

The rise of instant payments: a cross-country comparison

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Abstract

Purpose – The article presents the uptake and development of instant payments across countries representing various geographies with diverse economic and social backgrounds. It identifies the critical success factors for the rapid adoption of instant payments.

Design/methodology/approach – This study features five country cases where instant payments swiftly alter payment landscapes. These are Brazil's PIX, India's UPI, USA's FedNow, Poland's Express Elixir and BLIK, and the EU-wide SCT Inst. It discusses and compares all the country cases in detail.

Findings – The analysis identified success factors driving the widespread adoption of instant payments. It categorises these factors into five groups, each illustrated by country examples with their respective instant payment systems: regulatory support, an open ecosystem, and inclusive collaboration, network effects on the supply side of the market, network effects on the demand side of the market, and constant development through use and security improvements.

Practical implications – This article offers valuable insights for policymakers and developers of instant payment schemes and systems on enhancing network effects and accelerating the adoption of instant payments.

Social implications – The introduction of instant payments has profound implications for consumers and businesses. Consumers worldwide increasingly demand real-time payments that are available around the clock. Businesses seek streamlined cash management services that offer faster money flows, helping them reduce risk and exercise more precise control over working capital.

Originality/value – The findings contribute to a better understanding of instant payment adoption in various regions and countries, considering their unique characteristics.

Keywords Instant payments, Innovation, Real-time, Network effects, Regulation

Paper type Research paper

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Introduction

In the rapidly evolving financial technology landscape, instant payments have emerged as a transformative force, reshaping how consumers conduct transactions globally. Instant payments offer the possibility of transferring funds between parties in real-time and thus provide a stark contrast to traditional payment methods, which often involve delays ranging from several hours to multiple days (Bech, Shimizu, & Wong, 2017). The drivers behind this paradigm shift towards immediacy in financial transactions are advancements in digital infrastructure, regulation, increasing consumer demand for speed and convenience, and the proliferation of mobile technology (Hernández, Plooij, Hartmann, & Vandeweyer, 2019; Arango-Arango, Ramírez-Pineda, & Restrepo-Bernal, 2021).

Instant payments are credit transfers that enable the funds' movement from a payer to a payee account in seconds, around the clock (24/7/365). Standard credit transfers are slower, cleared in batches and usually settled once a business day, excluding weekends. For regular credit transfers and card payments, a deferred payment settlement results in a money float. Funds are locked in the financial system and do not work to the benefit of payers and payees, who could use them immediately for consumption, business or investment purposes. Instead, during the clearing and settlement cycle, those funds serve as a free-of-interest liquidity pool



for banks and other financial intermediaries (European Commission, 2022). Moreover, from a commerce perspective, traditional deferred payment methods require a payment guarantee to reduce risk for merchants who are ready to deliver goods and services right after the payment transaction. The cost of a payment guarantee is included in payment transaction charges. This cost becomes obsolete for instant payments, which provide immediate payment confirmation and instant settlement, similar to physical cash transactions.

Despite the clear advantages, adopting and implementing instant payment systems come with challenges. Issues related to interoperability among different payment platforms or legacy arrangements pose significant hurdles.

This research article aims to present the uptake and development of instant payments across countries representing various geographies with diverse economic and social backgrounds. It identifies the critical success factors for the rapid adoption of instant payments. Through a detailed analysis of case studies, industry reports and academic literature, this article elucidates the transformative potential of instant payments. It offers insights into the ongoing evolution of financial transactions in the digital age.

This article is structured as follows. Section 1 introduces instant payments and outlines the analysis context. Section 2 presents the methods and materials used in this study. Section 3 comprises a literature review of articles investigating the subject of instant payments from various perspectives. Section 4 analyses cases of countries with distinct instant payment systems, including those in India, Brazil, the USA, Poland and the EU. Section 5 discusses and compares all the country cases, providing key takeaways regarding their unique features and success factors. Section 6 concludes the article.

Materials and methods

For the purpose of research and comparative analysis, I utilised publicly available data from central banks and industry reports. I also included a literature review referencing scholarly and industry literature relevant to the topic of instant payments. Moreover, I synthetically compiled case studies of payment systems from various countries representing diverse economic and social backgrounds. Furthermore, I analysed the EU Instant Payments Regulation enacted in March 2024.

Literature review

The significance of instant payments extends beyond mere transactional speed. For businesses, instant payments enhance cash flow management, reduce operational costs and improve customer satisfaction. Consumers benefit from the convenience, security, and transparency that instant payments offer, making financial management more efficient and accessible. Furthermore, the global reach of instant payment systems facilitates cross-border transactions and supports the interconnectedness of modern economies. Khiaonarong and Humphrey (2022) investigate instant payments by examining their qualities compared to other payment instruments. They also analyse changes in payment composition across 12 selected countries with econometric modelling tools, arguing that substituting cash, cheque, and card payments with instant payments improve the cost efficiency and operational effectiveness of the payment system. This includes higher settlement speed and a reduction in system risk. Khiaonarong and Humphrey (2022) assign an important role in the development of instant payments to central banks and other regulatory authorities, emphasising their roles as catalysts, overseers and operators of payment systems.

This regulatory aspect of instant payments is further elaborated by Ślażyńska-Kluczek (2023) who identifies instant payments as a crucial element for further financial integration in the EU and commends the plans to introduce the Instant Payments Regulation in line with the objectives of the EU Retail Payments Strategy. Similarly, Polasik, Widawski, Keler, and Butor-Keler (2021) note that this strategy can potentially advance retail payment developments in

Europe, including the progression of instant payments. [Zalcewicz \(2011\)](#) identified the benefits of pan-European payments market integration as early as the adoption of the first Payment Services Directive and the establishment of the Single Euro Payments Area (SEPA) project. The Payment Services Directives have been viewed as key legal acts in transforming the payments landscape in the EU ([Grabowski, 2020](#)), catalysing new positive innovations such as open banking and its associated payment services – PIS (payment initiation service) and AIS (account information service) ([Masłowski, 2024](#)).

