis a vis other instrument. The more open banking payments are used the larger is the volume of payments directly between payment accounts which motivates innovation and investment in such basic payment mechanisms. The flagship example is instant payments legislation and implementations. Despite that instant payments have been developed entirely as a horizontal mechanism they provide super reinforcement to open banking payments. They eliminate the key comparative disadvantage of PIS payment versus card payments or similar payments which is uncertainty whether and when funds arrive at merchant's account. As soon as instant payments are available in open banking, the comparative advantage disappears. More importantly, this may change completely the current composition of market actors. While in the existing framework today merchant services providers naturally enter into possession of funds which is source of risk for payment system and restrictive requirements, they are subject to, in open banking with instant payments they may elect to become providers of data services only. In this scenario they initiate payment transactions from the payer's account in their role of payment initiation services provider. Instead of receiving funds to own bank account the funds are transferred directly to merchant account. Acquirer instantly monitors merchant's bank account in their role of account information services provider and informs merchant that goods and services may be released same as when funds were

¹² Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on a framework for Financial Data Access and amending Regulations (EU) No 1093/2010, (EU) No 1094/2010, (EU) No 1095/2010 and (EU) 2022/2554.



at acquirer's bank account. Acquirer saves the risk of holding and managing third party funds and costs of transfers incoming to and outgoing from their account. Acquirer is able to provide services with functionalities and risk most effective considering the nature of the service. Stabilization of this mechanism no doubt will lead to the development of value – added services including chargebacks and refunds which stand behind the global success of merchant – related payment instruments (payment cards and similar instruments).

4.3. Transmission mechanism

Lessons from open banking legislation are particularly important for policy-making insofar as options to steer payment market are considered including interoperability and standardization. The legislation on open banking is superficial relative to relevant standards, milestones, and provided incomplete instructions on the final shape of open banking. Yet it was sufficient to trigger chain reactions that made providers develop and deliver the complete result. Even if they mostly failed to develop a centralized point of access, the result was sufficient to mobilize the so – far – passive service of a payment account to extract its intrinsic value and exceeded expectations. In policy terms the alignment of outcome with policy objectives is maximized with minimized investment and time – to – market on the policymaking side. The underlying rationale for such a positive outcome is twofold. First, all providers had to deliver the interface at the same moment. Thus, the typical chicken and egg dilemma has been eliminated. Individual providers faced no risk that if they invested first in the development of the interface, but others fail to join the network effect will not ignite and investment effort will not be offset. Second, despite the legislation failing to provide relevant standards, the result that the legislation required was nothing but tangible. Each provider had to demonstrate by the relevant deadline a defined component of their IT infrastructure with clear capabilities. The development of this result offered no cost advantages if standardization was disregarded. Conversely, both in the short and long run it was more efficient in terms of resources, costs, quality of the result and securing the benefits of network effect (if any) to team with other providers to develop relevant protocols instead of an in-house project. In broader terms, disregarding the legislative call for standardization offered no cost advantages and risked sanctions for non – compliance and additional effort to comply with standard. In any scenario with similar impact factors and similar checks and balances the transmission mechanism elaborated above is likely to emerge.

5. Conclusion

Payment services legislation may impact the payment market through many instruments and in many ways. Most instruments have the power to stimulate innovation and thus make payments more efficient, available, and affordable. Standardization and interoperability of specific elements of the payment value chain initiated or delivered by legislation is one of the available impact instruments. Some EU legislative interventions of the last decade which aimed at standardization and interoperability have disclosed that these instruments are a very powerful part of legislative transmission mechanism. They tend to offer significant commitment and contribution from market stakeholders with relatively limited investment and time to market on the policymaking side if applied to properly identified elements and interdependencies of the payments value chain. The SEPA and PSD2 legislation deliver indeed the most persuasive and convincing evidence. In both cases the policymakers opted for standardization and interoperability as a stimulant of internal market for payments and innovation but refrained from providing explicit and detailed standards and interoperability principles. Yet the response of market stakeholders has been very strong, comprehensive, goal oriented and exceeding expectations. Notably they perfectly identified the underlying intention and absorbed most of the effort to develop building blocks of standards and interoperability. The overall result is that new customer value has emerged that has not existed before (open banking unlocking inherent value of payment accounts through payments from accounts without additional instruments and efficient customer onboarding / assessment by third parties based on information sitting in payment account) and substantial chunk of existing payment volumes have migrated to visibly more productive channels and scenarios (SEPA payments withing interoperable network of providers with same execution time, transparent pricing, minimized transaction errors). At the same time the links and feedback among elements of value chain in payments are so strong that standardization and interoperability in any of them quickly resonates in others reinforcing entire chain. SEPA enabled instant payments, they reinforce open banking payments, which in turn reinforce account – based payments and narrow the need for payment services on top of payment accounts with end-to-end processing.

