



FUTURE OF CROSS-BORDER PAYMENTS

Who Will Be Moving \$250 Trillion in the Next Five Years?

Citi GPS: Global Perspectives & Solutions

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FUTURE OF CROSS-BORDER PAYMENTS

Who Will Be Moving \$250 Trillion in the Next Five Years?

The world of cross-border payments is at an inflection point. As the ecosystem is shaken up by new competition and technologies, there will inevitably be winners and losers. All players must remain nimble and adapt if they are to retain their market share and thrive. This report examines the challenges and opportunities faced by market participants at this pivotal time.

The fierce level of competition in cross-border payments is unsurprising given the rewards on offer. There is a race emerging — between new entrants and existing players, often with new business models — to seize a slice of the cross-border payments wallet.

The evolving landscape is also driven by changing behaviors, and heightened expectations, with consumers seeking a streamlined, transparent, 24x7 real-time experience, both domestically and across borders. These expectations have crossed over to the corporate and institutional client market as well. New business models, such as direct-to-consumer offerings, marketplaces, and shared economy models, are also spurring change in the payments world.

Competition is increasingly multi-faceted within the industry. Payments are moving away from traditional instruction methods, which are tied to batch and files, and moving toward application programming interface (API) connectivity. This is leading to a heightened opportunity for both FinTechs and other participants that will be enabled through traditional financial infrastructures. Regulation is also increasingly fostering innovation via initiatives such as open banking and there has been a consequent increase in players that can deliver technology nimbly and leverage digital client experiences as a differentiating factor.

“Our vision to be the preeminent banking partner for institutions with cross-border needs grows ever more relevant every day. With international networks fully engaged and payment activity continuing to grow across borders, clients need solutions that meet their global needs.

Our industry is on a journey to reach the next phase of evolution within cross-border payments. We're partnering closely with financial institutions, FinTechs, corporates, and industry experts — all of whom have contributed their perspectives in this paper — to continue building best-in-class experiences for clients and using technologies such as artificial intelligence and digital assets to make it happen.

I'm excited to see the immense opportunity that the next five years will bring as we work together to transform cross-border payments.”

— JANE FRASER, CEO, CITI

”



Shahmir Khaliq
Global Head of Services, Citi



Jane Fraser
CEO, Citi

This report builds on qualitative contributions from key market infrastructure experts — from within and outside of Citi — FinTechs, and a diversified set of banks spanning across four continents. It also outlines the key findings from a proprietary survey of more than 100 of Citi's financial institution clients. Their priorities were resoundingly clear: Speed, cost efficiency, and transparency are critical to delivering best-in-class client experiences.

We examine what it takes to deliver such an experience, explore technological innovation across the traditional fiat currency stack — including alternative payment methods and other industry-driven developments — and draw connections to the fast-changing digital asset space. Digital assets have yet to scale; however, interesting use cases, such as smart contracts and real-time liquidity, are already emerging. Artificial intelligence has captured significant mindshare in 2023 and could act as a catalyst for change in the payments market.

While leveraging the pace of innovative change, it is also imperative to stay focused on safety and soundness for clients while continuing to comply with the needs of the evolving regulatory landscape.

As we show in this report, best-in-class client experiences — leveraging new technologies — can address clients' key pain points and have the potential to transform cross-border payments for the benefit of all. Citi is proud to play a key role in this journey, and we hope these insights help you both understand and benefit from the dynamic future of cross-border payments.

We would like to thank the host of experts below who contributed their time, expertise, and insights to the report.



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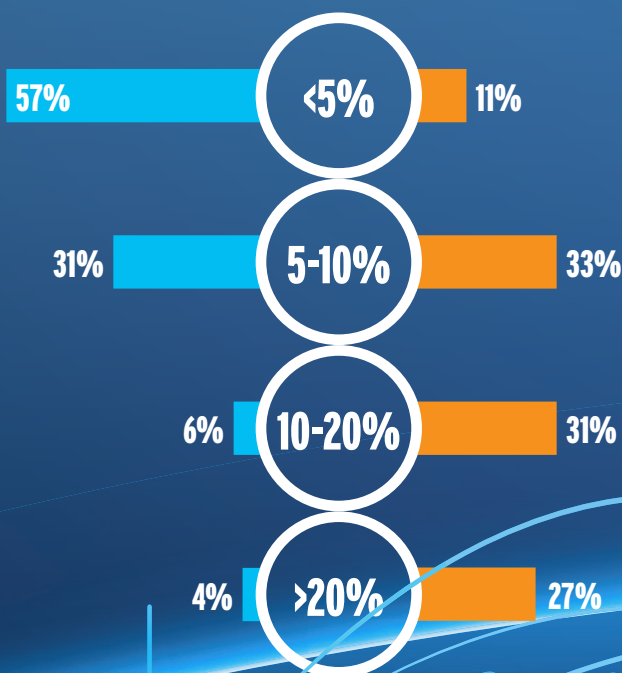
Delivering Best-in-Class Cross-Border Payments Experiences

GROWING REVENUE PIE IS ATTRACTING COMPETITION

With a revenue pie already at over **\$200 billion** and expanding at a high single-digit annual growth rate, and flows expected to reach **\$250 trillion** by 2027, competition in the cross-border payments market is increasing. Over 40% of banks have already lost at least 5% of market share to FinTechs, and 89% expect to lose at least 5% of their share to FinTechs in the next 5-10 years.

Past vs. Expected Market Share Loss (% of Respondents)

- How much market share has been lost to FinTech/Disruptors?
- How much market share will be lost to FinTech/Disruptors in 5-10 years?

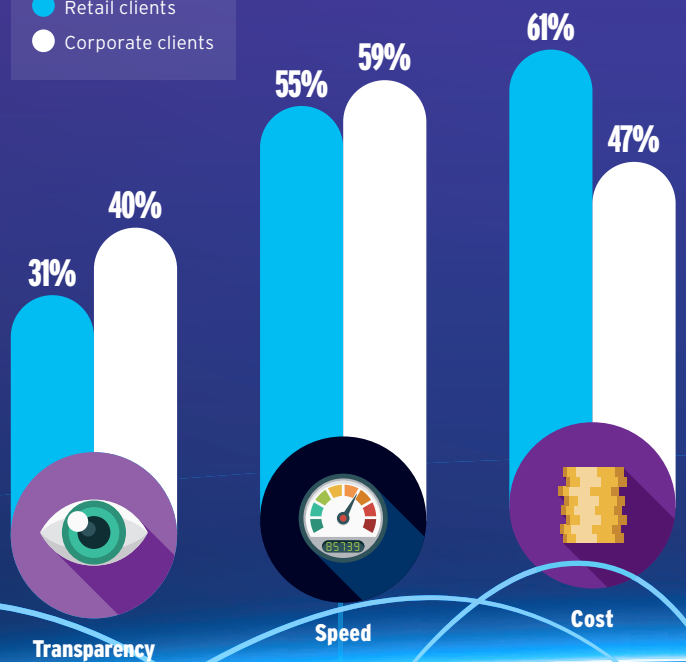


THE PAIN POINTS

In domestic transactions, consumers experience payments that are largely instant and fully traceable. Increasingly, these same expectations are being applied to the more complex cross-border space. This is driving a "consumerization" of corporate expectations, increasingly underpinned by a focus on speed, transparency, and cost efficiency.

Biggest Pain Points for Bank Clients

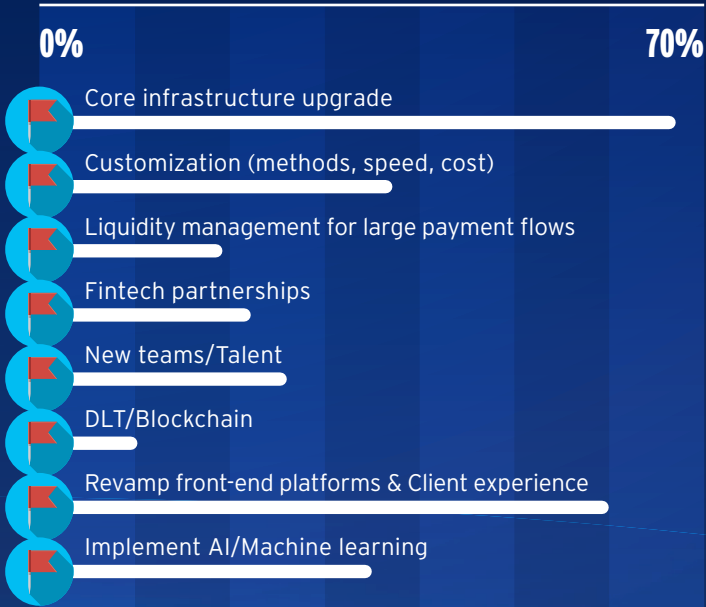
- Retail clients
- Corporate clients



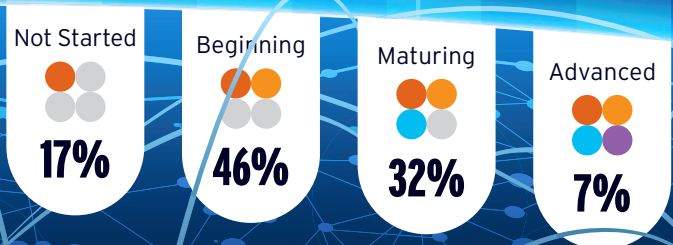
KEYS TO WINNING SHARE FOR BANKS

The changing cross-border payments space will favor those elevating and concentrating on the client experience. While over 50% of banks see the need to revamp their front ends to improve client experience, over 60% of respondents point to the need to upgrade their core infrastructure.

How Do Banks Plan to Compete Against Disruption?



Where Are Clients on their API Journey?



83% of banks recognize application programming interfaces (APIs) as the key technology to improve client experience. It is the enabler allowing them to expand their network through partnerships with network connectivity providers, elevate their capabilities, and deliver true digital client experience. Many incumbents, however, have to upgrade their legacy systems in order to take full advantage of APIs.



DELIVERING BEST-IN-CLASS CLIENT EXPERIENCES

To address the cross-border payment needs of clients looking for speed, cost efficiency, and transparency, financial institutions need to partner to deliver a digital-first client experience.



Transparency

Moving from ex post facto to up-front all the way from sender to receiver.



Speed

Maximize 24/7 availability and near real-time delivery.



Cost

Delivered through access to the most cost-effective channels & smart use of technology.

To both develop and deliver a best-in-class cross-border payment client experience, industry participants should consider:

Establish an end-to-end mindset



Aim for consolidation and simplification



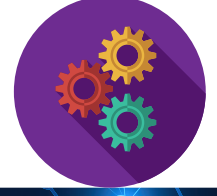
Harness the power of data



Focus on a dynamic, well-designed, intuitive journey



Ensure architectural validation and thorough testing



[A] Cross-Border Flows: Big and Growing

Globalization has increased individual economies' interdependence on each other. This has led to a rapid increase in the movement of goods, services, data and intellectual property (IP), people, and capital across borders and contributed to the importance of cross-border payments.

Globalization in recent decades has been driven by: (1) expansion of manufacturing supply chains across borders in the 1970s-80s; (2) growth of cross-border asset management and global investment flows, especially in the 1990s and 2000s; (3) surging international trade and e-commerce; and (4) rising international people flows.¹

It has become fashionable to talk about the death of globalization in recent years, and the 2010s post-financial crisis decade was marked by a more protectionist political stance on economic topics in many countries and the negative spill-over of European and global banks' balance sheet deleveraging.

However, cross-border flows have bounced back strongly post the COVID-19 pandemic, as evidenced in the data of people and goods flows. Trade volumes, relative to GDP, jumped back. COVID-19 further accelerated and deepened our reliance on e-commerce, digital goods, and the willingness to experiment with new form factors.

Trade in merchandise and services across borders also bounced back from its post-financial crisis decline. The value of exports amounted to almost 25% of global GDP in 2022, up from 23% in 2019 and 21% in COVID-affected 2020. The mix of trade is also changing, with increasing cross-border data and IP flows.



Globalization, driven by rising rates of flow of goods, people, ideas, and capital, underpin the growth we see in cross-border payments revenues, which have bounced backed strongly from 2020 pandemic lows and are forecast to continue growing at mid- to high-single digits over the next five years. B2B payments continue to dominate in absolute size. But the fastest growth area is expected in consumer-to-business payment flows, driven by e-commerce and other innovations. There is also a greater emphasis on client experience, and this has attracted new competitors, such as FinTechs, to satisfy consumer demands.

– DEBOPAMA SEN & AMIT AGARWAL, GLOBAL CO-HEADS OF PAYMENTS & RECEIVABLES, CITI



Cross-border commercial payments volumes reflect global trade flows and corporate activity — both inter- and intra-company. In this report, we will discuss the changing nature of these flows and how the payments industry needs to evolve to meet client expectations.

¹ Bank of England, "What Are Cross-Border Payments?," last updated on January 31, 2023

Financial flows remain robust, and many indicators of capital flows show a recent rebound. The U.S. dollar remains central to these flows. In 2022, global foreign exchange (FX) market daily volumes amounted to \$7.5 trillion on a net-net basis — more than double the turnover in 2007. The U.S. dollar remains one leg of 88% of all global FX trades. Similarly, the U.S. dollar also accounts for about 50% of commercial payments flows via Swift.

The share of the U.S. dollar in commercial payments flows and in global FX trading is approximately 2x the nominal GDP size of the U.S., reflecting both technical factors (e.g., liquidity attracts more liquidity via lower costs) and fundamental factors (e.g., a wide range of financial and commercial opportunities).

At the same time, a lot is changing in the world of payments. Advancements in technology and improvements in payments systems and financial market infrastructure, combined with a shift in customer preferences and behavior, are changing the way we transfer value inside and across borders.

Embedded finance and open banking can leverage application programming interfaces (APIs) to provide payments in new places and via new providers. The Metaverse could provide a new channel of experiences. Artificial intelligence could provide revenue through behavior prediction to facilitate cross-selling or to mitigate risk.

During the next few years, we expect to see further improvement in the “fiat stack” for cross-border payment flows, with a growing share of non-bank and FinTech players participating. Over the longer term, likely later in the 2020s, we expect to see more of an impact from digital assets, as supplementary cross-border rails.



Fiat industry innovation focuses around moving to the nirvana of true 24x7. Real-Time Gross Settlement (RTGS) systems are striving to an ‘always on’ model and initiatives exist to bring domestic offerings that are instant and 24x7 into a multilateral network. Alternative payment methods (APMs), such as digital wallets, provide another fiat solution to deliver faster and cheaper payments. There are also industry efforts, such as Swift gpi, to solve for the need of cross-payment transparency.

While digital ‘money’ has existed for some time, money and value being tokenized and programmable has gained a lot of attention recently. Tokenized commercial bank money may have advantages vis-à-vis stablecoins in terms of compliance with KYC and AML. Tokenization of public and private money is being heavily explored and the Regulated Liability Network (RLN) is an example of thought leadership developed with the aim of tokenization of central bank and commercial money sharing the same ledger. Finally, Central Bank Digital Currencies (CBDCs) are already being introduced around the world, moving from research to pilots, and in some countries a broader use.

– DEBOPAMA SEN & AMIT AGARWAL, GLOBAL CO-HEADS OF PAYMENTS & RECEIVABLES, CITI



Sizing the \$250 Trillion Cross-Border Opportunity

The underlying drivers of payments volume growth are strong, but change is ever present and creates opportunities and risks.

In this opening chapter of the report, we provide an overview of the shape and mix of cross-border flows and the cross-border payment opportunity. In the Future of Cross-Border Payments chapter, we do a deep dive into innovations and improvements in the existing fiat stack and the options offered by digital and other emerging technologies.

Throughout the report, we also include contributions from active participants in this trillion-dollar market, with input from around the world. Hopefully everything you ever wanted to know about cross-border flows and payments will be answered by this Citi GPS report, including a payments primer in the How Do Cross-Border Payments Work? chapter.

Famously, cross-border payment flows in the banking world involve a message crossing borders and the financial settlement, typically happening inside borders, between commercial banks via the central bank or even inside the same commercial bank if both counterparties of the transaction are the bank's client.

The Bank of England, on its website, quotes a forecast market size for cross-border payments of \$250 trillion by 2027.



The value of cross-border payments is estimated to increase from almost \$150 trillion in 2017 to over \$250 trillion by 2027, equating to a rise of over \$100 trillion in just 10 years.

Factors that are intensifying over recent years include: (1) expanding manufacturing supply chains across borders, (2) cross-border asset management and global investment flows, and (3) international trade and e-commerce.

– BANK OF ENGLAND²



When sizing the cross-border payments opportunity, our first challenge is how to define a cross-border payment. The primary component is commercial payments — payments executed by financial institutions on behalf of their clients (e.g., individuals, corporates, and small- and mid-sized enterprises). This includes single currency flows (e.g., U.S. dollar) between entities or individuals in different countries, that are ultimately executed via central bank accounts in only one country (e.g., the U.S. for U.S. dollar). It also includes cross-border inter-company flows for multi-nationals, often executed on the books of one commercial bank.

The second component is treasury payments — payments that are typically related to the settlement of inter-bank trades, securities, FX, money markets, or similar. We note that these treasury payments are typically very low margin flows in payment revenue terms.

² Ibid.

Stripping out inter-company and bank-to-bank flows, which are typically very low margin, and focusing only on external client transactions gives us a smaller market size. Industry estimates for this market typically include cross-border, inter-company business-to-business (B2B) flows and consumer flows (e.g., business-to-consumer (B2C), consumer-to-business (C2B), and consumer-to-consumer (C2C)).

Cross-border payments industry revenues totaled approximately \$240 billion globally in 2022, according to McKinsey & Company estimates (Figure 1). While geopolitical tensions and economic uncertainty are headwinds, the recovery of cross-border consumer spending, typically online spending, is likely to support growth.

Based on historical trends, cross-border payments revenues are likely to grow in line with nominal GDP growth. However, we believe businesses that are willing to invest and innovate in the space should gain market share and see compound annual revenue growth in the high-single digits over the next five years.

B2B payments represent the bulk of the cross-border payments and revenue flows, although they have among the lowest margins. By contrast, retail payments enjoy higher margins and, despite their small share in cross-border payments flows, they account for a nearly one-third share of revenues (Figure 1).

Banks account for the lion's share of B2B and B2C cross-border payments. By contrast, we are seeing the emergence of several new FinTech disruptors in the high-margin C2B and C2C segments.

Figure 1. Global Cross-Border Payments Revenues, 2022

	Payment Flows \$ trillion (% of total)	Revenue Margin, %	Revenues \$ billion (% of total)
B2B	149.3 (98%)	0.1%	165 (69%)
B2C	1.6 (1%)	1.4%	22 (9%)
C2B	1.3 (1%)	2.7%	35 (15%)
C2C	0.5 (0%)	3.4%	18 (7%)
Total	153	0.2%	240

¹ Includes 47 countries accounting for ~90% of global GDP: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Italy, Japan, Korea, Malaysia, Mexico, Morocco, Netherlands, Nigeria, Norway, Pakistan, Peru, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, UK, U.S., and Vietnam.

² Payment flows indicate average of outbound and inbound transactions for countries covered.

Source: McKinsey Global Payments Map

Mapping Major Payment Flows

Payments, including cross-border payments, are typically split by industry practitioners and experts into two categories: commercial and treasury.

- **Commercial Payments:** Payments executed by banks, payment institutions (PIs), and payment service providers (PSPs) on behalf of third parties, who are typically corporations or individuals that are making payments to suppliers for goods and services, intercompany transfers, or remittances.³ These are the payments provided as services for which banks, PIs, and PSPs seek direct or indirect compensation. These payments are the focus of this report as they make up nearly 90% of the revenue opportunity within the cross-border payments “revenue pie.”
- **Treasury Payments (Bank-to-Bank Transfers):** Payments that are typically in the settlement of inter-bank trade, securities, FX, money market, or other capital markets transactions and tend to be significant in terms of value transacted.

While there are more than 150 different currencies in the world, cross-border payments are mainly concentrated in a small number of currencies. The U.S. dollar and euro have been the dominant currencies over the years, with each having a nearly 40% share of cross-border payments, as per an IMF Working Paper, using Swift data.⁴ However, we note that major euro clearing systems run on Swift, while U.S. dollar clearing systems often run on proprietary messaging. So, the true contribution of the U.S. dollar to cross-border payments could in fact be larger than what is reflected in the Swift data.

A few other currencies, including the British pound, Japanese yen, Australian dollar, Hong Kong dollar, and Canadian dollar, have low- to mid-single digit shares, according to the same IMF paper.⁵ The Chinese renminbi has gained traction in the last decade, but usage remains small, and share is in the low-single digits.

More broadly, a recent paper from the Federal Reserve devised an index to assess the evolution of the U.S. dollar’s international role.⁶ This index combines five measures of the dollar’s “reserve currency” status, including its share of official currency reserves, FX transaction volumes, foreign-currency debt instruments outstanding, cross-border deposits, and cross-border loans.

³ As companies get larger, a rising proportion of their payment activity is intercompany payments and company-to-bank payments. Intercompany payments arise as goods go back and forth across internal subsidiaries in the process of assembly to sale, and because these payments are used by companies to centralize their liquidity. Once that liquidity is centralized, companies conduct FX, money market investments, or other transactions with banks and settle them. Although these are not treasury payments in the standard Financial Institution definition (as they are not Bank-to-Bank payments), they are in fact for corporate clients’ treasury management purposes.

⁴ Hector Perez-Saiz, Ms. Longmei Zhang, and Roshan Iyer, “Currency Usage for Cross-Border Payments,” IMF Working Papers, March 24, 2023.

⁵ Ibid.

⁶ Carol Bertaut, Bastian von Beschwitz, and Stephanie Curcuro, “The International Role of the U.S. Dollar Post-COVID Edition,” FEDS Notes, Washington: Board of Governors of the Federal Reserve System, June 23, 2023.

The conclusion is that the global role of the dollar has remained dominant and remarkably stable over the past two decades. The international usage of the Chinese renminbi has risen but remains below Japanese yen and British sterling usage levels and substantially below euro levels. On global trade invoicing, which is not included in this index, the Federal Reserve paper finds the euro dominates in Europe, but the dollar is preeminent in other parts of the world, especially in the Americas.

We strongly expect that the dollar will continue to serve as the leading international currency through the end of this decade and likely well beyond. The world's preference for the dollar flows first from the deep and liquid capital markets in the U.S. In this respect, we view the U.S. dollar and U.S. markets as unrivaled.

Second, the world is familiar with the U.S. dollar ecosystem, including the conventions of financial markets, the legal and policy environment, and the regulatory framework.