[Pranger \(2024\)](#) claims that the Instant Payments Regulation addresses several issues that have impeded the rapid rollout of real-time payments in the EU (explored below) and argues that they offer an advantage over card payments by enabling 24/7 instantaneous fund transfers. However, he also highlights the risks associated with fraud, mainly through Authorised Push Payments (APP), in the case of which the instant and irrevocable nature of instant credit transfers may benefit criminals. [Diadiushkin, Sandkuhl, and Maiatin \(2019\)](#) advocate using AI-augmented fraud detection techniques as a viable remedy for this problem.

[Oloveze, Ollawa, Chukwuoyims, and Onya \(2024\)](#) researched the subject of e-payments in Sub-Saharan countries. They found that small and medium enterprises and consumers, especially the mobile-first generation, are eager for instant money transfers. Mobile payments executed via smartphones with internet connection rapidly expanded in various regions, including Poland and Turkey ([Chmielarz, Zborowski, Fandrejewska, & Atasever, 2021](#)). Real-time money transfers can further fuel their growth, even in areas with lower adoption of digital financial services. In creating the PIX instant payment system, the Brazilian Central Bank (BCB) recognised that instant payments could be a powerful tool for the digital financial inclusion of its citizens and an effective response to the threat posed by BigTech companies poised to dominate the Brazilian payments ecosystem ([Schapiro, Mouallem, & Dantas, 2023](#)). [Harasim \(2021\)](#) studied the issue of BigTech encroaching on traditional banking. [Błach and Klimontowicz \(2021\)](#) found that collaborative efforts between competing banks can be a significant impetus for the successful rollout of PayTech solutions, such as the Polish BLIK mobile payment system. Meanwhile, [Sadłakowski \(2017\)](#) examined two retail instant payment systems in Poland – Express Elixir and Blue Cash. Sadłakowski sees them, along with the Polish RTGS payment system (SORBNET2), as essential components of the uninterrupted circulation of money in the new digital economy.

[Lule Yawe and Kiwala \(2019\)](#) studied the role of RTGS systems, such as T2 operated by the European Central Bank (ECB), in enabling settlement in central bank money to expand instant payments. The Target Instant Payment System (TIPS), integrated with T2, constitutes an effective and cost-efficient settlement mechanism for euro instant credit transfers processed within the EU SCT Inst scheme operated by the European Payments Council (EPC). On the other hand, [Kulk \(2018\)](#) argues that the RT1 clearing and settlement platform delivered by EBA Clearing can be equally effective in clearing and settling SCT Inst transactions. [Lindsay \(2015\)](#) detailed the advantages of implementing the data-rich and well-structured ISO 20022 messaging standard in instant payments. [Balla and Ilyés \(2016\)](#) discussed the liquidity needs and costs of two theoretical models of instant payments: instant settlement in central bank money and instant clearing with pre-funded cyclical settlement. They also conclude that both models are safe for the stability of the payment system.

Numerous studies have demonstrated that the successful adoption of instant payments requires more than just person-to-person (P2P) transactions. The essential element is also parallel services supporting various use cases, such as person-to-business (P2B), person-to-government (P2G), business-to-business (B2B), business-to-customer (B2C) and government-to-customer (G2C). [Salmony \(2017\)](#) confirms this from a European view, while [Arango-Arango et al. \(2021\)](#) support it in Colombia, and [Khanna and Samwani \(2023\)](#) show it through India's UPI case study. For instant payments to succeed, they must generate a network effect through a well-designed payment system. This network effect can then have a profound social impact. [Visconti-Caparrós and Campos-Blázquez \(2022\)](#) explain how Bizum's system value proposition was crafted to achieve this goal in Spain. [Mester \(2023\)](#)

highlights specific features of the newly launched FedNow instant payment service in the USA that can contribute to expanding the network and fostering instant payment adoption.

Instant payment systems on the rise: cases by country

The global market for real-time payments is steadily maturing, reaching an unprecedented high of 266.2 billion transactions in 2023, thus reflecting a year-over-year growth of 42.2%. According to the estimates, nearly 20% of all electronic payments worldwide were in real-time in 2023, expected to surpass 25% by 2028. Instant payment systems are already in operation in most countries across all regions, ranging from the Asia-Pacific, the most advanced region in real-time payment adoption, to the Middle East, Europe, Africa, and Latin and North America ([ACI Worldwide & GlobalData, 2024](#)).

I selected several distinct payment systems from five countries for closer inspection to provide insight into the dynamics and factors behind the global adoption of real-time payments.

India: UPI

India's Unified Payments Interface (UPI) has a leading position globally in driving real-time payment volumes, with 130 billion transactions in 2023, representing close to 50% of all instant transactions worldwide. The National Payments Corporation of India (NPCI) developed UPI as an entity established by the Reserve Bank of India (RBI) together with the Indian Banks Association. Launched in 2016, UPI has grown into a popular mobile-based real-time payment system in India, enabling immediate personal and merchant payments. It facilitates inter-bank, account-to-account (A2A) transactions, accounting for over 75% of the country's retail digital payments ([Shukla, 2024](#)). With over 350 million users (out of a population of approximately 1.4 billion), UPI is crucial in revolutionising India's digital payments ecosystem. It is available to all Indian citizens who have a smartphone and use one of the UPI payment applications linked to their bank account. Setting up a UPI ID and UPI PIN in the UPI app requires verification, such as based on Aadhaar (Aadhaar is a unique 12-digit identity number in India). All digital wallets in India have been integrated with the UPI platform. This integration enables wallet holders to pay any merchant using a QR code and their wallet balance. Thanks to the API-to-digital wallet integration and QR code infrastructure, digital payments have become more accessible to a broader population, thereby advancing financial inclusion in the country and bringing more individuals into the formal banking system. In the fourth quarter of 2023, the PhonePe digital wallet held a 46% share of UPI usage in India, followed by Google Pay with 36% and Paytm with 13% (others accounted for 5%) ([NPCI, 2024](#)).