Altogether the use case of EU SEPA and open banking legislation proves that legislation addressing interoperability and standardization is paramount to steer payment market towards mutually reinforced innovation. Careful consideration and selection of policy mix in this domain results in highly efficient transmission mechanism.



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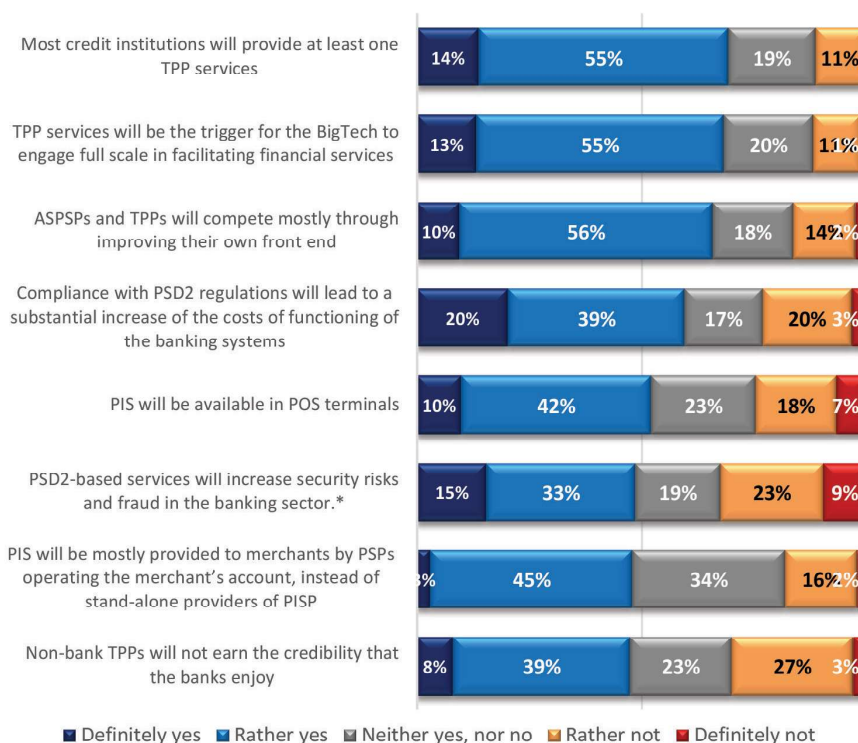
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Appendix

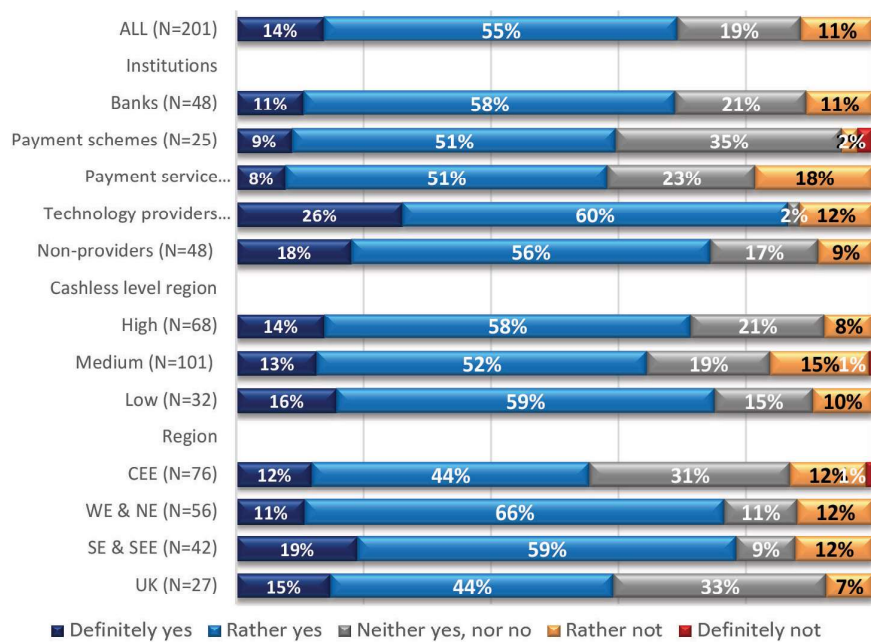
Chart 1. Anticipated long-term impact (up to 2025) of the introduction of Third Party Providers (TPP), Payment Initiation Services (PIS) and Account Information Services (AIS) into EU law



Additional information. C2. Do you agree with the following statements regarding the anticipated long-term impact (up to 2025) of the introduction of Third Party Providers (TPP), Payment Initiation Services (PIS) and Account Information Services (AIS) into EU law?; N=201.