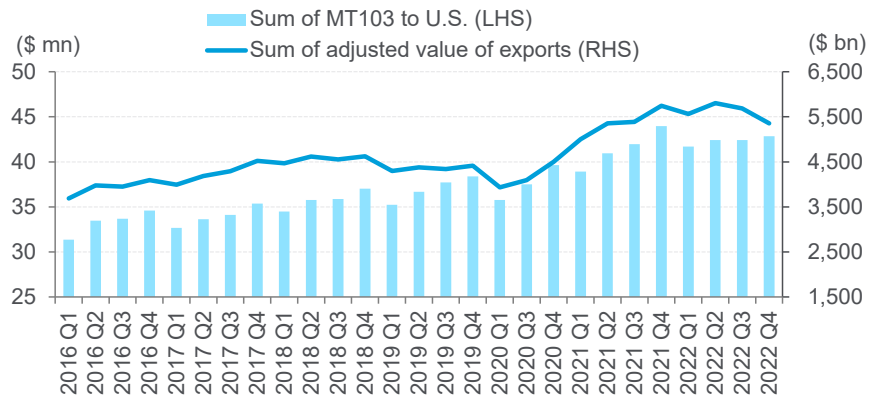
Third, during periods of global stress, the U.S. Federal Reserve has shown a willingness to step up and act as a global lender of last resort, including through the provision of swap lines to address shortages of dollar liquidity.

All that said, given China's significant role in global trade, we would not be surprised to see the renminbi expand its footprint as a trade-invoicing currency, especially in Asia. But the U.S. dollar's usage role in financial markets seems likely to show greater persistence.

[1] Commercial Payments and International Trade

Cross-border commercial payments matter. They are a necessary ingredient for any business to operate beyond its shores because they allow for the flow of goods and services. They are the fuel for a global economy to operate, as they enable cross-border trade and investment.

Figure 2. Swift Payment Volumes vs. Value of World Exports, 2016-22



Notes: Value of exports adjusted for inflation on a January 2016 constant US\$ basis. Swift payment messages data is the aggregate of commercial and treasury payments for all currencies.

Source: Swift data, International Monetary Fund, Citi GPS

As an indicator of cross-border payment activity, we look at wires in U.S. dollars processed over Swift (the main communication channel for such payments, where MT103 refers to cross-border or international wire transfers for commercial payments), which are very strongly correlated to global imports and exports in the long run (Figure 2). This correlation saw some disturbances during the COVID-19 pandemic when payment volumes outperformed global imports/exports, driven by increased Treasury activity on the back of market volatility.

Global trade volumes have exploded over the past five decades or so. In the early 1970s, global merchandise exports were equivalent to about 10% of GDP. By 1990, the figure was close to 15% and by 2008, those volumes peaked at 26%, before going into reverse with the Global Financial Crisis (GFC) (Figure 3).

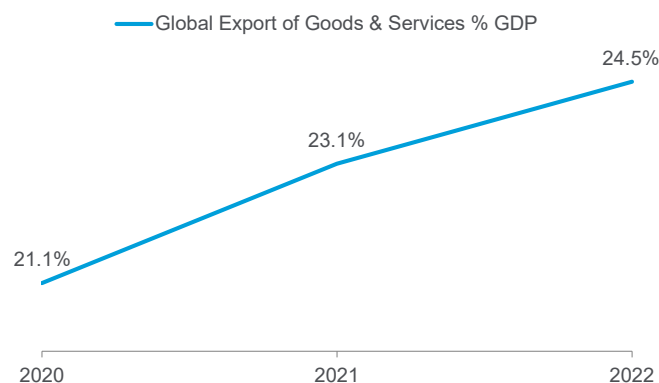
Following the COVID-19 low in 2020, global trade-to-GDP recovered, rising from around 21% in 2020 to 24.5% in 2022. Over the next few years, we expect trade to broadly track nominal GDP growth.

Figure 3. Global Exports of Goods/Services % of GDP, 1827-2022



Note: Data for 2015-2022 from World Bank, adjusted in-line with CEPII 2016 data.
Source: Fouquin and Hugot (CEPII 2016), OurWorldinData.org, The World Bank, Citi GPS

Figure 4. Global Exports of Goods/Services % of GDP, 2020-22



Note: Data for 2015-2022 from World Bank, adjusted in-line with CEPII 2016 data.
Source: Fouquin and Hugot (CEPII 2016), OurWorldinData.org, The World Bank, Citi GPS

[2] Treasury Payments and Global FX Markets

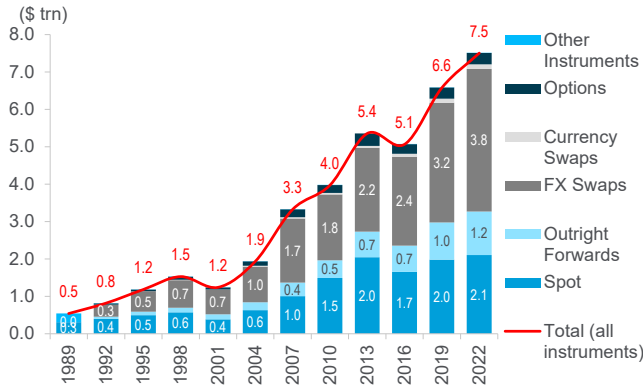
Global cross-border capital markets activity is sizable and steadily growing. Turnover in over-the-counter foreign exchange (OTC FX) markets averaged \$7.5 trillion per day in April 2022 on a net-net basis, across all foreign exchange instruments. This represents a 6% compound annual growth rate versus 2007 (Figure 5).

The overall size of the global FX market is enormous — nearly 17x the value of global nominal GDP. Growth of financial (rather than commercial) cross-border trade flows further accelerated growth in the FX swap and derivative markets in the 1990s and 2000s. Surging capital flows and growing financialization in the 2000s were also key drivers.

Financial flows have slowed in recent years amid rising geopolitical tensions and the partial unwinding of the global policy consensus around the value of open and integrated markets. However, what has not changed is the hegemonic role of the U.S. dollar in international flows.

According to data from the Bank of International Settlements (BIS), 88% of all trades in 2022 had the U.S. dollar on one side, a similar level to 2019. Meanwhile, in the same year, the euro was on one side of 31% of all trades, the Japanese yen 17%, and British sterling 13%. The share of Chinese renminbi in FX turnover rose to 7% in 2022 from just 1% in 2010 (Figure 6).

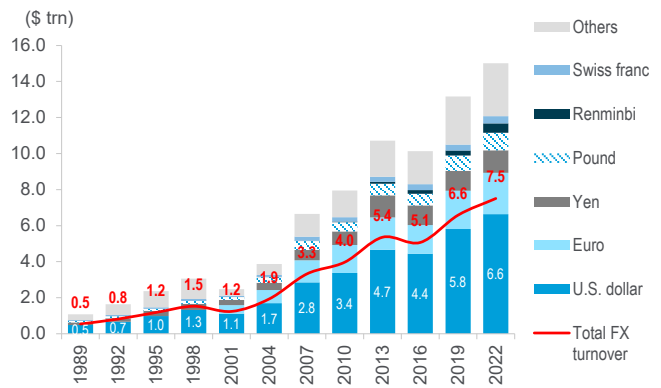
Figure 5. Global Foreign Exchange Turnover by Instrument, Daily Averages, \$ Trillions, Net-Net Basis



* Data from Bank for International Settlements "Triennial Central Bank Survey of Foreign Exchange and OTC Derivatives Markets". The material is available on the BIS website free of charge: www.bis.org

Source: Bank of International Settlements, Citi GPS

Figure 6. Global Foreign Exchange Turnover by Currency, Daily Averages, \$ Trillions, Net-Net Basis



* Data from Bank for International Settlements "Triennial Central Bank Survey of FX and OTC Derivatives Markets". Material available freely on BIS website.

^ Because two currencies are involved in each transaction, the sum of the percentages shares of individual currencies totals 200% instead of 100%.

Source: Bank of International Settlements, Citi GPS

Settling this activity occurs via bank-to-bank Treasury payments, often on a net basis. As a result, the nominal value of payments often tends to be lower than the value of the underlying financial activity.

Furthermore, the revenue opportunity from processing Treasury payments is not nearly comparable to commercial payments — the revenue pie for Treasury payments is nearly 10x smaller than for commercial payments.

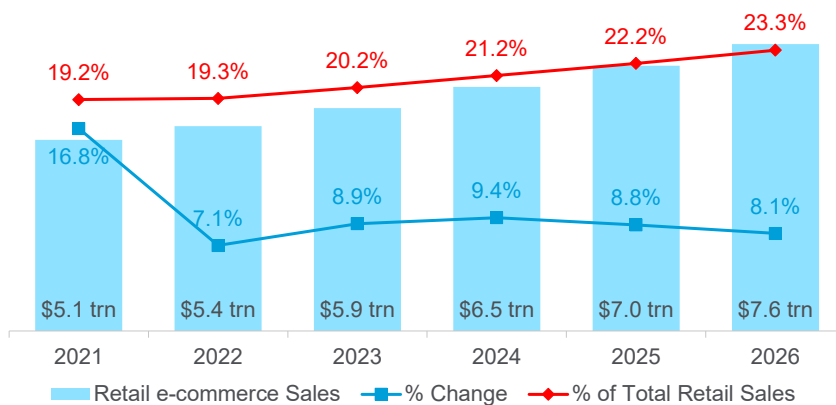
Despite limited opportunity for revenue, banks operate as correspondents or intermediaries for such payments (more on this in the How Do Cross-Border Payments Work? section) and the minimum viable product (MVP) for cross-border payments depends on banks being able to process such payments.

[3] Growth of Commerce and Online Marketplaces

Rising internet and mobile phone penetration over the last three decades has revolutionized the way we shop, spurring the growth of e-commerce and social commerce. With internet access, we can buy almost anything with just a few clicks, from the comfort of our homes.

Global retail e-commerce sales are estimated to grow at a 9% compound annual growth rate, rising to \$7.6 trillion by 2026 from \$5.4 trillion in 2022, according to forecasts by eMarketer. The share of e-commerce as a percent of total retail sales is also expected to increase, rising to 23% in 2026 from 19% in 2022 (Figure 7).

Figure 7. Retail e-commerce Sales Worldwide, 2021-26E



Note: Includes products or services ordered using the internet, regardless of the method of payment or fulfillment. Excludes travel and event tickets, payments such as bill pay, taxes or money transfers, restaurant sales, food services and drinking place sales, gambling, and other vice goods sales.

Source: eMarketer, December 2022 ([InsiderIntelligence.com](https://www.insiderintelligence.com))

As competition in the market intensifies, businesses are focusing on improving the customer experience by streamlining purchasing processes, providing personalized recommendations, and offering faster shipping options, among other strategies. They are also exploring the use of innovative new technologies such as augmented reality (AR) and virtual reality (VR), to help customers visualize and experience products before they make purchases.

The expansion of global logistics and shipping networks also makes it easier and more cost-effective for businesses to ship products internationally, despite complex customs regulations. The proliferation of digital payment options — such as mobile wallets and credit and debit cards — is another enabler of online purchases.

As customers increasingly use the internet to buy products from around the world, cross-border transactions are on the rise. Global cross-border e-commerce is expected to exceed \$3.3 trillion in 2028, up from \$1.6 trillion in 2023, according to Juniper Research. Asia Pacific is the largest market for cross-border e-commerce, accounting for over 40% of global sales.⁷



Asia and Africa are the hotspots for cross-border payments with expected growth of 10%-15%, significantly higher than conventional markets. The customer experience of instant, seamless, and well-integrated payments on e-commerce platforms is driving a shift in customer expectations for cross-border payments. With growing consumerization, customers expect everything to be digital now, with instant settlement and at significantly lower or zero cost.

– MATT HIGGINSON, PARTNER, MCKINSEY



⁷ Juniper Research, “Cross-Border e-Commerce: Key Trends, Regional Analysis & Market Forecasts, 2023-2028,” July 2023.



Nathan Sheets
Global Chief Economist
Citi



Given the complex economic and geopolitical environment, we do not expect new peaks in financial or trade flows in the immediate future. But over a longer horizon, we see the globalization of data, intangibles, and intellectual property as almost inexorable and likely irreversible, since it is tied to advancing technologies and human desires to learn, communicate, and exchange ideas and perspectives. Such globalization of intangibles is likely to drive incremental cross-border payments flows.

– NATHAN SHEETS, GLOBAL CHIEF ECONOMIST, CITI



2020s Global Flows — A Macro Perspective

Global trade accelerated in the decade before the Global Financial Crisis, supported by a broad set of factors including (1) China's integration into the global economy, (2) the deepening integration of European economies, and (3) the ongoing implementation of major trade deals, including the North American Free Trade Agreement (NAFTA) (see Figure 8).

Spurred by reduced protectionism and lower trade costs, companies looked for ways to globally diversify their supply chains. But trade growth and supply chain integration slowed appreciably in the 2010s, as many of the factors that had supported the 1990s-2000s surge in trade ran their course, or even reversed.

Through much of the 1990s and early 2000s, as the global economy rapidly integrated, trade growth meaningfully exceeded GDP growth. But in the current landscape, we expect global trade to grow roughly in line with GDP, not outpace it.

The post-pandemic global economy is likely to see meaningful shifts in trade and investment patterns. There has been a significant drop in China's share of U.S. trade in recent years in the face of tariffs and related geopolitical tensions. Mexico, and to a lesser extent other Latin American countries, are looking like beneficiaries of this realignment, and this is likely to continue in the future.

More broadly, the past few years have highlighted some previously unforeseen economic and geopolitical risks embedded in far-flung trade relationships and supply chains. Going forward, we expect globally active firms to shift to "China Plus One" or "China Plus Two" sourcing strategies — where production and supply chain activities are expanded to one or more countries beyond China — and to seek increased diversity in their supply chains and trading relationships.

Experiences during the pandemic have raised further questions about global supply chains, including whether countries should foster domestic production (and resist trade dependence) in key industries including semiconductors, pharmaceuticals, and medical equipment.

The nature of global integration and connectivity is also changing. Increased data flows and other intangibles, including intellectual property, are a notable feature of the 2020s global economy (Figure 9). We see this rise as both a signal of the depth of globalization and a driver of further globalization going forward.

By our reckoning, this uptrend reflects two major factors. First, the ongoing expansion of trade, travel, and financial flows necessarily brings with it a need for people around the world to communicate and exchange information (and with this

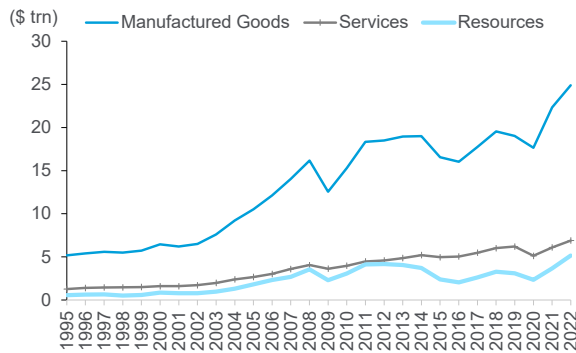
may come an increased need to transact cross-border). Good ideas are quickly shared (or licensed) for use around the globe.

Second, the growth in communication and information transfer is also due to the growing needs of businesses and individuals as they expand their geographic footprint. This is also reflected in the improvement of technology that enables communication and information transfer. The rise of AI, and the associated data and communication demands, will accelerate this trend.

Deepening financial integration has been another aspect of the globalizing economy (Figure 11). Key metrics of financial globalization — including foreign direct investment and portfolio equity flows — surged upward in the decade before the Great Financial Crisis but have moved sideways in recent years.

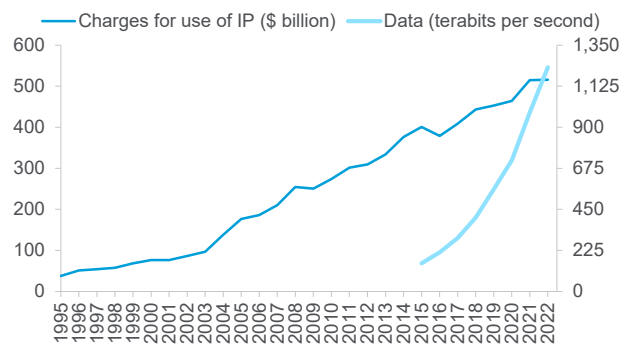
Foreign direct investment flows retrenched in 2008, likely reflecting the global deleveraging that occurred. They recovered somewhat through the first half of the 2010s and then fell off sharply with the upsurge in U.S.-China tensions and the Brexit vote later in the decade. Equity flows have manifest significant variability but trended up from just under \$1 trillion in 2005-07 to roughly \$1.5 trillion early in the pandemic.

Figure 8. Global Flow of Trade, \$ Trillion, 1995-2022



Source: Refinitiv Eikon Datastream, Oxford Economics, World Trade Organization, Citi GPS

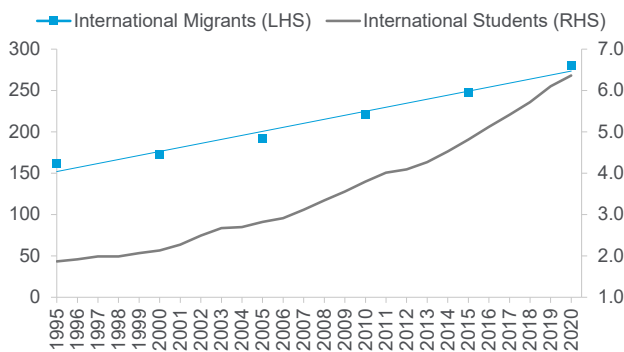
Figure 9. Global Flow of Intangibles, 1995-2022



Note: Data refers to the international bandwidth usage

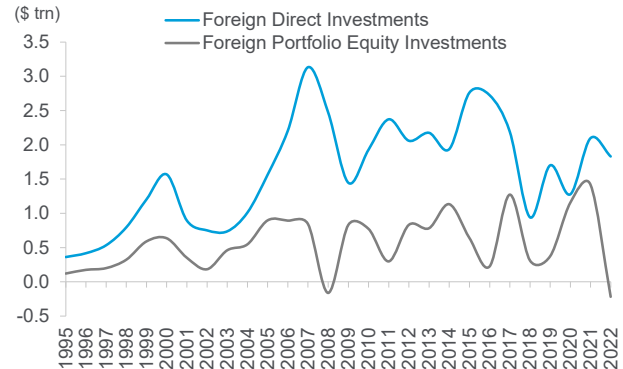
Source: International Telecommunication Union, World Bank, Citi GPS

Figure 10. Global Flow of People, Millions, 1995-2020



Source: United Nations, UNESCO Institute for Statistics, Citi GPS

Figure 11. Global Flow of Capital, \$ Trillion, 1995-2022



Source: IMF Balance of Payments, Citi GPS

The bounce back in global trade in 2021 and 2022 looks to be a one-off reset and was largely a one-off reset reflecting the strong recovery in the global goods sectors following the COVID-19-related lockdowns. Global consumers quickly realized that the consumption of goods was generally compatible with the public health constraints during the pandemic, and goods demand surged upward.

On the production-side of the economy, broad swathes of the global goods sector were caught off-guard by the favorable shift in demand. As a result, along with recovering export volumes came episodic shortages and a sharp increase in goods inflation, which lifted the dollar value of global trade. Such price effects were reinforced by sharply rising commodity prices in early 2022. However, the trend of further globalization of data, intangibles, and intellectual property is likely to continue on a strong growth trajectory, fueling the demand for associated incremental cross-border payments.

A Changing Payment Industry



Debopama Sen
Global Co-Head of Payments and Receivables, Citi Treasury and Trade Solutions

While the size of the global cross-border payments industry is growing in-line with nominal GDP, the rapid industry changes we discuss in this report and the likely associated market share shifts will create organic alpha generation opportunities. The ongoing mix shifts in underlying macro and sector trends (faster growth in cross-border consumer spending and more flows in intangibles and data) plays to the strength of new entrants and challenges incumbents.

The biggest cross-border payments segment is business-to-business (B2B), generating revenues at least three times those of consumer-facing activities. The small- and medium-size enterprise (SME) sector poses a significant opportunity, with sizable volumes and revenues from cross-border payments (see Figure 12 as an illustration using flows, revenues, and margins in each use case from Asia Pacific).



Amit Agarwal
Global Co-Head of Payments & Receivables, Citi Treasury and Trade Solutions

Figure 12. Cross-Border Payment Flows and Revenues,¹ Asia-Pacific including China,² 2021

Use Cases	Flows (\$ trillions)	Revenues (\$ billions)	Margin (basis points)	Expected Decline in Banks' Market Share
B2B	~90	~49	~5	↓
SMEs	~6	~20	~35	↓↓
B2C	~0.8	~20	~65	↓
C2B	~0.6	~8	~140	↓↓
C2C	~0.4	~5	~380	↓↓↓
	↓ Slight decline	↓↓↓ High decline		

1 Includes both inbound and outbound payment flows.
 2 All use cases except C2C include data for 12 Asia-Pacific countries representing more than 90% of GDP, C2C includes data for all Asia-Pacific countries.
 3 SMEs defined as companies with 50-100 employees; SME share is based on the share of SMEs in imports and exports of goods for Asia-Pacific.
 4 Revenues/margins only from outbound remittances originating from Asia-Pacific.
 Source: McKinsey Global Payments Map

Banks are losing market share in cross-border payments to non-banks. Between 2014 and 2021, non-bank market share rose to 12% from 5% and is expected to grow to 17% by 2024 (Figure 13). The share gains made by FinTechs tend to come through solving problems including lowering pricing, speeding up execution with a large range of products, increasing convenience and minimizing manual inputs, and digitalizing of processes.⁸

“ FinTechs have (1) a leaner business model that lowers the overall cost of processing, (2) high speed/instant settlement, and (3) a digitally native user interface. Banks can leverage sticky customer relationships and can compete with FinTechs by lowering cost and improving their interface.

– MATT HIGGINSON, PARTNER, MCKINSEY

”

⁸ McKinsey & Company, “How Asian Banks Can Regain the Cross-Border Payments Crown,” February 8, 2023.



FinTechs are a competitive threat in the Colombian payments market. They often pick a specific service and specialize in it, enabling them to offer great customer service at speed. FinTechs, with more agile structures and a focus on customer experience, tend to be quicker to market with new launches and offer a more seamless product. This has increasingly led to customers switching to FinTechs for specific needs.

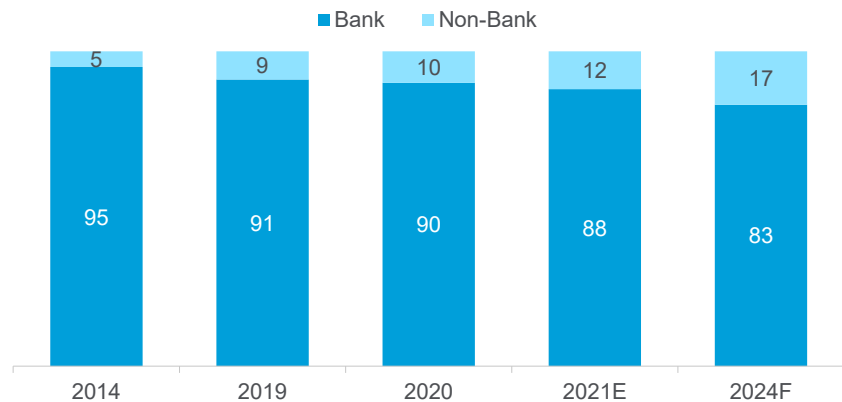
By contrast, banks with stricter regulatory requirements, face several structural challenges. For example, incumbent banks face extensive risk management processes (internal and external). This is often the leading cause of cumbersome end-user processes and longer turnaround times. New product launches by banks also go through elaborate approval processes, which lead to delays. Banks also tend to have higher costs due to their large structures and physical presence. To better compete with FinTechs, incumbent banks need to think differently and reimagine traditional processes.