In total, UPI payments grew by as much as 45% in 2023, accounting for 84% of all electronic payments in India. While this growth rate is impressive, the share of real-time payments in the total value of electronic transactions just slightly exceeds 10%, indicating there remains ample room for growth. Person-to-Person (P2P) payments, including payments to small merchants, dominated transaction values at 61%, followed by in-store payments at 35%, with online and bill payments accounting for the remaining 4% ([ACI Worldwide & GlobalData, 2024](#)). UPI has experienced a phenomenal 241% increase in Person-to-Merchant (P2M) transactions between June 2022 and June 2024, rising from 2.56 billion to 8.72 billion transactions ([NPCI, 2024](#)).

UPI offers a wide range of features and use cases that drive its growth, including P2P and P2M payments, UPI on delivery, UPI-ATMs to support cash withdrawals, standing instructions, IPO investments, and recurring payments for utilities and subscriptions. For P2P payments, UPI operates using aliases, keeping the payer's bank account numbers and card details confidential, while for P2M transactions, it uses QR codes ([Shukla, 2024](#)). Moreover, UPI includes an offline payment feature for low-value transactions, allowing users to utilise stored value in digital wallets (up to INR 2,000, or approximately USD 25). Furthermore, users

can link their RuPay credit cards to UPI apps. UPI usage is increasing, while other payment methods are declining, such as debit card usage, which dropped by as much as 34% year-over-year in the second half of 2023.

As the owner and operator of UPI, the NPCI establishes all the rules and regulations and defines the roles and responsibilities of all PSPs and third parties involved in UPI. This encompasses transaction processing and settlement as well as dispute management.

Although the Indian payments market is very significant in size, NPCI seeks opportunities for UPI expansion in cross-border payments. In January 2024, UPI-PayNow established a new remittance corridor with Singapore. Select merchants already accept UPI payments in Bhutan, France, Mauritius, Nepal, Singapore, South Africa, Sri Lanka and the UAE (Shukla, 2024).

Brazil: PIX

Launched just a few years ago in 2020 by Banco Central do Brasil (BCB), the PIX instant payment system has made significant strides in advancing financial inclusion and modernising domestic payments. It now attracts more than 150 million Brazilians (approximately three-quarters of the population and over 90% of adults) and 17 million businesses who use it daily (BCB, 2024; Matera, 2024). In total, PIX represents 75% of Latin America's real-time payments market and 14% of the global instant payments market by transaction volume, making Brazil the world's second-largest instant payments market. In 2023, Brazil's year-over-year growth rate in real-time payments was nearly 80%, surpassing even that of India (ACI Worldwide & GlobalData, 2024).

Today, PIX accounts for 43% of all payments in Brazil, with its transaction volume exceeding that of credit and debit cards combined by 45%. As of July 2024, PIX users initiated 43% of all transactions using static or dynamic QR codes, 45% using PIX keys and 12% through manual input (BCB, 2024). The PIX keys are a unique identifier linked to the recipient's bank account. This identifier can be either a phone number, email address or a randomly generated code. The payer just needs to enter the recipient's PIX key into their payment app along with the payment amount, and the system instantly transfers funds.

As of July 2024, B2B payments accounted for 44% of PIX transactions by volume, P2P payments represented 30%, B2P payments constituted 13% and P2B or P2M payments comprised 12%. BCB is working on streamlining the payment process with PIX. By February 2025, it plans to introduce an NFC tap-to-pay feature, which is arguably more convenient than QR codes. Contactless PIX will enable payments via digital wallets without requiring bank app authentication, using touch ID or facial recognition. Moreover, BCB is preparing to reduce the number of steps for online payments. Other features are in development, including offline PIX for payments without access to the internet connection, recurring scheduled PIX for standing orders and automatic PIX for recurring payments, such as subscriptions or bills.

Looking ahead to even more ambitious projects, the Brazilian central bank plans to launch an AI-integrated super app in 2025. This app will unify the nation's digital financial services, including the forthcoming central bank digital currency (CBDC) called Drex. The super app will integrate real-time payments through PIX, aiming to minimise the need for multiple banking apps by consolidating financial data and providing personalised services (BCB, 2024).

To combat fraud associated with PIX instant payments, the Brazilian central bank promotes lowering transaction limits and strengthening authentication measures. This includes encouraging the use of robust authentication methods like biometrics or SMS codes to verify transactions. In collaboration with industry partners, BCB is implementing additional countermeasures, including services like PIX velocity checks and the PIX Precautionary Block. The latter sends an alert and freezes transactions for 72 hours to allow for investigation. Moreover, efforts are underway to expedite the return of payer funds following confirmation of fraud or institutional failure (ACI Worldwide & GlobalData, 2024).

BCB made participation in PIX mandatory for all banks and payment institutions with over 500,000 transaction accounts. As of August 2024, there were 847 participants in the system, including 832 transactional account providers. Among other institutions, this group consisted of 73 banks, 577 credit cooperatives (unions) and 138 payment institutions (BCB, 2024).

Furthermore, PIX payments are gaining acceptance in other American countries, allowing Brazilian tourists to pay with PIX at certain points of sale in Argentina, Chile, Uruguay and the United States.

USA: FedNow

Despite its undisputed status as a leader in many areas, the USA is lagging in the development of instant payments. In 2023, instant payments accounted for only 1.5% of all transactions by number and just 0.7% by value (ACI Worldwide & GlobalData, 2024). This is anticipated to change due to the FedNow service launch in July 2023. The owner and operator of the FedNow service is the Federal Reserve. In its clearing and settlement capacity during its first year of operation, more than 900 financial institutions across the US have adopted FedNow, compared to around 600 financial institutions that utilise a real-time payment (RTP) system privately owned by The Clearing House Payment Company (a consortium of large banks). The Fed wants to connect the vast majority of approximately 9,000 financial institutions active in the US to the FedNow service (Federal Reserve, 2024).