Source: Own preparation based on results from Grant No. 2017/26/E/HS4/00858 (PayTechImpact.EU).

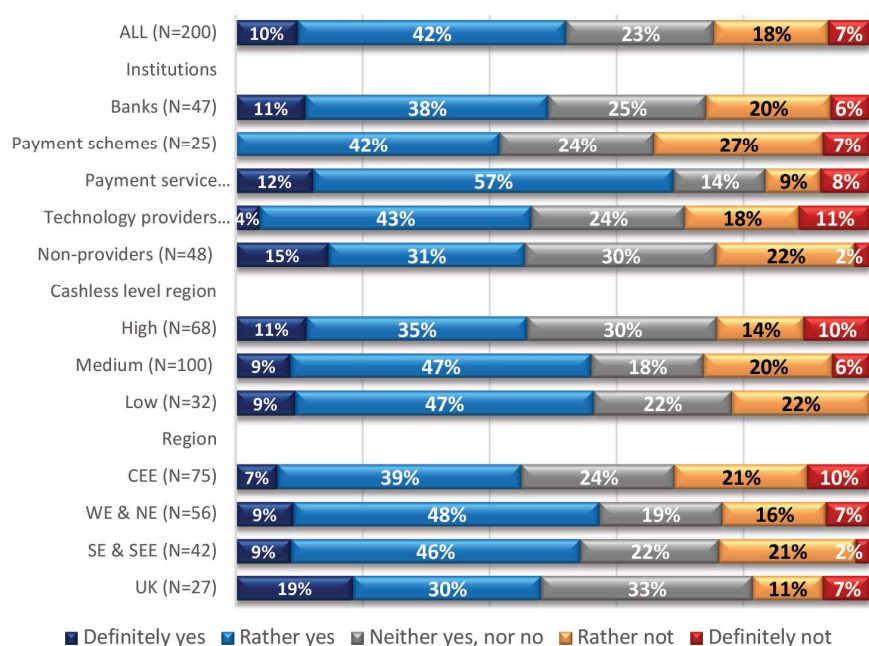
Chart 2. Distribution of answers to the question #1 of Chart 1. – Most credit institutions will provide at least one TPP services



Source: Own preparation based on results from Grant No. 2017/26/E/HS4/00858 (PayTechImpact.EU).

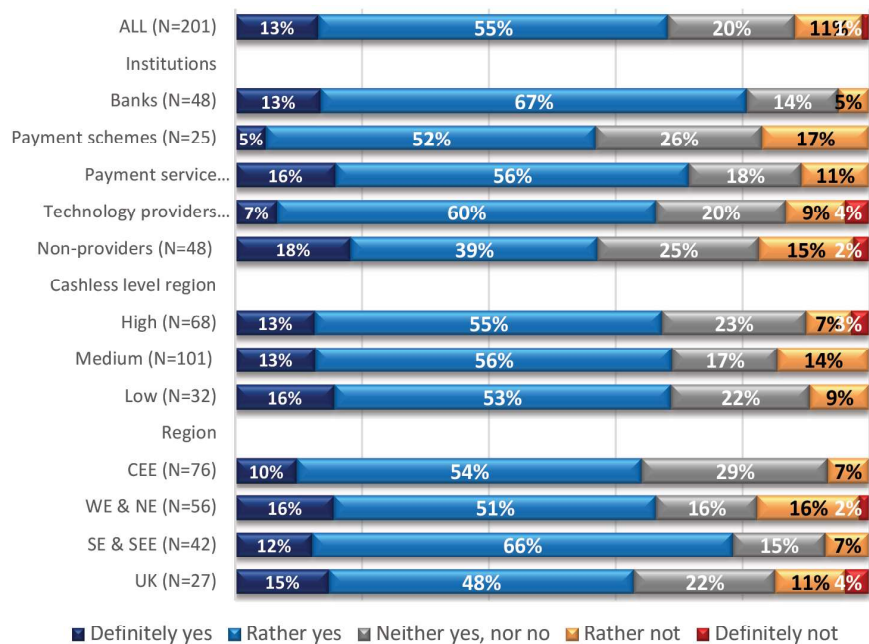


Chart 3. Distribution of answers to the question #5 of Chart 1 (POS Terminals) – PIS will be available in POS terminals



Source: Own preparation based on results from Grant No. 2017/26/E/HS4/00858 (PayTechImpact.EU).

Chart 4. Distribution of answers to the question #5 of Chart 1 (POS Terminals) – TPP services will be the trigger for the BigTech to engage full scale in facilitating financial services



Source: Own preparation based on results from Grant No. 2017/26/E/HS4/00858 (PayTechImpact.EU).