– MARCELA BORRERO CARDENAS, INTERNATIONAL BUSINESS MANAGER, BANCO DE OCCIDENTE



Recent analysis from Bain & Co on customer behavior and loyalty in banking states “although many of the digital insurgents initially targeted lower-income households, our survey shows that people with higher levels of income and formal education are also flocking to neobanks”.⁹

Figure 13. Global B2B SME Market Share Split by Banks and Non-Banks (%)

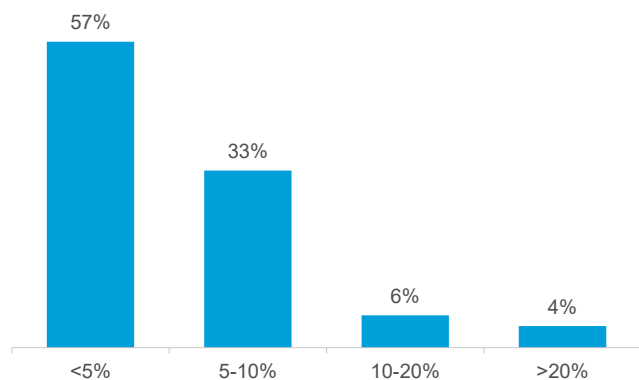


Note: Growth rate on the actual size of the SME-initiated flows processed by banks and non-banks.
Source: McKinsey Global Payments Map

⁹ Gerard du Toit et al., “Customer Behavior and Loyalty in Banking: Global Edition 2023”, Bain & Company, March 30, 2023.

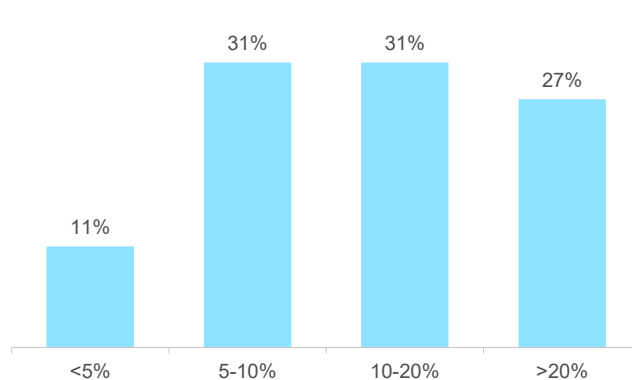
These findings echo those of the proprietary survey recently conducted by Citi (see Figure 14 and Figure 15) of more than 100 financial institution clients. Forty-three percent stated they had lost at least 5%-10% of market share in cross-border payments, and an even larger population (89%) predicted at least 5%-10% would be lost to FinTechs and disruptors in the future, with 58% of respondents anticipating losing over 10%. The key takeaways of the Citi Future of Payments survey are presented in the next section.

Figure 14. How Much Market Share Has Been Lost to FinTechs or Disruptors?



Source: Citi Treasury and Trade Solutions - Future of Payments Survey, May 2023

Figure 15. How Much Market Share Will be Lost to FinTechs or Disruptors in 5-10 Years?



Source: Citi Treasury and Trade Solutions - Future of Payments Survey, May 2023



The game is always to see whether the start-ups get to scale before the incumbents learn to innovate. But if you look below the surface, the real difference in the market is digitally-native digital businesses operating in a fundamentally different way than the big incumbents. The way in which FinTechs are attacking the market is fundamentally different from the way in which big incumbent organizations are doing it.

But big banks are still in prime position. FinTechs are merely rounding errors when it comes to scale compared to the biggest players in the market. Big banks have a lot to learn in the context of creating capabilities.

Marrying these two things together leads to a much better outcome, not only for the FinTechs or banks, but fundamentally for the customers using the products.

– DAVID BREAR, CEO AND CO-FOUNDER, 11:FS



Citi’s Future of Payments Survey — Key Takeaways

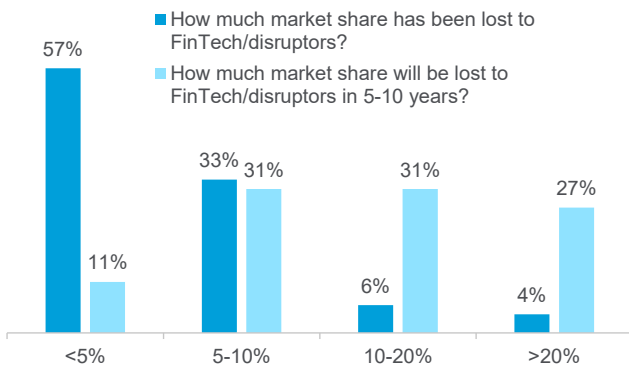
Citi Treasury and Trade Solutions, Citi’s transaction banking business, engaged with more than 100 financial institutions to conduct a proprietary survey on the future of payments.

The first takeaway from the survey is that the split between various players in the very attractive and growing cross-border payments revenue pie is going to look very different three to five years from now.

Of the financial institutions surveyed, two out of five indicated they lost market share of at least 5% to FinTechs. A staggering 89% of respondents said that over the next 5-10 years, they expect to lose market share of at least 5%-10%. Furthermore, those surveyed believe that the 5%-10% disruption they have seen is significantly higher in the cross-border space. Over half of the bank clients surveyed (58%) believe they will lose greater than 10% of their market share.

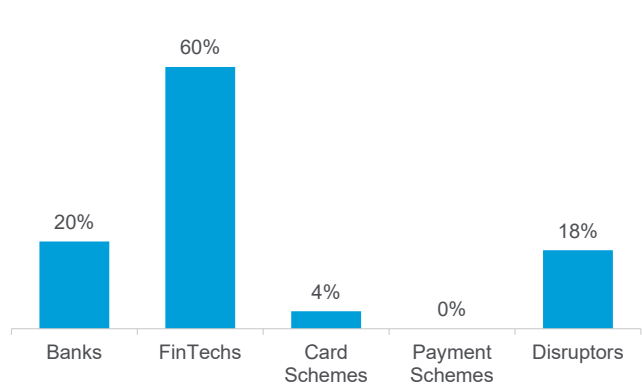
The level of change in the cross-border payments space will favor those embracing the elevation of client experience. Realistically, FinTechs are usually better at focusing on client experience, particularly with front-end technology. This helps explain why 60% of the financial institutions surveyed indicated they view FinTechs as the greatest threat to their market shares.

Figure 16. How Much Market Share Has Been Lost and Will Be Lost in 5-10 Years to FinTechs/Disruptors?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

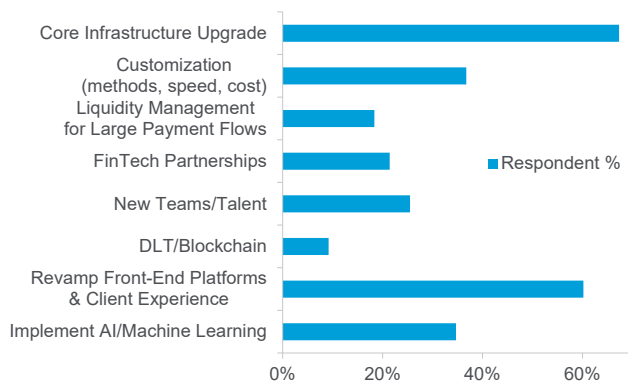
Figure 17. Where Will We See the Most Competition in the Next Five Years?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

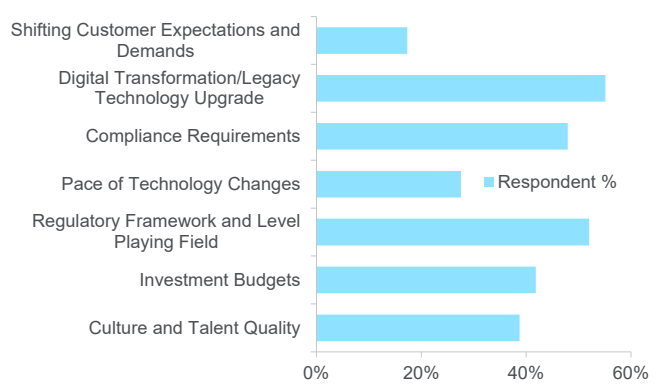
While over 50% of those surveyed see the need to revamp front ends to improve client experience, over 60% of respondents point to the need to upgrade their core infrastructure.

Figure 18. How Do Banks Plan to Compete Against Disruption?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

Figure 19. What Are the Challenges to Execute on These Strategies?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

Cost, speed, and transparency were most cited as significant client pain points. In the survey, over half of respondents indicated cost, particularly in the retail space, was their biggest consideration. For many others, speed — which often ties to 24x7x365 service availability — was also key.

Financial institutions need to focus their attention on resolving these pain points. Engaging with a provider that can already offer a vast amount of choice — including cross-border automated clearing house (ACH), integrated payables (IP), and digital wallets — can help reduce costs. To address cross-border payment needs of clients looking for speed, financial institutions need a partner that can deliver on the 24x7x365 evolution and be able to support the various instant payment methods that are continuously being expanded.

Figure 20. What are the Biggest Pain Points for Clients of the Bank?

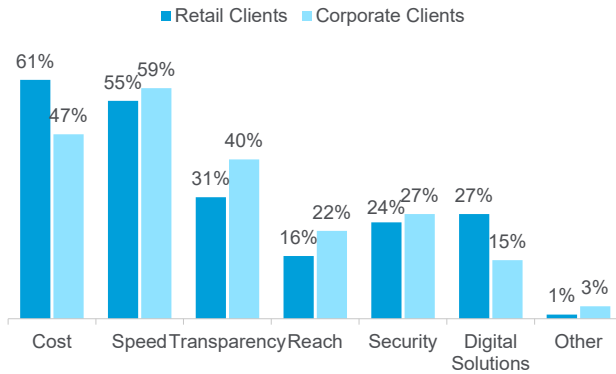
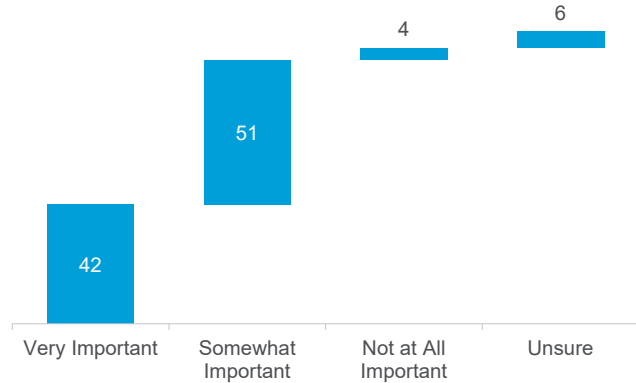


Figure 21. How Important Is the Ability to Process Cross-Border Payments Outside of Business Hours for Bank Clients?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

Survey respondents seem to realize the potential of application programming interfaces (APIs), pointing to it as the technology with the greatest potential to elevate client experience. Over 80% of those surveyed have started their API journey. While API-based solutions are the “North Star,” there is probably a lot that can be achieved in the interim, in a very cost-efficient way, without APIs and without the need for substantial investment.



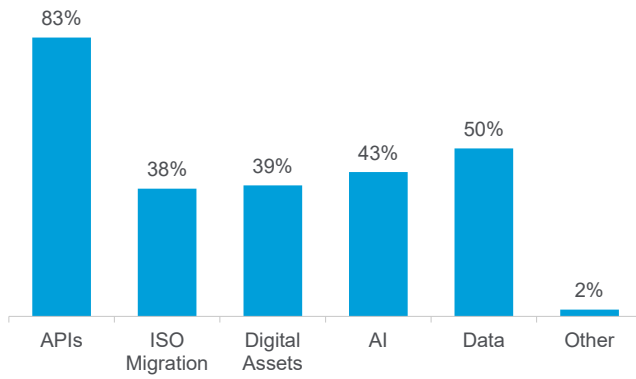
APIs are enablers to grant more flexibility and tailor-made solutions. They are not an emerging technology. There is nothing new here as they have already been used in our business for several years. The truth is they are more and more requested, especially for payments to support interlinking.

APIs are also considered as an alternative to Swift message exchanges and could be a key device for resiliency. In the coming years these devices should be a critical piece to stay ahead in the curve, offering the opportunity to reconcile standardization with customization.

– ISABELLE POUSSIGUES, GLOBAL HEAD OF PRODUCTS & NETWORK, SOCIÉTÉ GÉNÉRALE

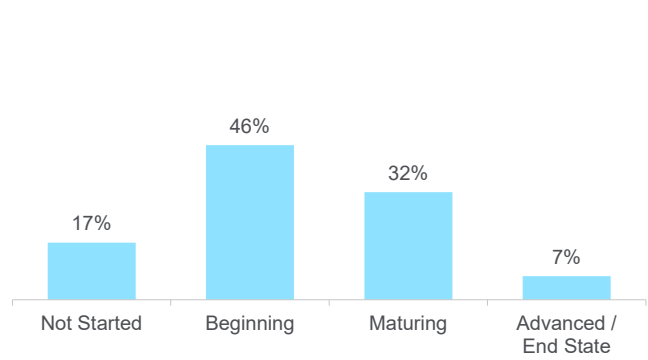


Figure 22. Which Technologies Will Improve Client Experience?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

Figure 23. Where are Clients on Their API Journey?



Source: Citi Treasury and Trade Solutions – Future of Payments Survey, May 2023

A Conversation with Bain & Company on the Opportunities in Cross-Border Payments



Erin McCune
Payments Partner
Bain & Company



Jeff Tijssen
Global Head of FinTech
Bain & Company

Q: What is the largest opportunity to grow in cross-border payments?

Cross-border consumer-to-business (C2B) e-commerce is the fastest-growing segment, driven by the resurgence of travel post COVID-19. Consumers are increasingly accustomed to shopping across borders, and platform businesses and merchants have increasingly sophisticated payment partners that help them scale quickly to reach many customers across geographies. Therefore, facilitating C2B cross-border flows (e.g., by offering access to local payment methods) is a priority opportunity.

Consumer-to-consumer (C2C) money transfers are another attractive segment with tailwinds from increasing remittances and a shift from higher-cost mechanisms. However, the vast majority of cross-border flows (around 95% share of the overall flows) are business-to-business (B2B), growing in-line with GDP at roughly 6%. Most of these transactions are affected by banks (via Swift) and despite improvements, can take a long time and incur significant costs — particularly for corridors with regulatory barriers and capital controls, or legacy banking infrastructure.

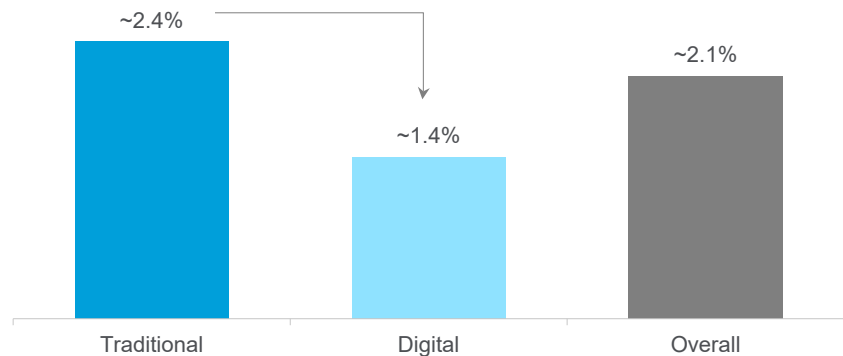
FinTechs have been targeting the C2C and small and medium-sized enterprise (SME) B2B segment, but there is more headroom to grow. The Bain Global Payments Model predicts that cross-border payments flows will grow, as existing volumes are mainly among G7 countries, but with more significant incremental growth in trade with and between Asian countries.

Q: How is the competitive landscape evolving in cross-border payments?

We observe intensifying competitive dynamics across all cross-border flows. This includes e-commerce and point-of-sale purchasing (i.e., C2B); payouts (i.e., B2C); remittances (i.e., C2C); and supplier payments (i.e., B2B) all driving down end-user cost, while simultaneously improving customer experience. Transparency of fees, predictable foreign exchange rates, and payment status tracking are increasingly common.

Players in both C2C and B2C are disrupting flows, and B2B disruptors are successfully carving out niches using new models. The average bank margin on cross-border payments has halved since 2015.

Figure 24. SME Cross-Border Fee Compression by Competitor Type



Note: Based on Bain B2B Survey respondent perceptions (N=421); Traditional includes GPS, AFEX, Cambridge Global Payments; Ebury, moneycorp, and WUBS; Digital includes Transferwise, Revolut, and Starling Bank.
Source: World Bank, AITE, Business Insider, Market Participant Interviews, Bain B2B Survey

Within the highly competitive SME foreign exchange and cross-border payments segment, we observe fee compression among both traditional and new digital entrants. We observe similar price compression in C2C as specialist providers (both money transfer operators (MTOs) and FinTechs) continue to take share from banks.

Correspondent banking remains the dominant method for large-value B2B payments, intercompany transfers, and settlement flows globally. Yet, both banks and technology players are innovating to provide faster and cheaper alternatives to the traditional correspondent banking model.

Bank-Led Initiatives

- **Peer-to-Peer Model:** Typically facilitated by a third-party network where payment service providers, representing sender and receiver, can be a bank or non-bank.
- **Bank Interlinking Model (e.g., TARGET2 today, CBDC interoperability in the future):** Includes central bank facilitated settlement of cross-border transfers. Today this occurs within the Eurozone, enabled by TARGET2. CBDC interoperability frameworks and pilots are being championed by Swift and BIS to examine the viability of using CBDCs to move between distributed ledger technology (DLT)-based and fiat-based systems using existing bank-centric financial infrastructure.

Technology Player-Led Initiatives

- **Closed-Loop Model:** Facilitated by a tech entity that has established its own network and acts as payment service provider for both sender and receiver. Funds are typically retained within the network and the tech entity is responsible for clearing and settlement, managing liquidity in various currencies to support its operations.
- **Partnership Model:** A tech entity provides differential rates for specific corridors through partnerships with banks and liquidity providers. The tech entity acts as payment service provider for both sender and receiver.

Cross-border infrastructure is getting better. Traditional correspondent banking has improved because of Swift gpi. New service level agreements (SLAs) commit participating banks to same-day processing of payments, end-to-end tracking of payment status, upfront disclosure of fees and foreign exchange rates, and increased confidence due to pre-validation services that use predictive analysis and AI to flag potential transaction issues.

According to Swift, over 60% of Swift gpi payments on average are credited to end beneficiaries within 30 minutes and 48% in under five minutes, as of May 2023. Yet there is still work to be done. Swift recently cautioned that only *“60% of wholesale payments reach customer accounts in that timeframe due to delays at the beneficiary leg caused by issues including regulatory controls, batch processing, and opening hours of market infrastructures.”*¹⁰

In addition, as more geographies implement real-time payment schemes, those domestic infrastructures are connecting to one another to affect cross-border transactions with India’s UPI (Unified Payments Interface) and Singapore’s FAST (Fast and Secure Transfers) leading the way.

¹⁰ Business Wire, “Swift’s Cross-Border Payments Processing Speed Surpasses G20 Target, August 22, 2023.

A Conversation with Deloitte on Cross-Border Payments



Roy Ben-Hur
Managing Director
Deloitte & Touche LLP

Q: Where do you see the largest opportunity for the cross-border payments businesses to grow?

The aggregate cross-border payments volume is very attractive, and it continues to grow in line with broader macroeconomic trends. The retail sector is also very attractive, with a lot of competition from existing and new players.

The wholesale sector is largely dominated by Swift and correspondent banking networks (which have extended in the aftermath of the Global Financial Crisis). The wholesale sector faces several challenges (such as being expensive and opaque) that make it difficult for corporations to move money across borders. There is a lot of room for improvement on the customer experience front in the wholesale space.

The global wholesale cross-border market is also not easy for market participants to enter, but we at Deloitte are seeing some non-bank players entering the space, through multilateral clearing and settlement mechanisms rather than traditional mechanisms. We also see the exploration of digital assets for cross-border payments.



Conrad Sheehan
Managing Director
Deloitte & Touche LLP

Q: Why are some companies better at commercializing opportunities in the cross-border payment space than others?

To better understand the competitive dynamics, one needs to differentiate between retail and wholesale cross-border transactions. On the one hand, traditional players like large banks have strong Treasury transaction businesses with presence across multiple markets. These present high barriers to entry for new entrants. On the other hand, there are new-age players with a digital-first mindset, leveraging technology to make cross-border payments faster and cheaper.

On the retail cross-border payments side, a small set of money transmitters whose business models grew out of the traditional cash-in/cash-out approach were quickly out-innovated by companies that took a digital-first/digital-only approach. Today, digital-only players continue to grow, and they are capturing a lion's share in the retail cross-border space.

The retail space tends to be a volume business, driven by customer experience. It is typically less risky and often dominated by non-banks. Meanwhile, the wholesale space is invariably tied to a broader corporate relationship that involves cash management, other collections, and disbursement relationships. Given the large size of these transactions, corporates are also unlikely to rely on non-banks for such transfers.



Subhashis Sen
Managing Director
Deloitte Consulting LLP

Q: In your view, as FinTechs grow, do you see them grabbing market share from banks or going after the SME space (e.g., B2B/B2C)?

FinTechs have generally been successful at disrupting the traditional cash-in/cash-out business model and are increasingly thinking about innovative ways to collaborate in a regulatorily compliant manner, rather than stealing one another's market share. The eventual goal is still to serve customers better, making the experience seamless and, in turn, growing the size of the pie for the entire industry. There is enough market opportunity out there that players do not need to cannibalize each other's offerings.

Q: Can new technologies help meet customer expectations in the wholesale payments space? Technologies such as distributed ledger technology (DLT), APIs, and AI in the financial services space have garnered a lot of market interest. Could you share your thoughts on these?

There is ample opportunity to use technology to deal with challenges in the cross-border payments space. The opportunity is not predicated on having a blockchain or an AI solution. It could even be built on existing rails if you set up the operations to allow for 24x7 capabilities.

We at Deloitte see the scope for wholesale central bank digital currencies (CBDCs) that operate on digital ledger rails, helping to make cross-border payments faster by simplifying the existing correspondent banking networks. Likewise, regulated stablecoins or tokenized bank deposits could help treasurers move large sums of money in cross-border payments. Harmonization and interoperability between so many jurisdictions and technology platforms will be the key to broader adoption.

AI could help automate anti-money laundering and Know Your Customer (KYC) processes and sanctions requirements in the retail cross-border payments space where the volume of transactions is large. Introducing AI into a rules-based engine could help make decision-making faster and more capable, as large language models (LLMs) continue to learn and adapt over time.

Deloitte is already seeing the use of AI in the customer servicing space. As AI gets more sophisticated and intelligent, it is likely to arrive at the problem statement much faster — which could potentially lead to greater customer acceptance.

Q: Why have traditional banks been slower than their corporate clients in embracing APIs?