Judging by the survey results conducted by the Federal Reserve in May 2024 among businesses and consumers, there is a strong demand for instant payments (FRB services, 2024). Furthermore, the prospects for FedNow seem promising when looking at the usage figures of Zelle and Venmo. These two services offer faster payments commonly used for P2P transactions among individuals. Zelle is a payment network established by major American banks, including Bank of America, JP Morgan Chase, U.S. Bank and Wells Fargo, whereas Venmo is a service offered by PayPal. According to Zelle, its P2P payment volume in the second quarter of 2024 increased by 26% year-over-year to \$115 billion. Consumers use Zelle mainly through bank apps although it is also available through a standalone app. In 2022, 80% of the US population was reachable through Zelle (Nunez, 2022).

The FedNow service operates on a fully scalable cloud-based platform that provides liquidity and fraud prevention tools to participating financial institutions. Settlement occurs in central bank money within the master or correspondent accounts of these institutions at the Federal Reserve. It is a decentralised (direct-connect) model, unlike the bank-owned RTP Network, where settlement is centralised and based on a pure pre-funding mechanism. However, both instant payment services – FedNow and RTP – process push payments (credit transfers), while popular American card networks rely on a pull mechanism.

Poland: Express Elixir and BLIK

There are two instant payment systems in Poland, i.e. Express Elixir and BlueCash. Both launched in 2012, making Poland the second European country, after the UK, to introduce real-time payments. BlueCash's operator is Autopay (formerly Blue Media), while Express Elixir is managed by the Polish domestic clearing house, KIR. BlueCash transactions are settled in commercial bank money, whereas Express Elixir enables settlement in central bank money.

An increasing number of transactions and the value of transactions characterise both systems. However, Express Elixir's growth has been more dynamic in recent years, largely due to the rapid uptake of P2P payments used by Polish individuals within the BLIK mobile payment system. The BLIK payment system (and scheme simultaneously), operated by the Polish Payment Standard company and established in 2015 by six commercial banks, supports several transaction types. In the second half of 2023, the most popular transaction types, based on the number of transactions, were online payments in e-commerce (52%), followed by P2P payments (24%), in-store payments (21%) and ATM withdrawals and deposits (3%). Among these transaction types, Express Elixir processes P2P payments in real-time, while the system

typically clears others in batches once per day. The first-morning session in the ELIXIR system is dedicated to clearing BLIK transactions generated in both e-commerce and in-store environments. Settlement occurs in central bank money through the RTGS SORBNET2 system, operated by the Polish central bank (NBP). The value of transactions in the BLIK system in 2023 was nearly 50% higher than in 2022, reaching 243 billion PLN. The growth of P2P payments was even more rapid, with a reported 93% increase year-over-year in value and a 71% increase in the number of transactions. Over 16 million Poles out of an approximate population of 37 million use BLIK (NBP, 2024).

Typically, consumers initiate BLIK payments using a six-digit code, except for some NFC-based in-store payments and P2P mobile payments sent to mobile phone numbers via a banking app. BLIK does not have a standalone app. Therefore, its payment feature must always be accessed through a bank app.

In 2023, Express Elixir processed around 200 billion PLN, approximately ten times more than BlueCash. While the value of transactions cleared in Express Elixir is still negligible compared to Elixir, which clears regular credit transfers in Polish zloty during three sessions a day (8.5 trillion PLN in 2023), the proportion in the number of cleared transactions is less overwhelming. Specifically, there were 370 million transactions in Express Elixir compared to 2.2 billion in Elixir in 2023, with the former growing much quicker (NBP, 2024).

European Union (EU): SCT Inst

The Single Euro Payments Area (SEPA) is an initiative aimed at integrating euro payments across Europe, eliminating distinctions between domestic and cross-border money transfers. SEPA comprises 36 countries in Europe, including all EU member states. Initially, it focused on standardising regular SEPA credit transfers (SCT) cleared in batches. With this goal fully achieved, priorities shifted in line with the EU Retail Payments Strategy announced in September 2020, which aims for instant payments to become “the new normal” in Europe (European Commission, 2020).

Moreover, SCT Inst covers credit transfers in euros, taking no more than ten seconds to transfer from the payer’s account to the payee’s account. The European Payments Council (EPC) launched the SCT Instant in November 2017. Backed by European banks, payment institutions, and industry associations, EPC collaborates with European institutions to manage SEPA payment schemes.

As of the second quarter of 2024, over 2,350 payment service providers (PSPs) joined the scheme, representing 65% of European PSPs and over 71% of PSPs in the euro area. The share of SCT Instant transfers accounted for approximately 19% of all SEPA credit transfers (EPC, 2024). Several years ago, the slow uptake of instant credit transfers in euros was deemed unsatisfactory given European ambitions to remain competitive globally. The European Commission (EC) identified obstacles inhibiting the optimal growth of real-time payments in the EU and, after extensive public consultations with all stakeholders, decided to implement legislation (European Commission, 2022). The Instant Payments Regulation (IPR, 2024) was published on 13 March 2024 in the Official Journal of the EU and became effective twenty days later.

The IPR is built on four key pillars: reachability, pricing, the IBAN check service and sanctions screening. Reachability refers to the capacity to send and receive instant credit transfers in euros, which is vital for increasing network effects. Moreover, it is envisaged that obligated entities will include not only banks but also payment institutions and electronic money institutions once they are granted access to designated payment systems. Regarding pricing, an impact assessment commissioned by the EC (European Commission, 2022) revealed that in countries where instant payments were subject to transaction fees considered dissuasive by payers, the adoption of real-time transfers was far below expectations. Therefore, the IPR stipulates that charges for instant credit transfers in euros cannot be higher than the corresponding fees for regular SEPA credit transfers. Concerns about the security of

instant payments in relation to fraud and errors have led to the requirement for a mandatory payee verification service, ensuring that payers can confirm the transfer recipient's identity by checking that the account number (IBAN) corresponds to the intended payee's name. Finally, the IPR aims to enhance the sanctions screening process by requiring PSPs to conduct daily checks of their customers against EU lists of entities subject to targeted financial restrictive measures. Current practices have indicated that for euro instant payments, performing unstandardised online sanctions screening for each transaction often resulted in the rejection of up to one in ten transfers. Subsequent reviews have shown that only a small fraction of these rejections should have occurred, while 99.8% of the transactions should have been processed ([European Commission, 2022](#)).