Building layers of APIs that are interoperable can be challenging for traditional banks. In our experience, the technology stack at traditional banks is outdated and tend to be an amalgamation of several systems, most of which do not talk to one another, making it difficult to keep up with innovations.

By contrast, new-age FinTechs are built on engines of technology. They tend to be faster at adapting, building, and assessing which APIs are necessary, and their speed to market is a lot faster.

Through our experience at Deloitte, we have seen that the demand for APIs is largely from the perspective of the corporate treasurer who wishes to get a consolidated view of their cash position rather than logging into multiple treasury portals. The bank, on the other hand, does not face any pain in this situation.

Another challenge in leveraging APIs is that most processes are run on batch processes, even today. This makes it difficult to run APIs on a real-time basis.

Q: How can banks successfully transform their legacy technology stacks? What are some of the leading practices that institutions need to follow?

At the very beginning, institutions must understand: Who are their client bases? Which client segments want new APIs and why? For which flows or use cases? And in what sequence can the bank deliver these APIs to generate the most value?

Notably, banks need to be operational throughout the transformation process. They cannot shut down for three months to undergo a technology upgrade. Trying to bite off everything in one go can be detrimental.

A Conversation with Ernst and Young on the Future of Cross-Border Payments



Alla Gancz
Partner
Ernst and Young



Vikram Kotecha
Partner
Ernst and Young

Q: What are the biggest growth opportunities in cross-border payments over the next 5-10 years?

Cross-border payments are vital to the global economy, and they are likely to continue to rise in importance. The volume of cross-border payments is expected to reach over \$250 trillion per year by 2027. While the majority of the cross-border payment flows are represented by the wholesale market, we are seeing a convergence between retail and wholesale as time goes on.¹¹

One of the biggest growth opportunities in cross-border payments is in the small and medium-sized enterprise (SME) space. The SME segment has typically been underserved in the market, with banking products often skewing towards consumer banking or large corporations.

Over the last 5-10 years, we have seen a host of FinTechs start their journey in the cross-border consumer space, before gradually move to the SME space. For FinTechs, the cross-border payments business is often an anchor proposition that they use to gain customer volumes, before moving upmarket. As the SMEs grow, we're seeing FinTechs tapping into opportunities to cross-sell a plethora of other sophisticated services, such as currency management or treasury management.

Q: What are FinTechs doing better in the cross-border space that allows them to capture market share?

We're seeing FinTechs excel in offering easy to use, seamless, digital-first customer experiences. They often provide solutions that are designed and customizable for the unique needs of the SME client.

We see two key propositions being brought to the market by FinTechs to capture market share. The first is consumer-facing apps or direct-to-consumer propositions. The second is the infrastructure layer proposition, where FinTechs white-label services from cloud providers and focus on key features such as price, speed, automation, transparency, and compliance. FinTechs are good at leveraging the best of what is available, harnessing new technologies, and creating new ecosystems.

Q: What can incumbent banks do to defend their market share?

Historically, cross-border payments have been a high-margin business. However, today these margins are increasingly under pressure, prompting incumbent banks to reimagine their business models. In addition, incumbent banks are acutely aware of the FinTech-led disruption in certain segments of cross-border payments.

¹¹ Markue Ampenberger et al., "The New Growth Game: Global Payments Report 2022," BCG, October 3, 2022.

Incumbents are working to bring new digital propositions to market in a cost-effective and timely manner with the help of strategic partnerships. Some incumbents are working with FinTechs to augment their capability across the value chain. This includes revamping the central engine or providing different ways to get payments from point A to B by, for instance, circumventing traditional rails and using local Automated Clearing House (ACH) networks or helping to facilitate front-end interfaces. We are seeing significant shifts from banks wanting to "build-and-own" everything to them embracing partnerships with peers to broaden customer offerings.

The market for global cross-border payments is very large and it is difficult for a single player to achieve global connectivity alone. Banks have an excellent opportunity to foster collaboration with peers in the industry to create new platforms, such as the Regulated Liability Network (RLN) — a regulated Financial Market Infrastructure (FMI) that would operate a shared ledger to record, transfer, and settle regulated liabilities of central banks, commercial banks, and regulated non-banks.

Q: Is it a cultural challenge for incumbents to disrupt existing business models and adopt lower margins amid FinTech-led competition?

While we have talked about margin pressures in cross-border payments due to FinTech-led disruption, it will be interesting to see if these FinTechs continue to focus on low prices in the next 5-10 years, or if their agenda will shift away from customer acquisition and volumes to a more traditional financial metrics approach.

In the meantime, incumbents shouldn't think of lower margins as an isolated profit & loss impact, but rather shift their culture and thinking to balance the risk of not acting on this. While the current cross-border payments business may be under pressure, banks run the risk of eroding the broader customer relationship and other affiliated businesses if they do not compete.

The industry is at a tipping point where we can innovate and transform cross-border payments, and incumbents can also leverage emerging technologies like blockchain and features such as tokenization to reimagine their business model. In doing so, it is also important to remember that cross-border payments are not just about payment processing. It also includes complex pre-validation processes — including compliance checks, anti-money-laundering, know-your-client, and sanctions screening — which makes offering instant solutions more complex. All of these changes are possible from a business process and technology standpoint but require incumbents to shift their thinking to disrupt existing business models.

Q: How important are APIs for banks in the cross-border payments space? Why do banks tend to be slow at adopting APIs?

Historically, the banking industry has relied on host-to-host integration solutions or enterprise resource planning (ERP) integrations. However, FinTechs are embracing APIs, with most integration with new players done through APIs today. The main challenges for all firms are the lack of standardization, maintaining and operating distinct API gateways, and the security of the API layer. While the level of adoption varies, banks and corporates are demonstrating readiness to adopt API technology. They need to work together on this journey and drive adoption through awareness, education, and specific use cases.

The adoption of APIs in payments will be further accelerated by the emergence of private sector networks that orchestrate calls to APIs covering different forms of retail money, ranging from open banking APIs for commercial bank ledgers to Project Rosalind-like APIs for the digital British pound. In addition, in the wholesale space, the Bank of England's Real-Time Gross Settlement Renewal Programme will provide APIs for synchronizing the settlement of different movements (of cash or securities) in a transaction.

Q: How can new technologies such as blockchain and distributed ledger technology (DLT) enable innovation in the cross-border payments space?

Experimentation with tokenization is likely to accelerate over the coming years, with adoption cycles getting shorter. If firms can justify business and customer value through the use of tokenization, we are likely to see accelerated adoption that will leap-frog cross-border payments.

We have seen some early success with DLT, especially in a closed-loop network setup, and we believe there will be more innovation in this space ahead. We've also seen uptake of blockchain, which can underpin a new payments infrastructure to interface with the existing legacy systems.

New concepts such as the Regulated Liability Network (RLN) — which uses DLT to provide a shared ledger for multiple commercial banks and tokenized commercial bank deposits — can enhance cross-border payments. For example, with all parties being able to agree to the transaction up front via a smart contract, and with confidence in settlement due to the atomic settlement functionality, the transaction could reach the beneficiary in a reduced time. This in turn could lead to reduced costs for consumers, businesses, and banks. In addition, the ability to agree transactions end-to-end before execution and increased speed of the transaction mean participants in a chain may be able to price foreign exchange rates at the point of execution (intraday and near real-time), which could reduce costs and foreign exchange risk. An overview of the RLN concept can be found at www.regulatedreliabilitynetwork.org.¹² Another positive trend seen in cross-border payments is the interlinking of domestic real-time payment rails. Examples include the India-Singapore link for cross-border payments using Unified Payments Interface (UPI) and PayNow and BIS's Project Nexus prototype, which successfully links Eurosystem, Malaysia and Singapore payments systems.

However, the biggest complexity with cross-border payments is that they touch multiple geographies, each with a separate set of settlement processes. This necessitates a multi-market effort with complex regulations and discussions with multiple central banks coupled with ample testing and experimentation.

¹² The Regulated Liability Network, "[Regulated Liability Network: Digital Sovereign Currency](#)," accessed September 11, 2023.

A Conversation with Rahul Singla on the Role of FinTechs in Cross-Border Payments



Rahul Singla
 Head of FinTech Investment Banking,
 North America
 Citi Corporate and Investment Banking

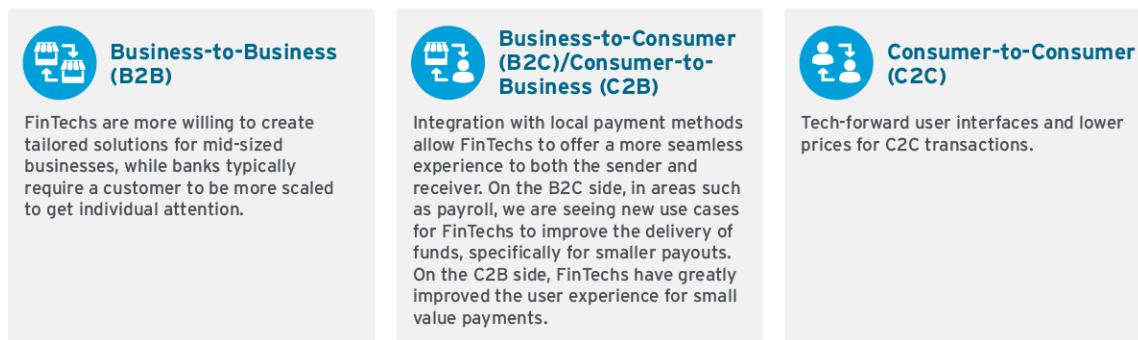
Q: What is the role of FinTechs in cross-border payments today? Why are they eating into what was historically a bank-only business?

Rahul: Cross-border payments through banks involve slower transaction times and elevated foreign exchange (FX) fees, particularly across lower-volume corridors with limited partners. By contrast, FinTechs promise to offer lower prices, deliver transfers substantially faster, provide more convenience, and offer greater transparency when compared to banks. This is made possible by:

- Integrating with local payment systems.
- Developing independent regulatory and compliance processes.
- Offering full-service customer support.
- Providing more advanced and intuitive interfaces (i.e., mobile devices and social media).
- Leveraging advanced technologies, such as biometric recognition on smartphones or facial and voice recognition features, resulting in a highly secured payment process.

Figure 25. Competition from FinTechs

Competition from FinTechs differs across customer segments:



Source: Citi GPS

Q: How big will FinTechs be in cross-border payments by 2030 (versus 2020)?

Rahul: Competition in the cross-border payments space is highly fragmented with a lot of room still for FinTechs to gain market share from banks. According to McKinsey, banks currently hold nearly 90% of volumes in the SME cross-border payments space.

Likewise, even in the C2C space, banks currently hold the largest share (about 66%) in the cross-border payments market. By contrast, money transfer operators (MTO) only hold a 13% stake, and other non-banks around 18%. Even though FinTechs just scratched the surface in terms of penetration, this provides significant opportunity in the future.

Key players have adopted various strategies, such as product portfolio expansion, target customer, price, mergers and acquisitions, geographical expansion, and collaborations, to increase their market penetration and strengthen their foothold.

A Conversation with OP Financial Group on the Opportunities and Challenges in Cross-Border Payments



Antti Niemela
Head of Transaction Banking
(Large Corporates and Institutions)
OP Financial Group

Q: Where do you see the largest opportunity to grow in cross-border payments?

Antti: In my view, cash flows follow trade flows. Hence, from the point of view of geographical areas, cross-border payments are distributed accordingly. Certainly, the current political tensions and economic developments affect supply chains, both upstream and downstream.

However, customers expect the same speed, transparency, and security and, of course, efficient processes as in domestic payments. Therefore, in my opinion, the most important opportunity lies in how payments are processed on behalf of customers to serve customers' needs in the best and most cost-effective way.

Q: What challenges are there in commercializing these opportunities?

Antti: I believe technology is the key that already makes it possible to achieve this. However, for example, the ability to utilize APIs does not develop globally at the same pace throughout the entire payment process. Therefore, achieving the same quality of service all over the world can be still challenging.

Q: How do you view the competitive landscape evolving in cross-border payments?

Antti: It is likely that the payments world will fragment to some extent. I believe this will have a particular impact on small businesses and retail customers. This is due to specialized payment operators, i.e., FinTechs, that offer special services. Unfortunately, this can also fragment the process from the customers' point of view.

Q: Why, in your view, are clients using FinTechs for their cross-border payments needs?

Antti: FinTechs are fast movers and have the opportunity to take advantage of banking infrastructure without legacy systems. In addition, the regulatory framework differs compared to the banking industry. This way they can quickly develop specific services for customers.

Q: How do you see innovation in cross-border payments? How is the evolution going to shape up across new technologies such as traditional rails, digital assets, AI, and others?

Antti: I believe that the landscape will change for the best of the customers. I am "technology agnostic" and prefer to focus on the impact on customers rather than what kind of technology is being used. But there are several new solutions in use, based on things like artificial intelligence and digital resources.

A Conversation with The Clearing House on Innovations in Cross-Border Payments



David Watson
President and CEO
The Clearing House

Q: Where is the largest opportunity to grow in cross-border payments?

David: The largest opportunity in today's market to accelerate the growth of cross-border payments involves the continued adoption of the ISO 20022 messaging standard by market participants, as well as the implementation of changes to business applications and systems so they can take advantage of the ISO 20022 benefits. The migration to ISO 20022 is underway for The Clearing House (TCH's) CHIPS network, the largest U.S. dollar clearing system in the world, which clears and settles \$1.8 trillion in domestic and international payments each day. CHIPS will fully migrate to ISO 20022 in April 2024. Over the next 18 months, other major payment networks around the globe will be moving toward ISO 20022, and this standard allows banks, and most importantly their customers, to benefit from enriched data content and structured message formats and to support innovation around a common message suite.

Q: What are challenges in commercializing these opportunities?

David: It is no secret that there has been a push by both the public and private sectors to streamline and remove frictions for cross-border payments. However, it is a challenge to overcome some of the many obstacles to cross-border payments, including potentially conflicting regulations in multiple jurisdictions, operating hours of payment systems in different time zones, and compatibility between various payment systems.

Q: Why do clients prefer FinTechs for their cross-border payment needs?

David: FinTechs have been especially focused on off-hours and cross-border use cases, which puts appropriate competitive pressure on banks and traditional infrastructures. We welcome that pressure, as it galvanizes our focus to standardize message formats, extend operating hours, and eliminate existing cross-border frictions, and ultimately serves the customer.

Q: Do banks have a right to "win?" Is there any area you would call out?

David: In a truly fair and competitive market environment, no entity has a right to win. Competition helps to sort out the winners and laggards. In terms of cross-border payments, banks certainly have advantages over other payment options, such as established connections to global payment systems, a track record of operational performance, robust compliance and screening protocols, and a trusted relationship with their customer. Banks also meet and exceed the significant regulatory requirements set by supervisors, which most FinTechs do not need to meet. To maintain these advantages, banks need to continue to improve cross-border payments technology to remove frictions, which cause delays, increase cost, and reduce customer satisfaction.

Q: Is regulation helping drive the pace of innovation or is it a barrier?

David: There is a great deal of work that needs to be done when it comes to regulations for cross-border payments. Regulation can help promote innovation by setting out clear requirements and helping to establish a level playing field that fosters competition in a safe and sound manner. But regulation can also hinder innovation if there is a lack of harmonization across jurisdictions or if there are differences in the ways in which the regulation is enforced. It is not an easy task, but it is one that needs to be accomplished to encourage smoother cross-border payments.

Q: How do you see innovation in cross-border payments?

- **Traditional Rails:** Traditional payment rails are already innovating and improving systems that have been highly reliable and the backbone of global commerce for decades. Expanding traditional payment rail availability to be closer to 24x7 will significantly help reduce frictions in cross-border payments, where sometimes payments are held simply because a payment system in another time zone is closed outside of normal business hours.
- **Digital Assets:** Digital assets will have a place in cross-border payments, but it is too early to say what that may be. The pullback in the cryptocurrency markets over the past two years has given many people pause when it comes to many use cases of digital currencies.
- **Artificial Intelligence (AI):** AI is going to play an increasingly important role in all facets of financial services — from payments operations to fraud detection and lending, among others. For operators of highly reliable payment networks, any use of newer technologies, such as AI, must be balanced with maintenance of the safety and soundness of the payment systems that underpin the global economy.
- **Instant Payments:** The next step in the evolution of cross-border payments is instant, where existing instant payment systems, such as the Real Time Payments (RTP) network in the U.S., are connected to real-time payment systems in other jurisdictions, such as the UK, Australia, Singapore, or virtually any other geography with an instant payments network.

Q: As channels shift significantly, what is the role of APIs?

David: APIs are an important way for financial institutions, FinTechs, and corporate customers to work together to provide newer payment options to the end customer. We have seen the importance of APIs on TCH's RTP network — the first instant payment system in the U.S. APIs are allowing banks to offer instant payment capabilities to customers, often through other technology providers, far faster than building a direct connection.

Q: Are cross-border payments solutions evolving with the shift in business models — for example, marketplaces, shared economy, and direct-to-consumer?

David: Not yet, but they will. As a payments system operator, our responsibility is to establish a robust infrastructure that supports the evolution of cross-border payments solutions beyond what we can anticipate. Message standardization, extended hours, and instant cross-border payments are not ends but means to ends. Once the infrastructure is in place, the innovation will follow.

Q: What else should banks, FinTechs, and others be thinking about in the future of cross-border payments?

David: Much like everything in society that is moving to instant (instant streaming, instant delivery), the next step in cross-border payments is real-time payments. This means that when a payment is sent cross-border, it is done so with instant currency conversion and instant confirmation of receipt. This removes the waiting and, quite frankly, confusion that is caused by some traditional cross-border payments where confirmation may not come for a few hours or even days. This requires cooperation and agreement between real-time payments rails in different countries, as well as regulatory coordination across multiple jurisdictions.

How Can Banks Win?

With the attractiveness of the cross-border payments market, due to its ongoing growth coupled with innovation, the distribution of the revenue pie between various players is going to continue to change. Those who embrace new technologies and invest in meeting evolving client expectations will emerge as winners and gain market share. Those who do not may eventually have to face the reality of their clients moving almost entirely to other providers for their cross-border payments needs.

With consumers shopping around and corporates expecting the best experiences in speed, transparency, and cost-efficiency, it is key for providers to move toward digital and transparent payment methods that operate on a 24x7 basis, allowing clients to send payments to various countries in a variety of different ways, including alternative payment methods (APMs), such as digital wallets.

While investment budgets make it challenging for many players to focus on regulatory obligations, safety, and soundness, among other concerns, a wealth of options are available in the industry for partnering on solutions without having to build everything in-house.

Figure 26. How Can Banks Differentiate Themselves from FinTechs?¹³



Extensive Branch & Correspondent Bank Network

Native presence or existing correspondent banking relationship in key flow corridors besides physical support from a relationship manager.



Primacy of Retail and SME Customer Relationship

Large onboarded consumer and SME customer base using bank products (e.g., lending) that are pre-approved/enabled.



Wider Range of Products

Ability to bundle solutions, including prediction of needs based on payment flow (e.g., trade).



Institutional Banking Relationship

Access to institutional relationships offers the right to play (e.g., education, government collections).



Primary Access to Foreign Exchange and Liquidity

Access to interbank market to enjoy best prices on foreign exchange and funding and to internalize flows.



Risk and Regulatory Compliance Infrastructure

Extensive experience in risk management across multiple jurisdictions.

Source: McKinsey & Company, Citi GPS

¹³ McKinsey & Company, "How Asian Banks Can Regain the Cross-Border Payments Crown," February 8, 2023.



In the past, international payments have heavily relied on the ‘cooperation’ between different actors of the end-to-end value chain of the payment, i.e., correspondent banking.

We must now talk about ‘coopetition’ (cooperation + competition) between traditional stakeholders and new entrants (FinTechs), who are fulfilling niche market requirements. Robustness of banks and our ability to streamline cumbersome processes is still there and, as the world gets more fragmented, banks are becoming more and more at the front and center of payments.

Banks are fully enabled, through infrastructure and reachability, to offer more innovative, robust, and adequate solutions for clients. But we ought to rethink our pricing and industry alliances to make us more agile and reduce our time to market.

– STÉPHANIE RODRIGUEZ ANIORTE, GLOBAL HEAD OF PAYMENTS, SANTANDER



In payments specifically, banks must focus on offering the best available core payments capabilities and delivering sleek customer experiences while addressing pain points of cost, speed, and transparency. This means leveraging best-in-class capabilities across fiat currencies, including APMs and potentially digital assets, when scalable cross-border payments use cases emerge.



The key foundation of customer loyalty is trust. Trust is built from a high predictability of the desired outcome through many repeated interactions between participants – in this case, between customer and the bank. It therefore follows that the key focus of any good bank is to ensure that its payments systems are robust and reliable with high uptime and availability, even as it scales quickly. This bread-and-butter business doesn’t often catch the headlines, but is key to trust, and the success of the customer-bank relationship.

– AARON FOO, CHIEF STRATEGY & SPECIAL PROJECTS, CHIEF STRATEGY & PROPOSITION OFFICER, GOTYME



Most local and regional banks, when competing for the cross-border payments business of their clients, will not be able to develop the necessary network connectivity to optimize for cost, speed, and transparency. They should consider partnering with “network connectivity” providers. In doing so, they should focus not only on delivering best capabilities, but also on a sleek user or client experience, likely enabled by APIs.

“

We see APIs as a key enabler to interact with our clients and provide cash management services. However, low adoption of APIs across the industry often poses a hindrance. Providing the strong need for further standardization and higher adoption, APIs could be seen as: (1) alternative payment channels offering better connectivity, leading to real-time processing, communication, and reporting; and (2) enablers for value-added services, owing to the potential access to a wide set of data across multiple data sources.

– UNICREDIT S.P.A.

”

[B] Future of Cross-Border Payments

Today's consumers, who are generally accustomed to domestic transactions where payments are largely instant and fully traceable, are becoming conditioned to expect the same in the more complex cross-border space. They want speed, transparency, choice, and a slick experience. They are willing to shop around to get the best experience, which leads to them increasingly having multiple banking and payments relationships.



We have seen an unprecedented amount of change in cross-border payments over the past 10 years, which will not be slowing down anytime soon. The industry is going through a fundamental shift with alternative payment methods and the need to be “always on” increasing in relevance.

The fundamentals of the future-proofed cross-border payments solutions are simple — offer a best-in-class client experience, centered around transparency, speed, and cost efficiency, which clients can trust. I'm personally very excited about the opportunity ahead.

— ASHISH BAJAJ, GLOBAL HEAD OF FINANCIAL INSTITUTION SALES, TREASURY & TRADE SOLUTIONS, CITI



These expectations are then shifting from the consumer-to-consumer (C2C) space to business-to-consumer (B2C) and business-to-business (B2B) space. We are seeing the “consumerization” of corporate expectations. Even though their transactions are often wholesale in nature, corporates increasingly expect the same speed, choice, and transparency that they experience as consumers processing retail payments.

This demand, in turn, accelerates the adoption of new technologies that deliver on clients' requests at an individual institution level and at an industry level. As this pace of change accelerates, the phenomenon is sometimes described as “evolvability.”