The IPR establishes fixed deadlines for compliance with requirements related to reachability, pricing, the IBAN check service and sanctions screening, with shorter timelines for eurozone countries and longer ones for non-euro countries. Most provisions for the former group will become binding in 2025, while those for the latter group will primarily take effect in 2027.

The EPC SCT Inst is a scheme, meaning it is a set of rules agreed upon by PSPs for executing and processing transactions with an instant SEPA credit transfer. It must connect to a clearing and settlement infrastructure to move funds, confirm payments, and notify payers of funds debited from their accounts and made available to payees. SCT instant euro credit transfers can be settled via TARGET Instant Payment Settlement (TIPS) or various private Automated Clearing Houses (ACH), such as RT1 from EBA Clearing. SCT Inst functionalities extend beyond basic features and offer value-added services, such as SEPA Request-to-Pay (SRTP) – a functionality provided by the EPC SRTP scheme that allows payees, such as public administrations and businesses, to send a request to a payer for a specific amount of money through email, SMS or a messaging app.

Discussion: cross-country comparison and lessons learned

The presented cases of countries with their instant payment systems allow for valuable comparisons and highlight critical success factors in driving real-time payment adoption. The EU is a conglomerate of member states that differ in the pace of development of innovative payment products and public readiness to embrace real-time payments. To overcome this obstacle and reduce the fragmentation level between payment markets in member states, a regulation, such as the Instant Payments Regulation (IPR), appears necessary to accelerate the desired outcome by establishing mandatory rules and deadlines. Market-driven cases like Poland, without explicit state backing, are slower to achieve high usage rates, although they report progress that we could consider substantial. Despite their large populations and significant payment market sizes, similar in this aspect to the EU, India and Brazil are more homogeneous and easier to navigate due to the actions of their central banks equipped with strong statutory powers to shape payment systems for the development's sake.

State-backed UPI and PIX demonstrate that the uptake of instant payments within a short time frame is possible when public-private partnerships are incentivised through instrumental prescriptions. Banco Central do Brasil (BCB) does not allow discretion in adapting PIX for larger banks and payment institutions with more than 500,000 accounts and is actively working on new developments and use cases (such as PIX for recurring payments, contactless PIX, etc.). The BCB is an infrastructure provider for the system and operates a central rulebook for PIX, which includes precise specifications for dedicated APIs that enable connection and utilisation of its functionalities. Similarly, NPCI in UPI establishes the rules related to transaction limits, security protocols to prevent fraud, and interchange fees defining the cost of UPI payments. The BCB is prescriptive but, to some extent, less stringent than NPCI in India regarding the imposition of government arrangements. In Brazil, PSPs can set transaction limits, interchange fees and security features like single or two-factor authentication.

On the other hand, the PIX approach to user data is more centralised than that of UPI, potentially allowing for quicker resolution of payment issues. PIX relies on a central database known as the Transaction Accounts Identifier Directory (DICT) to connect each user's PIX key with their corresponding transactional account information. In contrast, UPI is decentralised, storing user data by PSPs such as wallet providers PhonePe or Google Pay (Nuclei, 2024).

Historically, the USA has been strong in payments, home to major international card networks that have grown remarkably domestically and internationally. In addition, other American P2P payment solutions, like the bank-backed Zelle or PayPal's Venmo, originated from a market-led, bottom-up approach. However, this legacy has set a trajectory with its dynamics, which may not be conducive to an instant payment revolution. Thus, the Federal Reserve decided to step in and design the FedNow service as a clearing and settlement platform-based infrastructure. However, we may now perceive FedNow as competitive with existing solutions, such as the P2P payments mentioned above or the RTP network. Noteworthy, the Fed is acting less interventionist than central banks in Brazil and India.

Payment solutions are subject to network effects. The pricing for payers, payees and PSPs that utilise clearing and settlement mechanisms is key to achieving and progressing beyond the critical mass point. The latter component is less important from the perspective of market adoption of real-time payments. Still, it impacts PSPs' profit and loss accounts, especially when compared to fees charged for clearing and settlement of regular credit transfers and other payment instruments such as cards. TIPS, operated by the European Central Bank, has no fees for joining the system. However, the ECB recovers the costs of the system by charging monthly fees for holding accounts on the TIPS platform and by levying transaction fees of 0.2 euro cents as of January 2024. This fee is split equally between the sending and receiving participants in TIPS. In the US, the FedNow fee for each credit transfer is 4.5 dollars cents, and the sending institution bears this cost. In Brazil, the BCB charges PSPs a minimal fee, equivalent to BRL 0.01 for every 10 transactions processed, to cover the system's operational costs (information retrieved from ECB, the Fed and BCB websites). For network effects to take hold on the demand side of the market – between payers and payees – reachability of instant payments is a prerequisite. This entails the ability of payment accounts across different banks and non-bank PSPs to send and receive instant payment orders, supported by a robust and interoperable clearing and settlement infrastructure, potentially spanning multiple countries. In this analysis, I refer to such reach on the market's supply side as supply-side network effects. These effects facilitate the acceptance of instant payments by payees, typically merchants in P2B (or P2M) transactions, and the utilisation of instant payments by payers through their digital wallets and payment apps, thereby generating classical demand-side network effects.

As demonstrated by the cases of EU countries, the level of transaction fees imposed on payers for instant and regular credit transfers is crucial (European Commission, 2022). In countries such as France, Germany, Italy, Portugal and Slovenia, where instant credit transfers are subject to a premium rate over regular credit transfers, the adoption of instant payments has been notably slower compared to countries where the same transaction fee is charged for both types of credit transfers (European Commission, 2022). Prominent examples include Poland's BLIK P2P payments (processed via Express Elixir) and Spain's Bizum mobile payment system, which do not charge any transaction fee for instant payments and have reported strikingly high growth rates.