In addition to clients demanding better experiences, we see increased competition from emerging alternative infrastructures pushing legacy models to evolve. The pressure on legacy models often comes from the digital assets, digital ledger technology (DLT), and blockchain space— a topic we delve into in the Digital Assets Innovation chapter.

For decades, traditional financial market infrastructures (FMIs) have had technologies to deliver 24x7 instant experiences, to improve transparency, and to enrich and standardize data. But such overhauls at an industry level are very expensive, and market participants often require a push to embark on them.

Today, we are seeing a wave of such overhauls with the adoption of standards from the International Organization for Standardization (ISO), the launches of instant payment schemes, the rise of digital wallets, Real Time Gross Settlement (RTGS) schemes moving to 24x7x365, and other emerging concepts for increased interoperability.

In this rapidly evolving world, regulations are being introduced to foster innovation (e.g., the Payment Services Directive or PSD), while balancing competing concerns such as customer protection, safety and soundness, and operational resiliency. During periods of change, this does result in pockets of regulatory arbitrage that smaller players and new entrants tend to exploit. In the long run, however, for players operating at a larger scale, we believe a level regulatory playing field will prevail.

Among the highest industry bodies, we see recognition of the challenges associated with the cross-border payments landscape and articulation of a roadmap to address them. In October 2020, the Financial Stability Board (FSB) published its Enhancing Cross-border Payments Roadmap with the aim to “*make payments faster, cheaper, and more transparent and inclusive.*”¹⁴ The FSB believes that creating a vastly improved cross-border payments system, while retaining the safety and soundness of existing systems, would have a widespread positive impact in “*supporting economic growth, international trade, global development, and financial inclusion.*”¹⁵

Finally, we see the emergence of new business models that require very different payments solutions.

¹⁴ Financial Stability Board, *G20 Roadmap for Enhancing Cross-Border Payments: Consolidated Progress Report for 2022*, 10 October 2022.

¹⁵ Ibid.

BIS Committee on Payments and Market Infrastructures (BIS CPMI) Work on Cross-Border Payments

By Tony McLaughlin and Martin Cannings, Citi Treasury & Trade Solutions

In 2020, the G20 made enhancing cross-border payments a priority. Making cross-border payments, faster, cheaper, and more transparent and inclusive, while maintaining their safety and security, is intended to drive widespread benefits for citizens, businesses, and economies worldwide, supporting economic growth, international trade, global development, and financial inclusion.

The Financial Stability Board (FSB), in coordination with the Committee on Payments and Market Infrastructures (CPMI) and other relevant international organizations and standard-setting bodies (SSBs), developed a Roadmap to address these challenges. The G20 Leaders endorsed the Roadmap at their November 2020 Summit.

In summary, there are five focus areas, which contain nineteen building blocks that represent the bodies of work to improve cross-border payments. Periodic progress reports are issued.

Focus Area A: Public and Private Sector to Commit Jointly to Enhance Cross-Border Payments

1. **Develop common cross-border payments vision and targets:** Developing a common vision and expanding the range of agreed targets beyond remittance costs to include enabling faster, cheaper, more transparent, and more inclusive payments for wholesale and retail alike.
2. **Implement international guidance and principles:** Ensuring that international guidance and principles lead to the implementation of effective and efficient payments and ICT (Information and Communications Technology) infrastructures in order to achieve agreed targets.
3. **Define common features of cross-border payment service levels:** International guidance (e.g., technical standards, settlement finality provisions, rules for the handling of exceptions) to drive standardization and support competition and innovation in payment schemes.

Focus Area B: Coordinate Regulatory, Supervisory, and Oversight Frameworks

4. **Align regulatory, supervisory and oversight frameworks:** Building on the principle of “same business, same risk, same rules.” Consistent jurisdictional approaches will ensure greater clarity for market participants.
5. **Apply AML/CFT rules consistently and comprehensively:** Ensuring more effective and robust implementation and application of AML/CFT frameworks while continuing to pursue a risk-based approach.
6. **Review interaction between data frameworks and cross-border payments:** Identifying and addressing real or perceived tension between financial regulatory requirements, on one hand, and restrictions on cross-border data flows and data storage on the other.
7. **Promote safer payment corridors:** Reducing the burden associated with compliance checks and facilitating market entry to determine lower risk corridors and types of cross-border payments via rigorous and effective risk assessments.
8. **Foster KYC (Know Your Customer) and identity information-sharing:** Reducing the number of silos within and across jurisdictions to prevent identity duplication, ultimately benefiting both the end user and market participants.

Focus Area C: Improve Existing Payment Infrastructures and Arrangements to Support the Requirements of the Cross-Border Payments Market

9. **Facilitate increased adoption of PvP (Payment versus Payment):** Reducing settlement risk on the majority of FX transactions, to help cross-border payments, which rely on them.
10. **Improve (direct) access to payment systems:** Broadening the range of eligible candidates for settlement accounts by changing access policies, technical standards and supervisory, or oversight regimes.

11. **Explore reciprocal liquidity arrangements:** Analyzing the feasibility of bilateral arrangements between large-value payment system operators and central banks to enable collateral posted in one jurisdiction to support liquidity issuance in another.
12. **Extend and align operating hours:** Adapting operating timetables for critical infrastructures and market participants to enable greater overlap of settlement windows.
13. **Pursue interlinking of payment systems:** Decreasing the dependency on traditional correspondent banking by establishing links between the payment infrastructures of different countries.

Focus Area D: Increase Data Quality and Straight-Through Processing by Enhancing Data and Market Practices

14. **Adopt harmonized version of ISO 20022 for message formats (including rules for conversion/mapping):** Promoting the adoption of common message formats, such as a harmonized version of ISO 20022 and common rules of mapping/converting data between different data formats.
15. **Harmonize API protocols for data exchange:** Harmonizing API protocols for data exchange across payment infrastructures/jurisdictions to enable more efficient payment data and digital identifier exchange in cross-border payments.
16. **Establish unique identifiers with proxy registries:** Providing a globally standardized approach supporting the global Legal Entity Identifier for legal entities and a similarly standardized identifier for individuals.

Focus Area E: Explore the Potential Role of New Payment Infrastructures and Arrangements

17. **Consider the feasibility of new multilateral platforms and arrangements for cross-border payments:** To complement or substitute traditional correspondent banking links or bilateral interlinking of the payment infrastructures of different countries, new multilateral cross-border payment platforms could address problems inherent in legacy technologies/processes.
18. **Foster the soundness of global stablecoin arrangements:** Fostering appropriate risk management within global stablecoin arrangements, and sound legal underpinning, as a basis for the use of stablecoins in multiple jurisdictions.
19. **Factor an international dimension into CBDC designs:** Providing domestic CBDC implementations with the necessary guidance to enable cross-border transactions via access by non-residents and/or interlinking with international infrastructure.

This comprehensive diagnosis of the issues associated with cross-border payments is routinely referenced in industry-level work on payments and remains an important reference point as progress is monitored.

Innovations in Payments

Let us now segue into the future to look at innovations in the space. We see here Digital Money 2.0 acting as a catalyst for revolutionary change and existing infrastructure moving fiat currency through an accelerated evolution in response. We start by looking at the latter.

There is a lot of innovation occurring in the cross-border payments space. To structure an overview of this evolving landscape, we will touch on:

- Improving the fiat stack to address concerns of speed, transparency, and cost.
- Digital asset innovation in the context of payment use cases.
- Real-time liquidity management as an enabler of payment innovation.
- Key innovation foundation layers such as ISO 20022, and the role of APIs.

(See [Appendix: Knowledge Building Blocks](#) for more details).

[1] Improving the Fiat Stack¹⁶

(a) Speed

Nearly 89% of cross-border payments are processed over Swift within an hour, placing its transaction speed ahead of the G20's end-to-end target of 75% by 2027.¹⁷ However, consumer expectations of instantaneous payments are now carrying over from domestic transactions to cross-border transactions, the latter being rather complex. Solving for cross-border 24x7 transactions presents a different challenge, which is currently being addressed in two ways:

- The creation of linkages between domestic instant payment systems in different countries. However, these take time to launch, build, and scale; and alternative payment methods such as digital wallets are stepping in.
- Moving to RTGS (Real-Time Gross Settlement) systems and major correspondent banks supporting international currencies (e.g., U.S. dollar) to 24x7 mode. This upgrade has already begun in different countries, but it is by no means an “easy” fix. We cover the main hurdles that need to be overcome and what private market participants actions to date below.



Customers are increasingly used to the platform model where products and services are available seamlessly 24x7. They expect banking and payments to also function in a similar manner. Banks need to evolve quickly to meet changing customer expectations, or they are likely to lose market share (especially to FinTechs). We are seeing several banks in the region exploring collaborations/partnerships with other non-bank providers and FinTechs.

– MARCELA BORRERO CARDENAS, INTERNATIONAL BUSINESS MANAGER, BANCO DE OCCIDENTE



Domestic payments in many markets are largely instant, i.e., 24x7, and fully traceable. Several economies around the world have implemented instant methods of exchanging money and processing payments domestically. Prominent examples include Faster Payments Service (FPS) in the UK, RT1 and TARGET Instant Payments Settlement (TIPS) in Europe, Immediate Payment Service (IMPS) and Unified Payments Interface (UPI) in India, Vipps in Norway, Swish in Sweden.

¹⁶ From Investopedia, the fiat money is a government-issued currency that is not backed by a physical commodity, such as gold or silver, but rather by the government that issued it. The value of fiat money is derived from the relationship between supply and demand and the stability of the issuing government, rather than the worth of a commodity backing it. Most modern paper currencies are fiat currencies, including the U.S. dollar, the euro, and other major global currencies.

¹⁷ Swift, “Swift’s Cross-Border Payments Processing Speed Surpasses G20 Target”, August 22, 2023.



Payments has become a commodity, whether it is domestic or cross-border. Consumers are thinking more and more globally and borders between local and global are disappearing progressively. Indeed, they do not care anymore whether the transaction is cross-border or domestic or how it is settled (bank account, wallet, CBDC).

Real-time Payments Market Infrastructure (PMI) is increasingly seen as a new solution for cross-border payments, being promoted within the Financial Stability Board (FSB)/Committee on Payments and Market Infrastructure (CPMI). We are all convinced the interlinkage of market infrastructures will drive better reach and increase the speed of cross-border processing.

— ISABELLE POUSSIGUES, GLOBAL HEAD OF PRODUCTS & NETWORK, SOCIÉTÉ GÉNÉRALE



Globally, more than 118 billion real-time transactions were made in 2021, and 427 billion are expected by 2026, according to ACI Worldwide and GlobalData research.¹⁸ Real-time payments in the U.S. are in the fast lane, with significant year-over-year growth of 70%.¹⁹

This accelerated growth is partially attributed to the COVID-19 pandemic, which served as a catalyst accelerating the demand for real-time payments, as access to immediate cash-less transactions became more important than ever.

In the realm of accelerating cross-border payments via domestic instant payment systems in different countries, we see two potential approaches.

The first approach is for instant payment schemes to open themselves as channels for the distribution of incoming cross-border payments. Unfortunately, not all instant payment schemes currently allow for this. It is estimated that more than 20 instant payment schemes support cross-border flows today and this number is expected to grow.

Commercial correspondent banks and FinTechs have a very good track record of quickly leveraging such domestic channels (e.g., as seen with ACH) to offer better solutions for banks and their clients globally — i.e., by delivering payments to the “open” local markets via channels. From the perspective of beneficiaries, this is no different from “simple” domestic payments.

Correspondent banks and FinTechs have been doing this for a while now — leveraging their network of domestic connections, where permissible, for cross-border payments. The operative word here is “permissible.” The good news is that there seems to be an agenda of increasingly opening these domestic schemes for cross-border traffic.

¹⁸ Raconteur, “[The Opportunities and Threats of Real-Time Payments 4.0](#),” accessed August 20, 2023.

¹⁹ Deloitte, *Real-time Payments and Implications of the COVID-19 Pandemic*, 2020

The second approach is the interlining of domestic instant payments schemes. The Financial Stability Board (FSB) and BIS Committee on Payments and Market Infrastructures (BIS CPMI) worked together to publish a list of 19 building blocks as part of their roadmap to enhance cross-border payments.²⁰ They identified pursuing the interlinking of payments systems across jurisdictions as one of the building blocks.

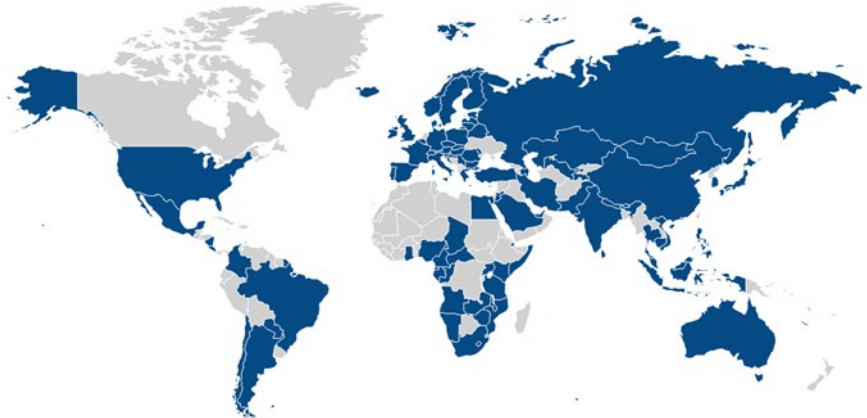
Such interlinkages can potentially facilitate simpler and shorter transaction chains, as well as lower costs and fees. The idea of the interlinkages extends of course to the 24x7 instant payments systems and, if executed at scale, represents a possible enabler for achieving 24x7 instant cross-border payments.

This approach effectively calls for the creation of a “*mega financial market infrastructure*” that connects domestic payment systems across markets systemically. Below are some examples of such initiatives currently being undertaken:

- **The Immediate Cross-Border Payments (IXB)** initiative proposed by The Clearing House (TCH), European Banking Authority (EBA) Clearing, and Swift has been in the works for a while now. The organizations developed a blueprint to facilitate immediate cross-border payments with embedded FX by connecting the real-time payment systems USD RTP and EUR RT1. To deliver immediate value and allow for replicability, the IXB taskforce focused its proof of concept on the Intermediated Model as a first step, building on the existing correspondent banking arrangements.
- **The Monetary Authority of Singapore (MAS)** is taking a somewhat similar approach to what TCH and EBA are doing: building bilateral arrangements between domestic instant payment schemes to connect them for cross-border payments purposes. The central banks established agreements with Thailand, India, and Malaysia to link their domestic instant payment schemes to enable cross-border payments and support the growing remittance traffic between these respective countries.
- **BIS Innovation Lab** embarked on Nexus, with the understanding that building these bilateral arrangements might make sense for major corridors. However, this approach is not scalable if the objective is to connect a network of instant payment systems, as the number of bilateral arrangements required to connect just 20 systems grows to 190. Nexus's vision is to develop a blueprint for a multilateral network or platform model, where local payment systems link directly to a single network or platform, which clears and settles transactions between participants on a common set of technical standards, operational guidelines, and legal frameworks. It is designed to be fast (i.e., payments should be near-instant and in most cases should be processed within 60 seconds), transparent (i.e., fees and FX rates are known upfront), cost efficient, and accessible.

²⁰ Bank for International Settlements, “Enhancing Cross-Border Payments: Building Blocks of a Global Roadmap – Stage 2 Report to the G20,” July 2020.

Figure 27. Global Tracker of Fast Payment Systems Worldwide



Note: The Global Tracker aims to provide a consolidated and comprehensive overview of the status of implementation of fast payment systems worldwide. Markets shaded in blue represent those that have implemented or are in the process of implementing faster payment systems.

Source: World Bank Project FASTT

Real-Time Gross Settlement (RTGS) Services

RTGS services are fund transfer systems that allow for the transfer of money and/or securities from one bank to another on a “real-time” and “gross” basis. Several RTGS systems in use today were not designed for interoperability across different countries. They were also built on aging technology stacks/infrastructure that are inflexible and costly to modify.

However, to facilitate cross-border payments and maintain relevance in today’s interconnected digital age, central banks are taking action to modernize their platforms. The next generation of RTGS systems are aimed at greater competition and innovation within the payments space and include features such as synchronized settlement, extended operating hours, and non-payment APIs.

Key features to be considered in the “next-gen” RTGS platform design include:

- Enhanced interoperability across financial ecosystems with help of open APIs.
- Broader access of payment ecosystems to banks and non-banks on a level playing field for both.
- Extended operating capabilities, possibly 24x7x365, to meet requirements for instant payments.
- Optimized liquidity management and collateralized operations by leveraging data analytics and artificial intelligence technologies.
- Enhanced security to combat rising cybersecurity threats.



A significant challenge in cross-border payments today is the need for interoperability across different clearing/payment systems (e.g., TARGET2, EBA, CHIPS, Fedwire). Defining a common ground for interoperability is likely to be the key driver for the evolution of instant payments solutions.

Instant cross-border payments will necessitate real-time processing, likely putting pressure on existing fraud and risk management, as well as compliance check systems.

– UNICREDIT S.P.A.



The upgrading of RTGS (or RTGS-like systems) to be operational 24x7 is likely to help facilitate cross-border payments by aligning the operating hours across linked RTGS systems in different time zones.

Countries such as India, Mexico, and Switzerland already operate RTGS systems at or near 24x7; while others such as the UK (further detail below) and the EU (TARGET2) are reviewing or moving in that direction. In the U.S., Fedwire and the Clearing House Interbank Payments System (CHIPS) are also contemplating such an endeavor.

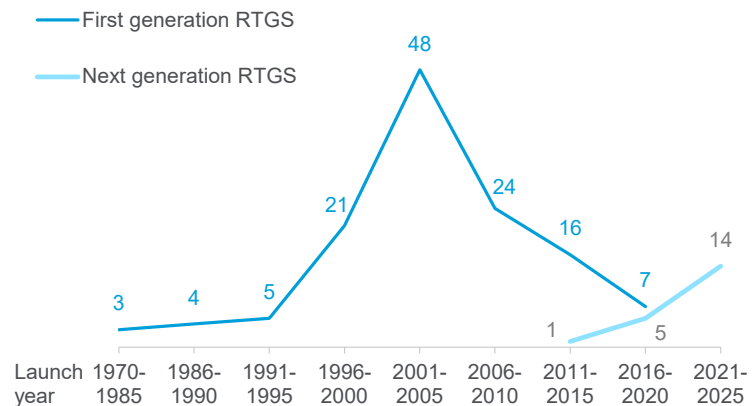
However, moving major RTGS systems to operate 24x7 is as challenging as it is necessary. To facilitate the smooth transition of major international currencies, two key criteria need to be put in place: (1) an outline of the regulatory framework, and (2) outreach to RTGS participants.

■ **Regulators need to prepare for the transition of RTGS systems to 24x7.**

Regulators need to develop a regulatory framework that enables banks to move their balances with central banks 24x7. This would have interesting implications — for example, what is the meaning of an overnight balance in such an ecosystem? Will the concept of an overnight balance even survive, or will we shift towards new mechanisms (e.g., continuous liquidity count or pro-rated average daily liquidity)?

■ **The second pre-work element is financial market infrastructures (FMIs) reaching out to RTGS's participants.** RTGS operators should start very actively consulting their participants on a 24x7 transition, including on the best way forward and challenges as well as risks and their mitigants. This work is underway in the U.S., for example, through the Payments Risk Committee (PRC).

Migration to the global ISO 20022 messaging standard also provides central banks around the world with an opportunity to modernize their RTGS platforms.

Figure 28. Number of RTGS Systems with Launch Years²¹

Source: Lipis Advisors, CMA Small Systems

Below we list a few of the recent completed or ongoing next-gen RTGS initiatives:

- UK:** The Bank of England's RTGS Renewal Programme, launched in 2021, aims to deliver increased resilience, greater access, wider interoperability, strengthened risk management, and improved user functionality. The system is based on the ISO 20022 messaging standard and will support nearly 24x7 operations with support for a larger number of direct participants. Implementation of the new system is in transition with the introduction of the new RTGS core ledger and settlement engine planned for the summer of 2024.
- Philippines:** The country introduced PhilPaSS Plus, an upgraded version of its existing RTGS system in 2021. PhilPaSS Plus promotes faster and more efficient movement of funds among individuals, corporations, and banks. Transactions are compliant with the ISO 20022 messaging standard.
- Oman:** The Central Bank of Oman launched the new national RTGS in June 2023, offering 24x7x365 operations. The new system also enables participants to monitor their liquidity requirements in real time, thereby mitigating risk; and facilitates final settlement for retail payment systems on a continuous basis. To facilitate cross-border payments between Gulf Cooperation Council (GCC) countries, the new system will be integrated with the GCC's regional RTGS system (AFAQ), as well as the Arab Regional Cross-Border Payment System (Buna).²²

The transition to an always-on RTGS will require major changes at banks in terms of technology and processes. The move from current batch processing to real-time processing is also likely to raise existential questions on operational nuances (e.g., the nature of overnight interest).

Major correspondent banks are already moving in this direction. Citi announced in 2022 the ability to process U.S. dollar treasury transactions for about 1,500 financial institutions in their network. It is widely expected that other major correspondents will also follow suit.

²¹ CMA Small Systems AB, *Imaging the Future of RTGS Systems*, May 19, 2022.

²² CMA Small Systems, "The Central Bank of Oman Has Launched the New 24x7 RTGS," June 18, 2023.

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Since launching in 2022, we have seen an overwhelming demand for 24x7 U.S. dollar clearing for treasury payments. Our financial institutions clients were excited for this solution to help reduce well-known pain points associated with making payments over weekends and public holidays and contending with cut-off times.

For example, a client can pay U.S. dollars in real-time from Sydney to Japan in the APAC time zone morning, even though the U.S. dollar clearing system is closed, without the need for scheduling.

The journey to help these clients (and in turn their underlying clients) to fully move to 24x7 is increasing in demand, which is why we are broadening the use case and are pleased to announce we are going to offer 24x7 clearing for commercial payments going forward.

– AMIT AGARWAL, GLOBAL CO-HEAD OF PAYMENTS & RECEIVABLES, TREASURY & TRADE SOLUTIONS, CITI

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India Market Cash Equity Trading: Citi Securities Service Funding on U.S. Holidays

By Marcia Saunders, Global Head of Cash Product, Citi Securities Services

The stock exchanges in India — the National Stock Exchange of India (NSE) and the BSE (formerly Bombay Stock Exchange) — and the Securities and Exchange Board of India (SEBI) announced in November 2021 that the equities trading market will move from a T+2 settlement cycle to a T+1 cycle starting from February 25, 2022. As of January 27, 2023, all trades in the equity cash segment (including futures and options on stocks) are now conducted on a T+1 settlement basis. This compressed settlement cycle posed unique challenges for clients, custodians, and intermediaries operating in India as it relates to funding, FX, and securities processing. Citi Securities Services was able to partner with Citi Treasury and Trade Solutions to deploy 24x7 capabilities to help overcome issues for our clients and internal operating models, allowing us to deliver best-in-class services and cut-off times.