For P2M (or C2B) retail purchase transactions, whether in e-commerce or in-store, the four-corner business model with inherent interchange fees comes into play. In Brazil, even though not directly regulated by the BCB, transaction fees charged to merchants remain significantly lower for PIX instant payments than for alternatives such as card payments. An average merchant services charge for PIX is 0.22%, compared to 2.2% for credit cards and 1.1% for debit card payments (Duarte, Frost, Gambacorta, Wilkens, & Shin, 2022).

In India, NPCI directly regulates interchange fees. UPI instant payments are cost-efficient and often free of charge for merchants. If payments are made directly via UPI from one bank account to another, they are free for both the payer and the payee. Thus, all peer-to-peer, peer-to-merchant, and bank-to-peer/merchant's bank transactions have no associated interchange fee.

An interchange fee is only paid for P2M transactions executed through digital wallets called PPIs (prepaid payment instruments) and only when a transaction value exceeds INR 2,000 (approximately €20). The interchange fee is then paid by the merchant's bank (the payment's beneficiary) to the payer's bank. However, merchants can surcharge payers holding digital wallets (PPIs) to pass on their interchange fee costs. Interchange fees for UPI wallet-based merchant payments exceeding INR 2,000 vary according to merchant type from 0.5% to 1.1%. Interestingly, wallet loading also entails costs. PPI issuers must pay 15 basis points to the bank from which the transfer is initiated for wallet-loading amounts over INR 2,000 (PayU, 2024).

Recently launched instant payments such as Brazil's PIX, USA's FedNow or EU SCT Inst use data-rich and interoperable ISO 20022 messaging, which includes detailed payment information like beneficiary details and remittance information. Thus, it is becoming a global standard for electronic data exchange between financial institutions.

A key driver of network effects is not only platform-based technical interoperability and pricing setting but also close collaboration between ecosystem participants, i.e. banks, fintechs and bigtechs. This collaboration is often guided by central banks, as seen in the success of PIX in Brazil and UPI in India.

The UPI usage statistics demonstrate that fintech and bigtech players, acting as wallet providers (PhonePe, Google Pay and Paytm), have been instrumental in driving UPI adoption. The use of widely adopted bank-account-based systems and central banks' cost-recovery (non-profit) settlement mechanisms, like pan-European TIPS and Brazil's BCB Instant Payment System (SPI), has been crucial. In the EU, a meaningful approach to strengthening network effects by broadening the base of payment account providers offering SCT Inst payment services is to include fintechs operating under a payment institution or electronic money institution license on the list of potential direct participants in designated payment systems with access to central bank infrastructure (such as TARGET/T2 and TIPS). This inclusion is likely to foster greater competition and innovation within the EU's payment landscape, also in the context of instant payments' development.

Table 1 summarises the factors contributing to the rapid uptake of instant payments, as identified through the cross-country analysis of real-time payment schemes and systems conducted above.

Conclusions

Instant payments are gaining traction globally, but their adoption rates vary. This study identified factors contributing to their uptake by examining showcased instant payment systems from diverse regions. A combination of regulatory measures and market-driven initiatives fostered through strategic partnerships between banks, non-bank fintechs and big tech players is instrumental in accelerating the adoption of instant payments. Leapfrogging happens in regions or countries where central banks have a clear mandate to lead the transformation and face less impact from legacy systems. Moreover, a well-crafted strategy and regulation that aims to make instant payments to the new standard (e.g. the EU) can also expedite adoption. The limitations of this study stem from the number of countries and instant payment systems examined in detail, which could have been more extensive. Nevertheless, the selection of case studies spanning various regions was sufficiently representative to provide key insights into the critical factors facilitating the faster uptake of instant payments. As highlighted earlier, their economic and social implications are significant, including benefits for consumers and merchants through real-time transaction settlements, akin to cash

Table 1. Factors driving the widespread adoption of instant payments

Factor	Factor clarification	Country examples
Regulatory support	Regulation, active engagement from a central bank or other public authorities	<p>India (UPI) – NPCI established by the RBI, together with Indian banks, as the UPI operator governing the entire system strictly</p> <p>Brazil (PIX) – BCB as the infrastructure provider and the system’s rulebook owner, directly managing PIX development</p> <p>USA (FedNow) – the Fed providing clearing and settlement rails</p> <p>EU (SCT Inst) – EU enacting the Instant Payments Regulation (IPR)</p>
Open ecosystem and inclusive collaboration	Public-private alliances, inclusion of all PSPs in the instant payment ecosystem	<p>India (UPI) – NPCI platform, close cooperation of RBI with banks connecting bank accounts to UPI, providing digital wallets (PPIs) in the hands of fintechs and bigtechs</p> <p>Brazil (PIX) – mandatory participation for large banks and encouragement for all PSPs (smaller banks and payment institutions) to join the system</p> <p>USA (FedNow) – inviting all financial institutions to become FedNow participants</p> <p>EU (SCT Inst) – openness towards all PSPs to offer SCT inst, enabling direct access to designated payment systems for non-bank PSPs</p> <p>Poland – cooperation between Express Elixir and BLIK for BLIK P2P mobile payments, including more PSPs in the BLIK system as issuers and acquirers</p>
Network effects on the supply side of the market	Reach, interoperability, and common and reliable infrastructure	<p>India (UPI) – NPCI operating infrastructure for settlement of transactions and establishing common rules for PSPs and UPI users, ubiquitous use of UPI between banks and fintechs</p> <p>Brazil (PIX) – BCB in charge of processing PIX payments and managing a PIX rulebook and PIX API specifications, PIX in an offer of banks, credit cooperatives, and payment institutions, ISO 20022 message standard</p> <p>USA (FedNow) – cloud-based clearing and settlement infrastructure at the FED, enrolling new financial institutions, ISO 20022 message standard</p> <p>EU (SCT Inst) – Instant Payments Regulation with fixed deadlines for PSPs adopting instant credit transfers in euro, uniform pricing rules, verification of payee service, and sanction screening, ISO 20022 message standard</p> <p>Poland – constant inclusion of more banks in Express Elixir and BLIK systems, BLIK payment feature available in all bank apps</p>

(continued)

Table 1. Continued

Factor	Factor clarification	Country examples
Network effects on the demand side of the market	Pricing, bringing payers and payees on board, user-centric approach	India (UPI) – incentivising usage through abandoning transaction fees for payers and lifting or reducing interchange fees (and merchant service charges) for shops Brazil (PIX) – free-of-charge PIX payments for payers, low merchant service charges, significantly lower than those associated with debit and credit card payments EU (SCT Inst) – instant credit transfers in euro charged at rates no higher than those for regular credit transfers (under IPR) Poland (BLIK) – offering free P2P instant BLIK payments
Constant development through use cases and security improvements	New use cases for different payment setups (P2P, P2B, P2G, B2B, B2C, G2C, etc.), ongoing improvement of security measures	India (UPI) – new features such as announced in August 2024 BillPay for Business designed to streamline B2B transactions across various accounting platforms, and UPI Circle, enabling users to delegate payments to others, improving security protocols, expansion abroad to Asia, Europe, Middle-East and South America Brazil (PIX) – developing new use cases like Offline PIX, Automatic PIX, Guaranteed PIX and even a groundbreaking CBDC-based PIX super app (functionalities set to be launched progressively in late 2024 and throughout 2025), alerts and freezing funds in case of suspected fraud USA (FedNow) – continuous efforts to improve the current system features and develop new use cases such as BillPay and Request-to-Pay EU (SCT Inst) – plans to use SCT Inst in new payment solutions such as Wero digital wallet operated by the EPI (European Payments Initiative) aspiring to rival American card payments in Europe, prospects for widespread utilisation of SCT Inst in enhancing the quality of A2A open banking payments throughout the EU Poland (BLIK) – international expansion of BLIK, currently underway, with ongoing efforts to extend its reach to Slovakia and Romania, as well as to other European countries, integrating contactless BLIK into Apple’s ecosystem, integrating BLIK with Revolut’s platform, continuous initiatives to enhance the existing BLIK service among participating PSPs, focusing on providing improved user experience

Source(s): Own elaboration

payments, without requiring payment guarantees typical of deferred card transactions or batch-cleared credit transfers. For businesses, instant payments enhance working capital, improving cash management and optimising costs. A promising direction for further quantitative research on instant payments would be to assess the economic advantages of reduced money float in specific countries or regions.

References

- ACI Worldwide & GlobalData (2024). Prime time for real-time: The global real-time payments, Report.
- Arango-Arango, C. A., Ramírez-Pineda, A. C., & Restrepo-Bernal, M. (2021). Person-to-business instant payments: Could they work in Colombia?. *Journal of Payments Strategy & Systems*, 15(4), 376–397. doi: [10.69554/CPVU7215](https://doi.org/10.69554/CPVU7215).
- Balla, G. P., & Ilyés, T. (2016). Liquidity needs and liquidity costs of an instant payment system. MNB Occasional Papers, 124. Magyar Nemzeti Bank (Central Bank of Hungary).
- BCB (2024). *PIX statistics*. BCB press releases and news. Available from: <https://www.bcb.gov.br/en/financialstability/pixstatistics>
- Bech, M. L., Shimizu, Y., & Wong, P. (2017). The quest for speed in payments. *BIS Quarterly Review*. March. Available from: https://www.bis.org/publ/qtrpdf/r_qt1703g.htm
- Blach, J., & Klimontowicz, M. (2021). The determinants of PayTech's success in the mobile payment market—the case of BLIK. *Journal of Risk and Financial Management*, 14(9), 422. doi: [10.3390/jrfm14090422](https://doi.org/10.3390/jrfm14090422).
- Chmielarz, W., Zborowski, M., Fandrejewska, A., & Atasever, M. (2021). Poland–Turkey comparison of mobile payments quality in pandemic time. *Journal of Risk and Financial Management*, 14(9), 426. doi: [10.3390/jrfm14090426](https://doi.org/10.3390/jrfm14090426).
- Diadiushkin, A., Sandkuhl, K., & Maiatin, A. (2019). Fraud detection in payments transactions: Overview of existing approaches and usage for instant payments. *Complex Systems Informatics and Modeling Quarterly*, (20), 72–88. doi: [10.7250/csimq.2019-20.04](https://doi.org/10.7250/csimq.2019-20.04).
- Duarte, A., Frost, J., Gambacorta, L., Wilkens, P. K., & Shin, H. S. (2022). Central banks, the monetary system and public payment infrastructures: Lessons from Brazil's pix. *BIS Bulletin*, 52. doi: [10.2139/ssrn.4064528](https://doi.org/10.2139/ssrn.4064528). Available from: <https://www.bis.org/publ/bisbull52.pdf>
- EPC (2024). Service about the SEPA instant credit transfer (SCT Inst) run by the European payments Council. Available from: <https://www.europeanpaymentscouncil.eu/what-we-do/sepa-instant-credit-transfer>
- European Commission (2020). The EU retail payments strategy. Available from: https://finance.ec.europa.eu/publications/digital-finance-package_en
- European Commission (2022). Commission staff working document impact assessment report accompanying the document proposal for a regulation of the European parliament and of the Council amending regulations (EU) No 260/2012 and (EU) No 2021/1230 as regards instant credit transfers in euro. Brussels, 26.10.2022 SWD(2022) 546 final
- Federal Reserve (2024). The FedNow service exploration platform run by the federal Reserve. Available from: <https://explore.fednow.org/>.
- FRB services (2024). Faster/instant payments use is on the rise among businesses and consumers, 15 May 2024. Available from: <https://www.frbservices.org/news/fed360/issues/051524/fednow-service-faster-payments-survey>
- Grabowski, M. (2020). *Ustawa o usługach płatniczych. Komentarz [payment services act. Legal commentary]*. Warszawa: C.H. Beck.
- Harasim, J. (2021). FinTechs, BigTechs and banks—when cooperation and when competition?. *Journal of Risk and Financial Management*, 14(12), 614. doi: [10.3390/jrfm14120614](https://doi.org/10.3390/jrfm14120614).