Citi Securities Services provides custody and related services to institutional investors trading in global markets. Investor clients trading in India as Foreign Portfolio Investors (FPI) need to adhere to local regulations and requirements related to trade settlement. Citi, as a custodian in India, must ensure compliance with local regulations set by the SEBI, the Reserve Bank of India (RBI), and other regulatory bodies that oversee local business. In line with these regulations, where custody clients are trading Indian securities, Citi India requires clients to have sufficient Indian rupee (INR) funding in their accounts to support respective settlement obligations before any trades can be matched and settled in the market.

Historically, the settlement cycle for the cash equities market was T+2, meaning the settlement date (SD) was two days the execution of the trade on the trade date (T). Custodians are required to confirm trades with the clearing house based on sufficient funding confirmed from clients. Once a trade is confirmed, the custodian takes on the obligations to settle the trade in the market and execute payment to the clearing house. Failure to settle once a trade has been confirmed leads to a failure by the custodian as a clearing member and attracts penalties under the clearing house regulations.

Many FPI clients use Citi's foreign exchange (FX) services (custody AutoFX or Direct FX booking) to support their INR funding needs for trade settlements. This reduces risk and ensures alignment of FX settlement and INR funding to the respective equity trade's settlement date. RBI regulations require that FX trades for foreign investors be settled in cash, which means credit cannot be extended and the currency being sold (the sell currency) must be received by the FX bank on the value date to complete the trade settlement. Any failure to settle the FX deal on the value date attracts regulatory reporting requirements to the RBI.

In the event custody clients are executing FX against the U.S. dollar (USD) to fund their INR obligations, and the equity trade confirmation date fell on a U.S. holiday, U.S. dollars could not be paid to the FX bank, which meant clients needed to make other arrangements. While the equity market settlement cycle was T+2, clients had ample time to cancel any standing FX services and make other arrangements to settle through the broker, such as pre-funding INR or executing a USD/INR FX trade for the settlement date. Trades not confirmed by custodian and settled separately were reported to the capital markets regulator and not encouraged.

With the introduction of the T+1 settlement cycle for the equity market, custodians will need to confirm trades by 07:30 AM IST on the settlement date (T+1) and as such, clients will need to ensure sufficient funding is in place before this time. As a result, the timeline for clients to manage their FX on currency holidays (e.g., on a holiday for USD or their fund's respective base currency) became challenging. Shortened timelines result in less time for clients to manage their funding and FX, and the increases the likelihood that clients need to prefund and/or estimate INR requirements to ensure sufficient funding is in place to meet securities settlement timelines. Where FPIs need to prefund INR, this leads to overnight exposure and increases the cost to investors.

Pre-funding arrangements made by Citi Custody to overcome client issues would also lead to manual processing, funding costs to Citi, and execution risk due to estimated funding needs.

Leveraging Citi TTS 24x7 and Holiday Cash Processing

To address the pre-funding issues for clients and Citi noted above, Citi Security Services Custody partnered with Citi Treasury and Trade Solutions (Citi TTS) to implement a 24x7 funding arrangement on our nostros (foreign currency accounts). Leveraging this capability meant Citi was able to fund U.S. dollars between our custody branches even during a U.S. holiday. As such, clients who are using Citi's FX services no longer need to prefund or adjust FX arrangements, as Citi can continue to execute FX for settlement on a U.S. holiday and ensure funding is allocated to Citi's onshore branch on the morning of the settlement date to meet trade settlement timelines.

As a result, the normal process and timeline for trade matching, affirmation, FX booking, and U.S. dollar funding through Citi continues seamlessly on a U.S. holiday as if it were a normal working day. This is a market-first solution for Citibank in India as it facilitates USD/INR FX settling on U.S. holidays to ensure seamless securities market settlement for custody clients of Citibank India. This also allows Citi's custody group to have a "best in class" securities settlement and FX cutoff time for clients investing in India and using Citi for FX services, even on currency holidays.

Alternative Payment Methods (APMs)

While the paths towards 24x7x365 discussed above are important, they take time. Meanwhile, banks and payment service providers (PSPs) operating in the cross-border payments space (particularly in retail payments) compete by offering increased connections to networks that can deliver payments to various countries via domestic payments schemes. In addition to leveraging instant payment schemes, we see increasing usage of alternative payment methods, such as digital wallets, as a way to deliver payments faster.

Digital Wallets

Digital wallets are an important alternative payment method that extend their omnichannel ability as they respond to changing consumer payment preferences. Consumers are looking for simplicity in payment instructions, speed in execution, cost transparency, and 24x7 availability (e.g., around the clock).

In emerging markets that have relatively large unbanked populations, digital wallets have become a key alternative for accessing financial services traditionally offered by banks. Digital wallets have become an essential consumer tool for storage and payment using various payment methods. These wallets function as a primary payment gateway through smartphones, feature phones, and smartwatches.

Wallets, such as Alipay, PayPal, and Apple Pay, remain the leading global payment method in e-commerce (49% share) and at point-of-sale (32% share), accounting for about \$18 trillion in consumer spending.²³ Wallets remain among the fastest-growing payment methods, with 15% compound annual growth at point-of-sale and 12% annual growth in e-commerce forecast through 2026.²⁴ More than 60% of the world's population, translating to nearly 5.2 billion people, is projected to use digital wallets by 2026.²⁵

Integrating with digital wallet providers has unlocked the ability to make faster cross-border payments around the globe due to the often "walled garden" nature of these systems and the unique ways in which settlement models can be developed with them. Digital wallets possess extensive reachability and penetration in the markets where they operate.

²³ WorldPay from FIS 2023 Global Payments Report, August 2023.

²⁴ FIS 2023 Global Payments Report, August 2023

²⁵ Juniper Research, "Digital Wallet Users to Exceed 5.2 Billion Globally by 2026, as Digitization Accelerates Cashless Transition," August 2, 2022.

For example, PayPal has more than 430 million accounts worldwide and supports full value payouts to wallets in more than 100 markets, including developing markets where traditional payments can take days to settle.

Digital wallets are also a way of paying into heavily regulated markets, such as China. For example, Alipay wallets provide near-instant payments to individuals in China, making it a preferred method of payment for financial institutions with consumer flows to optimize the payment experience and drive transactions through a widely accepted method. Additionally, the details needed to make a wallet payment are proxies or aliases that are relatively simple (e.g., email address, unique number, name) without complicated routing information.



The financial ecosystem is likely to become ever more fragmented because of factors such as geopolitical shifts and the rapid pace of innovation. Continued fragmentation also means there will be more forms of value and more ways to move it. And end-customers will want more choice — for example account-to-account, account-to-wallet, and fiat-to-digital. The industry shall be prepared for this shift and be ready to enable end-customers to move value seamlessly, anywhere, in any form, to anyone globally.

– THIERRY CHILOSI, CHIEF STRATEGY OFFICER, SWIFT



Alternative Payment Methods (APMs) via Card Networks

Card networks such as Visa, Mastercard, and UnionPay have expanded their payments offering. In addition to supporting traditional chip/pin payments and payments through digital wallets on smartphones/smartwatches using biometrics, card network players are now leveraging their extensive network and high reachability in local markets as a method of making secure, full-value, near-instant payments to debit cards to credit an underlying bank account with near 24x7 availability.

As these payments are near real-time, they remove the need for traceability, and the sender/beneficiary know within a matter of minutes whether the payment is successful. Card networks possess significant reachability across the globe — as high as 90% in some markets — making them a key alternative to routing payments to a bank account without the use of complex bank routing information.

Payments can be sent with as little information as a beneficiary name, card number, and beneficiary country, making this payment method accessible and convenient. Due to the strict standards associated with protecting card data, consumers can be confident their information is secure.

A Case Study on Seamless Cross-Border Payments for Canadian Companies with CIBC Capital Markets



Jimmy Dinh
Managing Director, Direct Financial Service
CIBC Capital Markets

A pioneering collaboration between CIBC, correspondent banks providing network connections, and FinTechs is opening up a new world for Canadian residents and vastly improving the experience for remitters and beneficiaries.

- CIBC is the first big bank in Canada to allow their clients to send money directly to the Alipay wallet in China. CIBC or Simplii (CIBC's direct banking brand) clients can now seamlessly remit funds to their family in China almost instantaneously and around the clock. By comparison, traditional wires can take one to two days and may only be available at specific times of the day.
- Through a collaboration with a correspondent bank providing network connectivity (Citi's WorldLink cross-border payments solution) and a FinTech (digital wallet Alipay), CIBC and Simplii are tapping into a vast new market in China.
- Such partnership of a bank (CIBC) with a provider of global network connectivity (including connectivity to digital wallets) increases the speed of payments and improves transparency. It also provides a single point of access to multiple payment methods in more than 130 currencies, including Chinese yuan through the Alipay collaboration.

Trusted Banking Partner

More than 2 million Canadians identify as Chinese, and many send money transfers back home, forming a nucleus of banking customers that need access to cross-border remittance services.

To offer a good client experience, CIBC and Simplii needed better solutions to support these flows. Building direct connectivity to all payment methods in demand (including wallets) was expensive. CIBC therefore entered into partnership with a provider already offering such connectivity (in this case, Citi's WorldLink).

Through this partnership, CIBC obtained access to Alipay, a leading digital wallet that serves more than a billion users in China. Customers can now make transfers directly to their families, with no transfer fees and in real time, from their Simplii or CIBC bank accounts with an Alipay mobile wallet — virtually eliminating the pain points of cost-efficiency, transparency, and speed.

The described partnership creates a seamless experience for the remitter, with the transaction facilitated by Citi's WorldLink cross-border payments solution. Through the partnership, CIBC, without having to expand its actual footprint, has obtained virtual access to multiple payment methods in more than 130 currencies. This makes the payments both simple and secure, with all transactions protected by sophisticated encryption technologies, access restrictions, and authentication procedures.

The collaboration is anticipated to yield substantial benefits for CIBC and Simplii, expanding the range of faster and more efficient alternative payment methods available to clients. Globally, alternative methods have increased in popularity, with digital wallet transactions projected to exceed \$12 trillion in 2026, up from \$7.5 trillion in 2022, as more people leave their cards at home.²⁶

Not only does the Alipay partnership with Citi help CIBC and Simplii target younger clients who are demanding more flexible and faster digital payment options, it also accelerates CIBC's global expansion.

With help from Citi, we're breaking down the barriers that can make remittances a costly waiting game. Our focus on innovation in this space is helping us win in key segments by enhancing client experiences and further diversifying our business.

²⁶ Juniper Research, "Digital Wallets: The Catalyst for a New Payments Ecosystem," May 2022.

(b) Transparency

Many institutions have improved their transaction tracking capabilities and offer *ex post facto* transparency on fees. While initiatives such as Swift gpi have made it possible for institutions involved in cross-border payments to track and trace them, there are still some limitations (for example, there is no upfront information on downstream deducted fees common in cross-border payments) and challenges remain that would best be solved at an industry level. In the meantime, various companies and solutions are entering the market to fill in the gaps.

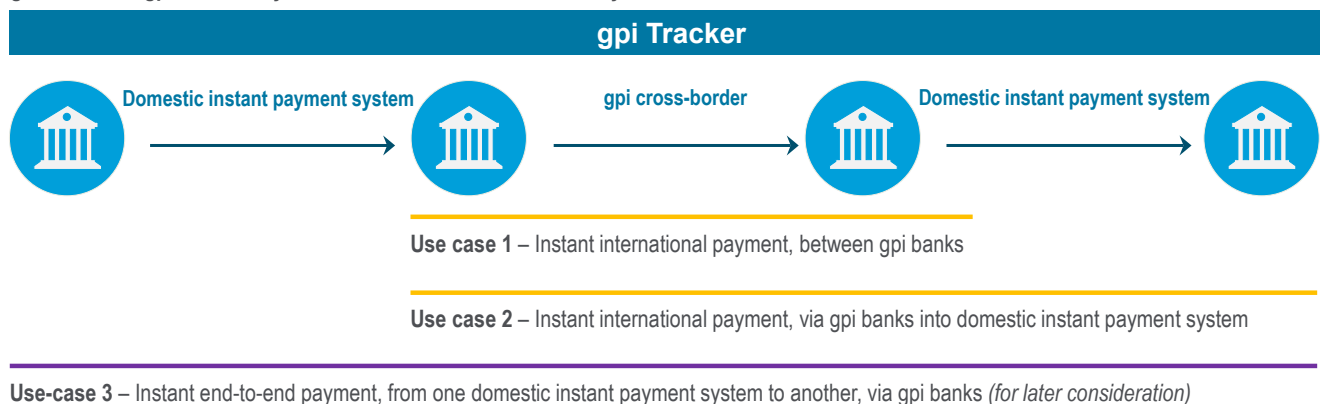
Swift gpi

Swift launched gpi in 2017, thereby setting a new standard for cross-border payments through gpi track and trace (with approximately 80% of MT103 payment message sent as gpi) and universal confirmations (with nearly 90% of MT103s being confirmed). It allows all institutions involved in processing a cross-border payment to see its status and the fees extracted from payment principal by each institution.

Before gpi, such information was only available on demand through a query or investigation process. The solution is now expanding beyond flows on Swift through the gpi Instant initiative, where instant payment schemes can leverage Swift gpi infrastructure to update upstream institutions about payments where the last mile is delivered via a participating instant payment scheme.

Swift gpi strives for cross-border payments to be credited to the beneficiary's account within 24 hours, with median processing times of less than two hours. Additionally, gpi also helps enhance tracking ability, providing customers with full visibility of fees, timelines, and exchange rates.

Figure 29. Swift gpi Instant Payments Service for Cross-Border Payments²⁷



Source: Swift, Citi GPS

The overall success of Swift gpi depends on it achieving critical mass, which is vital to ensuring the system has sufficient reach to allow banks and their clients to realize its full benefits. Currently, more than 4,420 financial institutions across more than 150 currencies signed up to Swift gpi, and 79% of all payments on the Swift network are sent via gpi.

²⁷ SWIFT, "[Instant Cross-Border Payments](#)," accessed August 30, 2023.

Swift gpi, however, does not ensure upfront transparency of fees in a scenario where delivery of payment is dependent on institutions that a sending institution does not have contractual relationship with (see section How Cross-Border Payments Work more detail). It also does not solve for upfront visibility into a beneficiary's account status (e.g., whether the account number is correct, or if the account is active or open, etc.).

These challenges are best solved at an industry level, and we see a number of initiatives being undertaken by Swift — which, as the institution connecting almost all banks in the world, is well-positioned for such endeavors.

- **Pre-Validation:** Provides upfront validation of the beneficiary account information. We see a substantial benefit of delivering this value-added service via an industry organization spanning essentially across all banks. Each individual bank can only do so much within its network, as required information needs to come from all (or as many as possible) beneficiary banks.
- **Case Resolution:** Focuses on introducing industry standards, as well as Service Level Agreements (SLAs) of best practices, coupled with intelligent routing of Exception and Investigation (E&I) queries and updates to the relevant bank in the chain. Again, we see Swift best positioned to deliver this service as E&I information needs to be passed often between banks that do not have a client-provider relationships with each other.

While an industry solution adopted at scale represents a “North Star” here, it is certainly a challenge. Meanwhile, we see individual commercial institutions competing in this space through their offerings (e.g., data-driven best estimates or smart routing via more predictable channels).

Interestingly, we do not see substantial industry efforts to deliver transparency of incoming wires to beneficiaries; however, some institutions are beginning to offer solutions to address this.



No matter where clients are on their digital transformation journey, whether clients are fully Swift enabled or want to interact via APIs, the need for transparency always remains: Clients want to know where their payments are and in real time.

– DEBOPAMA SEN, GLOBAL CO-HEAD OF PAYMENTS & RECEIVABLES, TREASURY & TRADE SOLUTION
CITI



(c) Cost

In this section we outline the two major cost components of cross-border payments and explain the driving force behind the costs and how they can potentially be mitigated.

Innovation can sometimes provide the answer; for example, banks and FinTechs may offer innovative alternative payment methods to avoid higher fees. Swift has launched, and is driving the adoption of, Swift Go, promising a lower-cost channel for small value payments.

However, innovation is not always the holy grail. Other factors such as transparency also have a critical role to play. When evaluating the cost of a cross-border payment to the sender and beneficiary, one should consider two key components: the FX rate and fees.

The FX component of the transaction is where costs can vary depending on the client's relationship with the financial institution executing the conversion and whether the beneficiary is in a higher-spread jurisdiction.

While costs may be expensive — typically not driven by the scheme or a technical challenge but rather the availability of FX — they are associated with reporting in a country or lack of competition and transparency.

As such, costs are unlikely to be mitigated by innovation itself, but rather by increased transparency, better consumer education, and more competition so senders and beneficiaries can choose where and when to do the conversion. We already know that a significant share of cross-border remittances occurs outside of bank networks due to the transparency and rates provided by FinTech providers offer in certain corridors.

Meanwhile, it is possible to address the fees associated with cross-border payments through innovation. As we discuss later in the “How Do Cross-Border Payments Work?” chapter, multiple institutions are involved in the processing of a payment, particularly in the corporate single-currency space. It only takes one player to charge high fees to the sender or the beneficiary (which is likely if the cross-border payments business may not be a volume play for them) for the ultimate end-to-end cost to be high. Improved upfront transparency could help senders avoid sending payments via banks charging higher fees for intermediations or for incoming wires.

Notably, high fees associated with cross-border payments are almost never driven by charges imposed by the infrastructures involved. In other words, they are not due to usage of a particular technology (even if it is a “legacy” technology).

Instead, high costs are more likely to be the result of pricing strategies of institutions involved in end-to-end delivery of a transaction or due to the processing cost required to conduct activities like regulatory reporting and overall regulatory adherence, which can be onerous. These fees are often higher for “wires.”

Given the specificity of the above challenges to cross-border *wires*, — challenges not related to technology, but rather driven by market practice or strategy — innovation to address them is focused on:

- developing alternative schemes, and
- re-routing transactions towards non-wire channels, which are typically subject to lower fees at end points. We described these in prior sections in APMs and usage of instant payments and ACH for cross-border purposes.

Swift Go, a service launched in 2021, falls in the first category. The service is Swift's initiative aiming to decrease fees associated with low value payments. One of its key objectives is limiting the end points' ability to extract fees from the principle of the payment or from upstream institutions. Unlike in traditional wire processing, where beneficiary bank can extract fees from parties who are not their clients (through deductions or claim processes in lieu of deductions), in this flow, the beneficiary bank can only charge their client — the beneficiary for processing of incoming credit. This is expected to naturally decrease costs as fees are extracted from a party whose business the service provider is actively competing for, rather than from relatively remote parties.



The industry is hard at work making local instant schemes interoperate cross-border and other initiatives, such as Swift Go, are offering a more competitive service, where pre-validation models are reducing transactional incidents.

— STÉPHANIE RODRIGUEZ ANIORTE, GLOBAL HEAD OF PAYMENTS, SANTANDER



[2] Digital Money 2.0 for Cross-Border Payments

Digital Money vs. “Traditional” Forms of Money

Money in the modern era is account based: “I am, therefore I own.” Before the computer era, this was literally a physical ledger entry build on double-entry accounting. Twentieth-century digital money was the electronic version of this.



Value will take new forms in the future, whether that is CBDCs, asset tokenization, or other forms of value. Most CBDC technologies are currently being developed with a focus on their individual domestic markets, which could mean we start to see ‘digital islands’ springing up around the world. Swift can provide institutions with a single point of access to an ecosystem consisting of different blockchain networks and existing fiat currencies, and also collaborate with our community to provide interoperability globally.

– TOM ZSCHACH, CHIEF INNOVATION OFFICER, SWIFT



Digital money in the 21st century is different as it is tokenized: “I know, therefore I own.” Being programmable, its value can be fiat-linked (or not) and its technology and governance can be centralized (or not). The story of digital money in the 2020s is the growth of tokenized money.

Fiat money is a government or central bank-issued currency that is not backed by the value of a physical asset like gold. As a liability of the issuing central bank, its acceptance and value as a medium of exchange or payment is a function of the stability of, and confidence in, the government or central bank that also has control over the supply of the money, which is theoretically unlimited.

Most modern currencies, including the U.S. dollar, are fiat money. Hard-money enthusiasts might argue there is no reason to alter the structure of money, which includes central bank money at the base of the pyramid, followed by commercial bank money, as well as electronic money offered by regulated non-banks as a digital representation of client funds held within commercial banks. Proposed changes to this structure are likely to have destabilizing effects.



Traditional rails will need to find a way to adapt if they are to remain relevant, especially within the high-value, wholesale payments space. One way forward for traditional banks may be strategic partnerships with more blockchain-native players.

– UGUR KOYLUOGLU, GLOBAL HEAD OF DIGITAL ASSETS, OLIVER WYMAN



The fiat currency stack is a set of domestic and international systems that enables modern money movement. This includes Real-Time Gross Settlement (RTGS), Automated Clearing House (ACH), real-time payments, card schemes, open banking, Swift, Continuous Linked Settlement (CLS), and e-money.

Tokenized money — such as CBDCs, stablecoins, and cryptocurrencies — are relatively new and could be disruptive to the existing monetary, banking, and payment structures. Tokenized money could disintermediate incumbent financial institutions, increase the volatility and cost of bank deposits, and be a substitute for existing payment forms such as checks and cards.

On the other hand, while currently unregulated, which is a challenge in itself, the balance sheet implications of tokenized money's construct present a hurdle for scalability, which was recently documented in a BIS Annual Economic Report.²⁸



I believe there is room for stablecoins (both U.S. dollar and non-U.S. dollar pegged), tokenized deposits, CBDCs, and tokenized money market funds to revolutionize cross-border payments landscape. Tokenized payments could play out differently across high-value versus retail payments, and there will also be significant differences across jurisdictions around what forms of digital money are allowed, which will impact how cross-border payments evolve.

– UGUR KOYLUOGLU, GLOBAL HEAD OF DIGITAL ASSETS, OLIVER WYMAN



We believe the Cryptopian thesis often begins by misdiagnosing the nature of the problems in the payment space. For example, crypto enthusiasts often cite traditional payment rails to be very slow and profess their network to be faster. However, during the testing for a CBDC, the Federal Reserve Bank of Boston showed that a non-blockchain payment technology could perform 1.7 million transactions per second, compared to 170,000 transactions per second on blockchain technology.²⁹

This is not surprising given that SWIFT uses electrons to send messages over a secure network with extremely high speed, security, and reliability. Distributed ledger technology (DLT) electrons are unlikely to be faster than SWIFT electrons (DLT is the technology underlying blockchain).

To understand the real challenges in payments, we simply need to compare 21st century digital platforms that operate interactively 24x365 with the banking system. Especially key is seeing how the new platforms will impact correspondent banking, which is still largely based on batch processing, and store and forward messaging.

While we observe a digital money race, fiat currency does not sleep — we are seeing meaningful strides towards 24x7 operations and improved transparency, diminishing some of the advantages advertised by digital ledger technology (DLT) and blockchain evangelists as these features are not exclusive to these technologies.

²⁸ Bank for International Settlements, *Annual Economic Report 2022: The Future Monetary System*, June 21, 2022.

²⁹ James Lovejoy et al., *A High-Performance Payment Processing System Designed for Central Bank Digital Currencies*, MIT Media Lab Digital Currency Initiative and the Federal Reserve Bank of Boston, February 3, 2022.