- Hernández, L., Plooij, M., Hartmann, M., & Vandeweyer, Q. (2019). Are instant payments becoming the new normal? A comparison study. Occasional Paper Series, No. 229. European Central Bank.
- IPR (Instant Payments Regulation) (2024). Regulation (EU) 2024/886 of the European Parliament and of the Council of 13 March 2024 amending Regulations (EU) No 260/2012 and (EU) 2021/1230 and Directives 98/26/EC and (EU) 2015/2366 as regards instant credit transfers in euro.
- Khanna, K., & Samwani, U. (2023). The growth of digital payments in India- A case study of UPI. *Rabindra Bharati University Journal of Economics*, 27(2), 1–8.
- Khiaonarong, T., & Humphrey, D. (2022). Instant payments: Regulatory innovation and payment substitution across countries. 2022(228), 1. IMF Working Papers, 2022/228. doi: [10.5089/9798400221897.001](https://doi.org/10.5089/9798400221897.001)
- Kulk, E. (2018). Supporting the smooth uptake of instant payments: Pan-European infrastructure principles revisited and checked against the live RT1 system. *Journal of Payments Strategy & Systems*, 12(4), 328–334. doi: [10.69554/FBYP6649](https://doi.org/10.69554/FBYP6649).
- Lindsay, S. (2015). ISO 20022 and real-time domestic payments. *Journal of Payments Strategy & Systems*, 9(1), 22–29. doi: [10.69554/OJXT3105](https://doi.org/10.69554/OJXT3105).
- Lule Yawe, B., & Kiwala, Y. (2019). The role of real-time gross settlement in a world of instant payments. *Journal of Payments Strategy and Systems*, 13(3), 194–200, September.
- Masłowski, M. (2024). *Otwarta bankowość*. Warszawa: C.H. Beck. [Open banking].
- Matera (2024). PIX by the numbers. Available from: <https://insight.matera.com/pix-by-numbers-q2-2024>
- Mester, L. J. (2023). An update on the federal reserve’s instant payments service: FedNow. Federal Reserve Bank of Cleveland, Summer Institute 2023 Macro, Money, and Financial Frictions National Bureau of Economic Research. Cambridge.
- NBP (2024). Statistical data on payment systems in Poland. And Ocena funkcjonowania polskiego systemu płatniczego w II półroczu 2023 r. (Assessment of the functioning of the Polish payment system in the second half of 2023), Platform of Narodowy Bank Polski. Available from: <https://nbp.pl/system-platniczy/dane-i-analizy/ocena-funkcjonowania-systemu-platniczego/>
- NPCI (2024). Unified payments Interface (UPI) ecosystem statistics, Platform of the National Payments Corporation of India. Available from: <https://www.npci.org/in/>
- Nuclei (2024). UPI vs pix: Unpacking the similarities. Available from: <https://www.gonuclei.com/blog/upi-vs-pix-unpacking-the-similarities>
- Nunez, A. (2022). Zelle carries momentum thanks to network and capability expansions, 9 September. eMarketer. Available from: <https://www.emarketer.com/content/zelle-carries-momentum-thanks-network-capability-expansions>
- Oloveze, A. O., Ollawa, C. C., Chukwuoyims, K., & Onya, V. O. (2024). Cross-border product payments in sub-Saharan Africa! How MSMEs react to PAPSS as e-payment innovation: Moderating role of experience. *IIMS Journal of Management Science*, 5(2), 158–179. doi: [10.1177/0976030X241239195](https://doi.org/10.1177/0976030X241239195).
- PayU (2024). NCPI interchange fee: UPI payments will come at a cost. How does this affect you?. *PayU.In Blog*. Available from: <https://payu.in/blog/upi-interchange-fees-npci-payu/>
- Polasik, M., Widawski, P., Keler, G., & Butor-Keler, A. (2021). Retail Payments Strategy for the EU versus the challenges of the payment sector. *Ekonomia i Prawo. Economics and Law*, 20(3), 617–640. doi: [10.12775/EiP.2021.037](https://doi.org/10.12775/EiP.2021.037).
- Pranger, N. M. (2024). Instant payments: Providing the rails for new payment solutions. *Journal of Payments Strategy & Systems*, 18(1), 96–108. doi: [10.69554/RKOX7837](https://doi.org/10.69554/RKOX7837).
- Sadłakowski, D. (2017). The role of instant payment systems in the polish economy. *Copernican Journal of Finance & Accounting*, 6(2), 59–69. doi: [10.12775/CJFA.2017.011](https://doi.org/10.12775/CJFA.2017.011).
- Salmony, M. (2017). The future of instant payments: Are we investing billions just for mobile peer-to-peer payment?. *Journal of Payments Strategy & Systems*, 11(1), 58–77. doi: [10.69554/UEPL3194](https://doi.org/10.69554/UEPL3194).

- Schapiro, M. G., Moullem, P. S. B., & Dantas, E. G. (2023). Pix: Explaining a state-owned fintech. *Brazilian Journal of Political Economy*, 43(4), 874–892. doi: [10.1590/0101-31572023-3470](https://doi.org/10.1590/0101-31572023-3470).
- Shukla, R. (2024). UPI: Revolutionising real-time digital payments in India. Unlocking the Potential of A2A Payments Report 2024 by The Paypers.
- Ślązyńska-Kluczek, D. (2023). Płatności natychmiastowe euro jako kolejny etap integracji płatności w ramach Unii Europejskiej. *Nauki Ekonomiczne*, 37(7), 117–130. doi: [10.19251/ne/2023.37\(7\)](https://doi.org/10.19251/ne/2023.37(7)).
- Visconti-Caparrós, J. M., & Campos-Blázquez, J. R. (2022). The development of alternate payment methods and their impact on customer behavior: The Bizum case in Spain. *Technological Forecasting and Social Change*, 175, 121330. doi: [10.1016/j.techfore.2021.121330](https://doi.org/10.1016/j.techfore.2021.121330).
- Zalcewicz, A. (2011). European payments market integration process – regulation challenges. *Ekonomia I Prawo. Economics and Law*, 7(1), 321–340. doi: [10.12775/EiP.2011.020](https://doi.org/10.12775/EiP.2011.020).

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