This is where the public central bank initiatives and private bank consortia will come in. What remains uncertain is how various solutions will fit together. The Bank of International Settlements (BIS) recently proposed a blueprint for a unified programmable ledger to knit together tokenized commercial bank money and assets, while the International Monetary Fund (IMF) presented a proposal for a cross-border payment and contracting platform based on reserves in escrow.³⁰

Swift recently announced a partnership with public blockchain data provider Chainlink, for experiments with DTCC (Depository Trust & Clearing Corporation), BNP Paribas, BNY Mellon and others, which hints at the types of collaboration that may begin to define the next phase of the cross-border payments market.³¹

It is likely we will see combinations of public and private networks coexist, each specializing in specific use cases with their own pros and cons. Some may even form “hybrid” networks in domains that require the best of both.

For example, we may see a stablecoin on a public network, backed by a CBDC held in escrow on a parallel private network, combining the assurances of central bank money with the interoperability of public networks.

Types of Digital Assets Likely to Be Used for Payments

Blockchain-based payments networks could drive competition to make cross-border payments rails instantaneous, efficient, and with 24x7 operability. However, the move toward instant, 24x7 payments is not universally welcomed by industry participants, as it changes the way corporates and financial institutions must manage their liquidity.

This shift may create new intermediaries in the payments process or enable existing intermediaries to adapt their business models and remain competitive. One of the big questions for the payments community is: To what extent will these technologies impact the intermediary-based cross-border payments model?

Focusing only on a path to scale, for cross-border payments to happen on DLT and blockchain, digital money needs to be issued at a scale that can be moved on blockchains and DLTs. While the digital asset and blockchain revolution started with cryptocurrencies, cryptocurrencies have by now been all but dismissed as viable for payments use cases at scale. But they did “give birth” to three candidates: stablecoins, tokenized commercial bank money (deposits), and CBDCs.

[1] Stablecoins

Stablecoins are blockchain-based digital currencies collateralized to the value of an underlying asset, usually a claim on a reserve held at a regulated institution. Stablecoins seek to deliver the benefits of tokenization while removing volatility (at least in theory), owing to their peg to a stable fiat currency or other assets.

There are broadly four types of stablecoins: (1) fiat-collateralized, (2) commodity-collateralized, (3) crypto-collateralized, and (4) non-collateralized. The most commonly collateralized stablecoins are linked to fiat currencies such as the U.S. dollar, the euro, or British pound.

³⁰ BIS, “Blueprint for the Future Monetary System: Improving the Old, Enabling the New,” June 20, 2023.

³¹ Swift, “Swift Explores Blockchain Interoperability to Remove Friction from Tokenised Asset Settlement”, June 6, 2023.

The primary use case for stablecoins, until now, has been to enable crypto trading and speculation activities. However, one recent research report highlights that stablecoin usage has decoupled from crypto exchange volume and may not be driven by speculative activities.³²

Potential use cases for stablecoins include greater integration of payments with social media and facilitating cross-border payments, among others. Stablecoins are often touted as a solution for cross-border remittances, given their potential to offer instantaneous settlement at low costs.

Recently, PayPal launched its own U.S. dollar stablecoin (PYUSD) that is fully backed by U.S. dollar deposits, short-term U.S. Treasuries, and similar cash equivalents. PayPal's stablecoin is redeemable 1:1 for U.S. dollars.

PYUSD is based on the Ethereum blockchain and is issued by Paxos Trust Company, which specializes in blockchain that is subject to regulatory oversight by the New York State Department of Financial Services.

For now, PayPal users can use PYUSD to make peer-to-peer payments, pay for purchases, and convert the stablecoin to other PayPal-supported cryptocurrencies using compatible external crypto wallets.³³ Other potential use cases could include cross-border remittances and in-game purchases of digital goods, as mainstream adoption picks up in the coming years.³⁴

For their merits, stablecoins also have important shortcomings, as noted by the BIS in their *Annual Economic Report*, published in June 2023. As stablecoins are tradeable, their prices can deviate from par, especially as variations in the quality of the backing or characteristics of the issuer lead to differences in perceived creditworthiness of different issuers.

Even higher-order uncertainty can arise when the public starts harboring doubts about the value of a stablecoin, which can lead to discounting and undermine the “singleness” of money (i.e., the property that payments denominated in the sovereign unit of account will be settled at par, even if they use different forms of privately and publicly issued monies).

The absence of clear regulatory or supervisory frameworks across major economies, and the lack of a central bank as a lender of last resort, have led to instances where stablecoin prices have lost their pegs (e.g., the failure of the LUNA cryptocurrency on the Terra blockchain).

However, the Monetary Authority of Singapore recently announced features of a new regulatory framework that seeks to ensure a high degree of value stability for stablecoins regulated in Singapore.³⁵

³² Gordon Y. Liao et al., “Beyond Speculation: Payment Stablecoins for Real-Time Gross Settlements,” Social Science Research Network, June 13, 2023.

³³ Cheyenne DeVon, “PayPal Is Diving Deeper into Crypto by Launching Its Own Stablecoin—What Investors Should Know,” CNBC, August 10, 2023.

³⁴ Laura Shin and Jose Fernandez da Ponte, “Will PayPal’s PYUSD Steal Market Share from Tether and Circle? – Episode 530,” *Unchained Crypto*, podcast, August 11, 2023.

³⁵ Monetary Authority of Singapore, “MAS Finalizes Stablecoin Regulatory Framework,” Media Releases, August 15, 2023.

Lastly, transaction speeds differ by blockchain but are slow for stablecoins issued on a predominant blockchain. Factors such as the block time and size, transaction fees, and network traffic also influence transaction speeds.³⁶

According to the Bank of Canada, stablecoin arrangements do not currently serve as substitutes for the suite of traditional payment arrangements, but instead address niche use cases or user segments that value their benefits and can accept their risks or cost.³⁷

[2] Tokenized Commercial Bank Money

Many view this form of money as the future of tokenized or digital money. A BIS report acknowledges tokenized deposits as a possibility along with CBDCs. And according to the BIS, tokenized money has advantages over stablecoins in terms of compliance with Know Your Customer (KYC) and Anti-Money Laundering/Countering the Financing of Terrorism (AML/CFT) rules.³⁸

Furthermore, it also helps preserve singleness of money as the central bank operates settlement infrastructures that guarantee the ultimate transfer of payments at par value in terms of the sovereign unit of account.

On the Fed website, we find tokenized deposits described as a “*fruitful avenue to pursue*” for digital money and an option that improves upon the existing stablecoin offerings.³⁹ If tokenized deposits are going to be the dominant money moved on DLT and blockchain, we are likely going to see a form of intermediation by issuers of such deposits — effectively correspondent banks. Many participants see substantial potential for the Regulated Liability Network (RLN), discussed in the next section, Tokenized Commercial Bank Money, as the future platform for open or ubiquitous movement of tokenized commercial bank money and CBDCs.

Commercial bank money is a liability of a commercial bank in favor of the depositor and is stored in accounts. Much like bank deposits that are the dominant form of money in use today, tokenized deposits can support a variety of use cases such as domestic and cross-border payments, trading and settlement, and provision of cash collateral.

The idea of tokenizing commercial bank money has been gaining ground in recent years, especially with the implosion of stablecoins in 2022. There is potential to build new payment rails based on DLT and cryptographic tokens to expand the functionality of the regulated financial system.

³⁶ Mitsu Adachi et al., “Stablecoins’ Role in Crypto and Beyond: Functions, Risks and Policy,” European Central Bank, July 2022.

³⁷ Annetta Ho et al., “The Relative Benefits and Risks of Stablecoins as a Means of Payment: A Case Study Perspective,” Bank of Canada, December 2022.

³⁸ Bank for International Settlement, *Annual Economic Report*, June 2023.

³⁹ Rod Garratt et al., “The Future of Payments Is not Stablecoins,” Federal Reserve Bank of New York, February 7, 2022.

Moreover, as tokenized commercial bank money supports the singleness of money, as described earlier, it does not circulate as a bearer instrument and can be redeemed on demand at par value with other account-based forms of money. According to the BIS, tokenized commercial bank money supports the “singleness” of money, i.e., the currency is interchangeable irrespective of the form.⁴⁰

In the model of tokenized commercial bank money, participants are customers of regulated financial institutions (e.g., banks), and transfers are recorded at the individual bank level and settled automatically, likely using wholesale CBDCs.

By tokenizing commercial bank money on a multi-entity and multi-jurisdictional basis, it is possible to deliver benefits of the tokenization, such as programmability and instant or atomic settlement, both domestically and internationally. This could help speed up transactions and automate payment operations.

For example, the Monetary Authority of Singapore (MAS), in collaboration with other financial institutions, is experimenting with the use of blockchain for asset tokenization through Project Guardian. In the first phase, a live cross-currency transaction involving tokenized Japanese yen and Singapore dollar deposits was successfully conducted.

The deposit tokens enabled concerned parties to interact directly with the protocol, offering the benefits of automated market making, matching of bids and offers for assets, and execution of transactions between parties upon certain agreed-upon conditions being met.

Beyond initial pilots, the success of tokenized commercial bank money will require enhanced interoperability between traditional financial systems and blockchains (across different chains and different assets). Also, as noted, there is the potential for intermediation (i.e., by deposit issuers, such as correspondent banks) if tokenized deposits are going to be the dominant money moved on DLT and blockchain. While the BIS has proposed tokenized deposits underpinning their unified ledger vision, coordination of what regulation of tokenized deposits looks like is still in the early days.

⁴⁰ Rodney Garratt and Hyun Song Shin, “Stablecoins Versus Tokenized Deposits Implications for the Singleness of Money,” April 11, 2023.

Tokenization of Public and Private Money: RLN

The Regulated Liability Network (RLN) is a concept developed from Citi thought leadership that represents the intersection between the beneficial features of shared ledger technology and the positive attributes of the regulated financial system.⁴¹ The RLN proposes the tokenization of both central bank money and commercial bank money on a shared ledger.

The RLN would represent a financial market infrastructure (FMI) that allows financial institutions to move value and settle transactions with finality on a 24x7 basis. Payments using RLN are operable on a cross-border basis, programmable through smart contracts, and extendable to multiple assets.⁴²



We must nurture the new emerging world of tokenized financial instruments. Undertakings, such as Regulated Liability Network (RLN), are tangible ‘avenues’ supporting this new way of payment processing.

– STÉPHANIE RODRIGUEZ ANIORTE, GLOBAL HEAD OF PAYMENTS, SANTANDER



⁴¹ Tony McLaughlin, “[The Regulated Internet of Value](#),” Citi, 2021

⁴² The Regulated Liability Network, *Digital Sovereign Currency: Whitepaper*, November 15, 2022.

Case Study: U.S. Regulated Liability Network (RLN) Proof of Concept

The U.S. Regulated Liability Network (RLN) Proof of Concept (PoC) was a contained 12-week experiment conducted in the first half of 2023. The PoC enabled regulated U.S. commercial banks, global payment and messaging networks, and the New York Innovation Center (NYIC) to collaborate on innovative solutions for interbank and cross-border payments through shared ledger technology. This industry working group explored the business applicability, technical feasibility, and legal viability of the RLN concept. A summary of the reports is detailed below:

[1.] Business Report

- The PoC demonstrated that the basic operations of the RLN concept can **effectively provide domestic and cross-border credit transfers**.
- Global payments in U.S. dollars could be significantly improved through a system like RLN with 24x7 availability and increased operational efficiency.
- The creation of a global instant dollar payment system would augment the U.S. dollar as an international settlement currency and facilitate global trade and financial settlements.

[2.] Technical Report

- The technical sandbox **successfully met all functional requirements** to deliver the RLN concept.
- The PoC demonstrated potential to deliver a payments system that can process and settle **24x7 in near-real time**, support **interoperability**, ensure **privacy**, facilitate programmability through smart contracts, and deliver capital efficiency.
- The PoC demonstrated the **RLN concept is technology-agnostic** and not reliant on a specific technology.

Non-functional requirements were not in scope.

[3.] Legal Report

- A payment system based on the RLN concept could **likely be created within existing rules and regulations**, most likely as a Financial Market Utility (FMU) and funds transfer system.
- Deposit tokens should be considered **equivalent to normal bank deposits** in all respects, including FDIC insurance.
- Within the RLN construct, **wholesale Central Bank Digital Currencies** (wCBDCs) should be considered as equivalent to **normal bank reserves**.
- **Finality of settlement** is achievable within the RLN.

In addition, the BIS is exploring a unified ledger concept that would act as an FMI combining central bank money, tokenized deposits, and tokenized assets on a programmable platform. This could help promote financial inclusion where certain institutions — for example, small cooperative banks in villages — may not have been able to connect to central bank settlement systems. The initiative would also help to improve existing processes through the seamless integration of transactions that harness programmability.⁴³

⁴³ Bank for International Settlement, *Annual Economic Report*, June 2023.

[3] Central Bank Digital Currencies (CBDCs)

Today, nearly 130 countries, representing 98% of global GDP, are exploring CBDCs, and a new high of 64 countries are in an advanced phase of exploration (i.e., development, pilot, or launch).⁴⁴

CBDCs are a digital payment instrument, denominated in the national unit of account, and are a direct liability of the central bank, unlike other forms of digital payments (e.g., credit transfers, card payments, e-money), which are the liability of a private financial institution. There are two predominant types of CBDCs:

- **Retail CBDCs:** Intended for use by households and enterprises for day-to-day transactions.
- **Wholesale CBDCs:** Intended for use for transactions between banks, central banks, and other financial institutions.

Several central banks have completed pilots for retail and wholesale CBDCs in 2022. For example, Sveriges Riksbank tested a technical solution for a potential e-krona, and the Federal Reserve Bank of New York published research demonstrating how a wholesale CBDC could significantly speed up cross-border transactions.

CBDCs could potentially result in disintermediation of banks if (and this is a big if) they were issued by central banks directly to anyone who asks for them — that is, all foreign commercial banks, corporations, individuals, etc. The likelihood of this happening is uncertain.

On one hand, a recently published report by the U.S. Department of Treasury includes the following statement:⁴⁵

“A more feasible model [as compared to one-tier system] in the United States for intermediating a retail U.S. CBDC would be a two-tiered system, which is in line with what the majority of jurisdictions globally are considering. Under this model, the Federal Reserve would issue and redeem U.S. CBDC, but the distribution of U.S. CBDC would be handled by intermediaries eligible for an account at the Federal Reserve and payment services would be managed by intermediaries and other private sector participants.”

⁴⁴ Atlantic Council, [“Central Bank Digital Currency Tracker,”](#) accessed August 31, 2023.

⁴⁵ U.S. Department of the Treasury, *The Future of Money and Payments: Report Pursuant to Section 4(b) of Executive Order 14067*, September 2022.

Figure 30. Central Bank Digital Currencies

Central Bank Digital Currencies (CBDCs)

Nearly **130** countries are exploring a CBDC



64 countries are in advanced phase of exploration



What is CBDC?

It is a digital payment instrument denominated in the national unit of account and is a direct liability of the central bank.



Retail CBDCs

Intended for use by households and enterprises for day-to-day transactions.



Wholesale CBDCs

Intended for use for transactions between banks, central banks, and other financial institutions.

Wholesale CBDCs can:



Help deliver faster, cheaper, and more transparent cross-border payments.



Help address limited operating hours, long length of transaction chains, and legacy technology platforms.

Source: Citi GPS

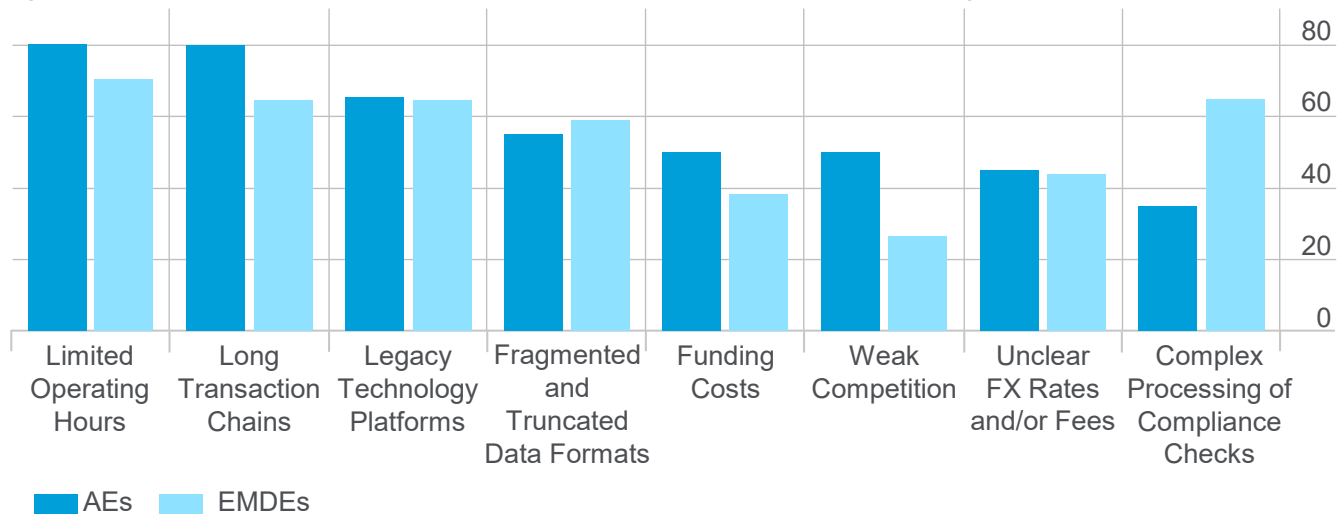
While work on retail CBDCs is at a more advanced stage than wholesale CBDCs, interest in wholesale CBDCs is primarily driven by the desire to enhance cross-border payments. Some of the prominent multi-CBDC projects aimed at delivering faster, cheaper, and more transparent cross-border payments are listed below:

- **Project mBridge:** The BIS Innovation Hub, the Hong Kong Monetary Authority (HKMA), the Bank of Thailand (BoT), the Digital Currency Institute of the People's Bank of China (PBOC), and the Central Bank of the United Arab Emirates (CBUAE) are working to build a multi-CBDC pilot with central banks issuing to foreign commercial banks to improve cross-border payment speed and efficiency, as well as reduce costs and settlement risk.
- **Project Mariana:** Banque de France, Monetary Authority of Singapore, and the Swiss National Bank partnered with the Eurosystem BIS Innovation Hub in 2022 to pilot a cross-border automated market maker (AMM) project. The project aimed to explore the use of AMMs to facilitate exchange among Swiss francs, the euro, and the Singapore dollar at a wholesale level.
- **Project Jura:** Launched by the BIS Innovation Hub, Banque de France, and Swiss National Bank together with a private sector consortium, Project Jura aims to conduct experiments using wholesale CBDCs for cross-border settlement on DLT platforms.
- **Project Dunbar:** This endeavor aims to explore international settlement across multiple CBDCs among the central banks of Australia, Singapore, Malaysia, and South Africa.

- **Project Jasper:** Launched by the Bank of Canada in 2017 and concluded after four phases, the project included cross-border testing with the Bank of England and the Monetary Authority of Singapore.
- **Project Aber:** Launched in 2019 by the United Arab Emirates and Saudi Arabia, the bilateral project concluded that decentralized ledger technology can successfully facilitate cross-border transactions.

Key pain points in traditional cross-border payments that wholesale CBDCs could help address include limited operating hours, long transaction chains, and legacy technology platforms.⁴⁶

Figure 31. Cross-Border Frictions That Wholesale CBDC Could Address, % of Respondents Conducting Work on CBDCs, 2022



Note: The material is available on the BIS website free of charge: www.bis.org. AE = Advanced Economy, EMDE = Emerging Market & Developing Economy.
 Source: 2022 BIS Central Bank Survey on CBDCs and Crypto

In addition, there are also projects such as Partior, which is an open industry platform looking to onboard banks across various countries. It offers participating banks alternative options for delivering cross-border payments within its network. Some of the use cases that Partior is working on include Delivery Versus Payment (DVP), FX Payment Versus Payment (PVP), and tokenized lending and borrowing. They are also exploring potentially serving as a complementary platform for ongoing CBDC initiatives.⁴⁷

CBDCs are increasingly relevant as a financial policy and plumbing question. Collectively, the euro, British pound, and Indian rupee constitute around 15% of the world’s monetary base (i.e., M0, which is currency in circulation and money being held by banks in reserves), or \$15 trillion. These currencies also together constitute 22% of global narrow money (i.e., banknotes and coins, plus overnight deposits) at \$71 trillion.

⁴⁶ Anneke Kosse and Ilaria Mattei, *BIS Papers No. 136: Making Headway – Results of the 2022 BIS Survey on Central Bank Digital Currencies and Crypto*, BIS, July 2023.

⁴⁷ DBS, “Future of Payments: Reimagining the Evolution of a New World of Payments on Blockchain,” accessed September 10, 2023.

Central banks estimate up to 20% of deposits could transition to newer digital money formats.⁴⁸ We could have \$5 trillion of CBDCs circulating in major economies in the world in this decade, half of which could potentially be DLT-linked.⁴⁹

Now that we have explored how innovation across fiat and digital asset stacks is improving speed, cost, and transparency, let us turn our attention to some other emerging technologies at play.

⁴⁸ Bank of England, "[New Forms of Digital Money: Discussion Paper](#)," June 7, 2021.

⁴⁹ Citi GPS, "[Money, Tokens and Games: Blockchain's Next Billion Users and Trillions in Value](#)," March 2023.

ECB Paper on the “Holy Grail” of Cross-Border Payments

By Tony McLaughlin and Martin Cannings, Citi Treasury and Trade Solutions

In August 2022, the European Central Bank published a working report that explores how the “holy grail” of cross-border payments might be found in the next 10 years.⁵⁰

The holy grail is defined here as cross-border payments that are immediate, cheap, universal, and settled in a secure medium (such as central bank money). The paper systematically scrutinizes the credentials and the potential of a host of different options, including modernized correspondent banking, emerging cross-border FinTech solutions, Bitcoin, global stablecoins, interlinked instant payment systems with an FX conversion layer, and interlinked CBDCs with an FX conversion layer.

Against each area, the paper explains how the settlement mechanism works and interrogates its potential efficiency, competitiveness, and impact on monetary sovereignty.

- **Modernized Correspondent Banking:** Acknowledged as a well-tested method for the settlement of cross-border transactions, with established KYC/compliance expertise, it preserves monetary sovereignty and provides universal reach as well as remaining the only feasible solution for low-volume corridors. Questions remain, however, around the inherent inefficiency of the approach (e.g., it creates a multiplicity of IOUs) and the dependence on commercial bank money settlement.
- **Emerging Cross-Border FinTech Solutions:** In recent years, such solutions have served to generate competition and lower prices, as FinTechs specialize on limited services and ensure strong offerings and user experience. Their reach, however, is more limited than correspondent banking, and they maintain a reliance on existing infrastructure (i.e., banks and payment systems).
- **Bitcoin:** Bitcoin provides a single system that could be used globally without intermediaries, and wallet providers have developed mechanisms to convert fiat money to and from Bitcoin. But the drawbacks are extensive and include expensive and wasteful proof-of-work mechanisms, absence of clear regulatory treatment, poor governance that may make Bitcoin resistant to valuable changes in a dynamic environment, and finally, significant price volatility hindering its practicality as a functioning currency. Because of these factors, Bitcoin is unlikely to be the holy grail for payments.
- **Global Stablecoins:** Global stablecoins offer technological efficiency, scalability and — conceptually — price stability through their linkages to fiat currency or other assets. However, a number of potential drawbacks remain, including financial stability issues (as visibility on stablecoin reserves has proved difficult to implement), threats to monetary sovereignty, and risks of currency substitution. While recognizing that the structure of stablecoins represents a better fit than Bitcoin, the identified issues remain highly significant and would seem to disqualify stablecoins as strong candidates to be the “holy grail.”
- **Interlinked Instant Payment Systems with FX Conversion Layer:** This mechanism represents an inherently efficient approach, as it reuses domestic infrastructure and delivers a competitive FX conversion layer. It is simpler than correspondent banking models but preserves universal reach and respects monetary sovereignty. However, the technical complexity and cost of interlinking and establishing the instant FX conversion layer are material, and significant political will is required. The challenge becomes still more acute in the narrow corridors.
- **Interlinked CBDC with FX Conversion Layer:** This mechanism preserves monetary sovereignty and is arguably simpler than linking instant payment schemes. However, CBDCs are immature, and much work needs to be done to enact a satisfactory implementation in major economies.

The paper concludes that Bitcoin is the least credible option, stablecoins are likely to be problematic from a public policy perspective, and correspondent banking and cross-border FinTechs may both contribute to improvements in payments over the coming years. The interlinking of instant payment schemes and interconnectivity of CBDCs are identified as having the highest potential to deliver the “holy grail.”

[3] Real-Time Liquidity Management as an Enabler

Business model changes and payments innovation will drive a sea change in liquidity management for economic players across the board — financial institutions, FinTech payment providers, companies, and individuals. We will focus on companies, as they are a major contributor to economic activity and originator of payment activity through banks and non-banks, so they provide a good basis for illustration of the principles impacting all players.

We first define liquidity management, then highlight some of the potential changes and challenges, and finally posit approaches that the industry will need to take.



As new business models evolve, we know that liquidity management transformation is a key strategic investment that treasurers are looking to make. We are helping clients navigate this journey via thoughtful investments into real-time liquidity solutions that catalyze this transformation, as well as advisory services to guide through the change.

– STEPHEN RANDALL, GLOBAL HEAD OF LIQUIDITY MANAGEMENT SERVICES, CITI



In this context, liquidity management refers to how an economic player or organization ensures enough cash is immediately accessible to meet all payment obligations as they become due. If liquidity reserves (including cash and available borrowing lines) are too little to meet obligations, the organization may face a challenge with customers, suppliers, and regulators. If it holds excessive reserves, its core business may be starved of working capital, and a “lazy” balance sheet will depress returns and risk disappointing investors.

As companies grow, so does their physical presence across geographies and currencies. This growth naturally makes the process of liquidity management more complicated — the organization needs to ensure that enough liquidity reserves are available, not only in the aggregate but in the right location in the right currency at the right time across the globe. Across most organizations, the treasurer’s role has evolved to have liquidity management as the core responsibility.

Core processes that have evolved to facilitate liquidity management include weekly forecasting of expected cash flows to determine how much cash will likely be needed where; daily cash concentration and pooling, whereby bank accounts’ cash positions (e.g., resulting from customer collections) are centralized so the cash can be redeployed wherever needed (e.g. to fund payments); and daily electronic bank statements, which provide visibility over all cash positions across the globe.

Additionally, many central banks manage their FX reserves and money supply by placing restrictions on cross-border money transfers. This creates added complexities, and the responsibility of the treasury team is to ensure it has capacity to manage liquidity for these markets through additional processes.

⁵⁰ Ulrich Bindseil and George Pantelopoulos, *Working Paper Series: Towards the Holy Grail of Cross-Border Payments: No. 2693*, European Central Bank, August 2022.

All this evolved over a time when most flows occurred over the traditional business day and often in batches; for example, most companies make vendor payments in predictable payment runs from weekly to monthly frequency. Larger companies often buy technology (often called Treasury Management Systems) from providers to support the liquidity management process.



The opportunity still lies in satisfying the specific needs and expectations of our current and future clients.

In cross-border payments, the area more likely to experience larger growth would be the ‘retail sector,’ where we have to offer international payments that are secure, faster, cheaper, and frictionless, as well as fully embedded in the newly formed e-commerce infrastructure.

Richer and fully traceable data will enable us to help our corporate customer base with their liquidity management forecasting and associated accurate decision making.

– STÉPHANIE RODRIGUEZ ANIORTE, GLOBAL HEAD OF PAYMENTS, SANTANDER



But, with digital transformation, economic players interact at a faster pace and payments become 24x7. We can imagine how liquidity management becomes more challenging as this happens. Consider the following scenario: A ride-hailing company that prides itself on its driver network considers the immediacy of payment to drivers as a strategic driver engagement tool and therefore pays its drivers almost immediately after a customer completes a ride. However, in situations when ride volumes and/or pricing “surges,” so does the amount of cash needed to pay the drivers. Consequently, traditional cash forecasting models and liquidity management tools become inadequate for such situations.

What this implies is that, instead of a weekly cash flow forecast, organizations may need to forecast much higher frequency changes in cash positions. Instead of electronic bank statements at the end of day, or perhaps a few times during the day, organizations will need real-time visibility into their global cash. Instead of cash being concentrated once a day, five days a week, organizations may need to centralize and mobilize cash multiple times a day (including the weekend) to fund payment obligations as they occur 24x7 across their geographic footprint.

Treasury teams must evolve to process what will ultimately become 24x7 needs, which will require a high velocity of change in cash positions and therefore quick decision-making and action. In other words, industry innovation in payments driven by business model evolution is now becoming a catalyst for change in liquidity management practices. We call this real-time liquidity management.

It is clear that a new set of tools will be needed for real-time liquidity management. Scaling up the size of treasury teams is neither a realistic option nor even sufficient. A change in banking tools, technologies, and processes is required.

Fortunately, encouraging developments are promising accelerated emergence of real-time liquidity solutions:

- **Digital Assets:** Solutions using digital asset technologies can enable on-demand, just-in-time mobilization of liquidity. Tokenized cash and smart contracts joined together can enable mobility of liquidity that is highly automated, conditional to the funding need, and operational in real time.
- **Open Banking:** Development of open banking standards and APIs creates interoperability across banks and technology providers. The flow of data gets super-charged and transmitted in real time through the power of APIs. As importantly, banks and non-banks are now free to develop value-added “apps” for customers over the native banking capabilities. We can already see a new age of treasury management systems and solutions emerging for balance visibility, cash forecasting, and cash concentration.
- **Artificial Intelligence:** Cash flows occurring 24x7 require automated systems to manage liquidity. As noted, treasury teams will not be able to scale by simply adding more people. Current developments in AI also suggest the technology has promise for liquidity and treasury management. Notably, automation — whether AI-powered or not — will not necessarily replace humans. Rather, it will free them to oversee the technology rules and results, leaving capacity to deal with exceptions such as markets that are more complex and have regulations and risks.

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AI could be a good fit for improving operational efficiencies across the enterprise. We are already seeing use cases around fraud detection, transaction alerts, and compliance with KYC and sanctions in cross-border payments. Machine learning and natural language processing are getting better at helping us automate the ingestion of new regulations (often released in physical/PDF form) and convert them to digital logic. AI can also help stitch together different technology components across the enterprise and drive operational efficiency.

Validation of beneficiary details is another prominent use of AI in payments. It can also be used to generate more customer insights, e.g., Who is the end customer? Where is he/she located? Several efforts are underway across the industry in setting up data repositories. These will allow financial institutions to collate relevant data to better understand their customers. Over time, this is likely to generate new business opportunities and help financial institutions get more comfortable with taking on new customer segments.

The use of AI in liquidity forecasting (to settle cross-border payments) could help financial institutions optimize their treasury and make sure balances are available at the right time, in the right currency, at the right location.

– BISWARUP CHATTERJEE, GLOBAL HEAD, TTS STRATEGIC PARTNERSHIPS & INNOVATIONS, CITI

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Case Study: Utilizing Real-time Information to Support Daily Payment Needs

A global pure-play agriculture company combines industry-leading innovation, high-touch customer engagement, and operational execution to profitably deliver solutions for the world's most pressing agriculture challenges.

Context:

Given the global nature of its business, the company maintains numerous bank accounts with multiple local banking providers. As a more traditional industrial client, most of its outflows are batch-processed for payments to vendors, suppliers, and administrative tasks such as payroll.

A large amount of the company's payment inflows occur during the day into its third-party bank accounts. The company operates in markets such as Argentina, which has seen exponential growth in instant payments usage. The unpredictability of collections initiated via instant payments poses cash forecasting and reconciliation challenges.

The recent macroeconomic, geopolitical, and societal shocks have emphasized the importance of being able to make decisions based on up-to-date information. The limited visibility of activity and balances across the company's multiple bank accounts in certain markets poses a risk to its ability to respond to urgent situations.

Solution:

By utilizing Balance Inquiry API technology, third-party bank account balance information is retrieved in real time directly into the company's treasury management platform.

This information is used to maintain visibility of underlying activity in the local bank accounts, aiding the company's cash forecasting processes.

To aid automation, funds can be concentrated immediately from third-party banks, based on pre-determined balance thresholds.

Benefit:

By optimizing and automating its liquidity management process, the company is now able to retrieve the information in real time, and its cash is now concentrated from local banks. In addition, counterparty risk is now mitigated, providing an opportunity for funds to be used more efficiently to make vendor payments and additional payments needed for the company's day-to-day operations.

With payment innovation, and as more companies set up marketplaces and sell direct-to-customer (D2C, whether B2B or B2C), the challenges for a treasury built for the world "as it has been" will become immense. Leading companies are now starting to put together real-time liquidity management transformation strategies. We see several common elements in their approach:

- **Putting the right infrastructure in place:** Companies should consider whether the right systems and support resources are being put in place. While treasury has little influence over the company's enterprise resource planning (ERP) system decisions, it should make sure that treasury is laying out the right foundations between the ERP and treasury systems, and between treasury systems and the banking system. It is likely that APIs will play a key part in straight-through data, or without human intervention, to achieve the real-time visibility and decision-making process.

- **Continually optimizing the bank account and liquidity structure:** Leading treasury teams ensure that the bank account and liquidity structure (that connects the accounts to operate as a single system) is continually updated. The business is constantly changing, and bank account administration is an effort that is never one and done. In addition, as real-time cash flows and payments grow, bank account and liquidity structures originally established to support older batch and end-of-day processes will clearly be inadequate. The “never one and done” mantra becomes even more urgent, and companies should start planning for real time-enabled solutions.
- **Building the treasury operating model of the future:** What has previously been “after hours” will become a time when money continues to move into and out of the company’s bank accounts. For most companies, setting higher liquidity buffers is unlikely to be viable. Rather, treasury teams will need to rethink how resources are deployed and processes are automated for efficient liquidity management. Since automation will play a large part, it is likely that treasury teams will need to have resources that are much more tech savvy.
- **Building strategic enterprise alignment:** Treasury teams should frame their role as supporting the company’s revenue growth, over and above the table stakes of managing liquidity and mitigating financial risk. The revenue framework means ensuring treasury is aligning internally to enable business operations. In a world of payment innovation, that means the company’s payments strategy.

Treasury teams should be partnering with the business to operate as thought leaders and enablers to drive revenue growth, facilitating new payment and funding capabilities that can be used to create competitive advantage for the business. Indeed, by being at the table when the plans are being decided, treasury helps itself. It will be better positioned to predict and build for the implications of growing real-time cash flows, mismatches between inbound funding and outbound payments, FX mismatches, and so on.

Finally, as a business partner, treasury will be able to gain technology and resources not available to a function seen solely as an internal.

Other Emerging Technologies, Schemes, and Models

Technologies and solutions are emerging that could provide a new vehicle or marketplace for making cross-border payments. Some are very new developments that are not yet live, such as the Metaverse, which could act as the new digital “agora” or marketplace for commerce.⁵¹ Others include payments through facial recognition alone (a type of biometric payment) and leveraging existing initiatives largely developed in the domestic payments space, such as making open banking global.

We are moving away from traditional models wherein a large company operates with a relatively manageable number of vendors, paying them large sums infrequently. Players like Uber or Vrbo use “micro-vendors,” and how they deliver payments to them is an important part of their business model.

For many years, we have taken marketplaces like Amazon for granted without really considering how they help connect vendors with buyers from across the globe. Each transaction can potentially create a sender and a beneficiary of a cross-border payment.

In the direct-to-consumer (D2C) space, we have seen manufacturers taking on a new role of “merchants” and selling directly to consumers — individuals who often expect a seamless end-to-end experiences, including with payments. They no longer focus solely on paying invoices and salaries, but rather on running massive incoming payments operations as well.

- **Artificial Intelligence (AI):** In financial services, AI more generally, and Generative AI specifically, can be used in various parts of the payments lifecycle, from reconciling payments to automatically responding to transaction banking-related customer queries.

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Generative AI has made significant progress in the last few years. For example, technology was available over the last 2-3 years to use Generative AI to write a new movie script. However, until recently it was still not easy for the average person to use it.

Today, AI services launched by Big Tech firms, through their search engines with the help of large language models (LLMs), allow humans to interact with AI by simply using common speech or text. These easily accessible AI tools have been successful at creating an efficient user experience, with the ability to ask questions and get immediate responses. This has helped popularize AI and is likely to drive further interest in the space.

– BISWARUP CHATTERJEE, GLOBAL HEAD, TTS STRATEGIC PARTNERSHIP AND INNOVATION, CITI

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⁵¹ Citi GPS, [Metaverse and Money: Decrypting the Future](#), March 2022.

Some prominent examples include:

- **Cost Reduction:** Compliance costs have been one of the major roadblocks for more extensive correspondent banking relationships. By analyzing vast amounts of data, AI-powered systems can proactively identify potential fraud and other risks, enabling payment providers to expand their payment networks with greater confidence to less well-regulated areas of the globe.
- **Revenue Growth Opportunities:** AI can identify cross-sell opportunities for clients by making predictions about client behavior, such as needs for additional products and services.
- **Operational Enablement:** AI can power transaction-based outlier and fraud detection capabilities and can augment client servicing through chatbots, speech recognition, or text-to-speech.
- **Risk and Controls:** Generative AI can help enable adherence to existing policies, standards, and procedures related to payment processing.



The advances in AI have opened exciting new opportunities for delivering novel customer experiences in transaction banking, as well as a potential step-change in the efficiency of AML and fraud monitoring systems.

Improvements in contextual intelligence means that data output from AI are no longer just nice-looking summary statistics, but rich, contextualized insights. The increased ability to parse meaning from unstructured data will empower previous rules-based systems to deliver robust and safe transaction processing at high volumes, with less exception processing and manual intervention.

– AARON FOO, CHIEF STRATEGY & SPECIAL PROJECTS, CHIEF STRATEGY & PROPOSITION OFFICER, GOTYME



In addition to the above, financial institutions are also using data in the payments space to generate new revenue opportunities and improve client experiences by leveraging a branch of AI known as natural language processing (NLP). This enables offerings such as deep-neural network-based Balance Prediction Models for account types or clients, as well as 360-degree client dashboards using Generative AI technologies.

Figure 32. Artificial Intelligence

Artificial Intelligence (AI)

AI can be used in various part of the payments lifecycle – from reconciling payments, to automatically responding to transaction banking-related customer queries.



Cost Reduction

By analyzing vast amounts of data, AI-powered systems can proactively identify potential fraud and other risks.



Revenue Growth Opportunities

by making predictions about client behavior, AI can identify cross-sell opportunities for clients.



Operational Enablement

AI can power transaction-based outlier and fraud detection capabilities and can augment client servicing



Risk and Controls

Generative AI can help enable adherence to existing policies, standards, and procedures related to payment processing.

Source: Citi GPS

- **Metaverse:** The Metaverse may be the next generation of the internet. It would combine the physical and digital worlds in an immersive manner. Use cases may include everything we use the internet for today: gaming, commerce, art, media, advertising, smart manufacturing, health care, virtual communities, and social collaboration (including for enterprise and education).

Consumers are traversing between virtual and physical worlds and expect financial institutions to keep up with technological changes. The Metaverse could be a part of the omni-channel presence to which most payment companies are aspiring.

Projections around the Metaverse fluctuate as it is still in a fairly nascent state. In 2022, we estimated the target addressable market for the Metaverse economy could be in the range of \$8 trillion to \$13 trillion, and it could involve significant volumes of commerce in which businesses and consumers transacted across countries and different Metaverses.⁵²

The Metaverse of the future is likely to encompass more digitally native tokens but also embed traditional forms of money. Money in the Metaverse could exist in different forms, i.e., in-game tokens, stablecoins, CBDCs, and cryptocurrencies.

International coordination of regulatory approaches to the Metaverse and associated technologies will also be crucial given the borderless nature of these technologies.

Current payment rails are usually domestic for real-time and expensive cross-border payments, making them an imperfect fit for a borderless global Metaverse ecosystem. We expect decentralized finance (DeFi) and existing traditional financial systems to co-exist in the Metaverse.

⁵² Citi GPS, [Metaverse and Money: Decrypting the Future](#), March 2022.

- **Embedded Finance:** Refers to the integration of financial services, via APIs, within a product or service provided by another firm (it can be a bank, FinTech, or non-financial company). APIs build a “layer” in computer architecture terms, akin to how the internet is a layer on a complex network of hardware and software protocols. When combined with AI, APIs become a powerful tool for companies to use to analyze data on consumer preferences with a view to providing more relevant products or services.

Cross-border payments could be the next frontier for embedded finance solutions to integrate as a product offering. For example, e-commerce payments could be made for a product or service in the U.S. with the payee sitting in Europe — a payee could be offered a “best price” FX rate, embedded in their online purchase experience. The payee simply needs to pick the most competitive rate and proceed to purchase through their bank.

- **Open Banking in a World of Platforms:** Open banking is the process of enabling registered third-party payment providers (e.g., FinTechs) and financial services firms (e.g., banks) to access and securely share customer banking data (with the customer’s consent) using APIs. Open banking was created to promote competition and innovation in banking by harnessing technology and new business models.

Open banking allows for the decoupling of account relationships and payments services. It allows senders to more easily shop around for the best experience and a provider that is best positioned to address their needs, such as cost, speed, simplicity, and transparency.

While cross-border payments tend to be more complicated than domestic payments, open banking could help streamline payments for retail users. By contrast, the use of open banking for B2B transactions can be complicated by different international regulations governing financial transactions. Open banking is still in its relative infancy, especially in context of cross-border payments. Standardization of APIs at a global level, which is unlikely to be easy, will be crucial for scaling adoption.

IMF Contracting and Exchange Platform

By Tony McLaughlin and Martin Cannings, Citi Treasury & Trade Solutions

A working paper published by the IMF in November 2022 outlines the vision of a multilateral platform that would seek to leverage advancements in technology to improve cross-border payments.⁵³ The paper highlights that there are various public and private sector-drive projects using DLT to make cross-border payments more efficient, including the Regulated Liability Network. The IMF builds on these initiatives and goes further.

The paper recognizes the current challenges in cross-border payments, specifically that international payments can be slow, expensive, and risky. Such payments are often handled by intermediaries, lack a common settlement asset, and are subject to differing rules and governance.

Innovations in technology present an opportunity to enhance cross-border payment processes, including the foreign exchange, risk management, and financial contracting. The paper goes on to examine the architecture of the system, the compliance aspects, and how it might deliver more efficient foreign exchange.

Technology Architecture:

There are three areas of technology that enable this vision of an Exchange and Contracting Platform (X-C):

- **Common Ledger:** A trade contract or transfer is recorded on a common ledger accessed by participants. The ledger mitigates settlement risk through the provision of a single view of the status ensuring all participants have access to the same information.
- **Programmability:** The use of smart contract code can automate the execution of contractual provisions, without the need for a trusted third party to execute the agreement.
- **Cryptography:** Authenticating participants and ensuring the exchange of information with appropriate privacy can significantly eliminate friction. This provides the opportunity for messaging, settlement, and contracts to become linked, allowing transactions on the platform to be final and irrevocable.

Compliance:

The system offers several capabilities to streamline compliance requirements. It is recognized that further work is required to address the challenge of KYC framework harmonization to avoid the need for inter-jurisdictional agreements.

- X-C designed to comply with privacy requirements, domestic and international regulations. Regulators or compliance officers can perform checks and audits.
- Checks are in place to ensure the appropriate credentials and authenticity of users.
- System can vet sanctions lists and record cryptographic proof that lists have been checked against participants involved in a transaction.

Foreign Exchange:

The fees associated with cross-border are driven in large part of FX spreads — largely due to wholesale market underdevelopment. A limited number of intermediaries, carrying different currency inventories, supported by large balance sheets reflect an imperfect market for FX. X-C would represent some steps to address this.

- Centralization of information on this platform, and the elimination of settlement risk, may lead to increased transparency and greater incentives for competition.
- X-C platform will increase competitiveness by leveraging market design theory — and effectively creating an auction environment without the need for a third party.
- The platform enables participants to hedge FX risk through forward/contingent contracts.

The paper is intended to be a first step towards stimulating further work in this space.

A Conversation with Kotak Mahindra Bank Ltd. on Transaction Banking and CBDC



Shekhar Bhandari
President, Global Transaction Banking,
Kotak Mahindra Bank Ltd.

Q: How will the payments industry and transaction banking be impacted by CBDCs?

With “digital” at the epicenter of our growing economy, the CBDC e-rupee comes with multi-fold benefits. The concept and tech behind the solution opens endless possibilities across retail, wholesale, and cross-border payments. With enhanced payment efficiency, security, and disintermediation, CBDCs may change the entire payment landscape in the foreseeable future. I see CBDCs as a channel with the potential to cut across the socio-economic strata and further boost digital adoption in India and the world.

Q: How are you using innovation in your enterprise business?

Project fyn is a unique industry proposition for Kotak’s enterprise customers. Fyn is an intuitive, easy-to-use, comprehensive, and integrated offering. It allows all our customers universal access across Trade, Collections, Account Services, Loans and Payments through all channels. Fyn is “For Your Needs” and a future-ready platform designed to reduce complexity and friction for our customers and provide a truly differentiated user experience.

With fyn, our customers can now say “no” to non-unified journeys, dependencies on relationship managers, branches, and other manual and time-consuming processes.

With direct end-to-end processing, which culminates in lower turnaround time and an intuitive user interface (UI) and user experience (UX), the fyn portal is designed to be customer-centric, with the ease of the customer at the heart of the design. The data is presented via persona-based dashboards, with insightful widgets and the ability for users to tailor their experience.

Q: What role do you see for artificial intelligence in transaction banking?

With the democratization of artificial intelligence (AI) and the heavy usage of AI across industries, whether e-commerce or entertainment, we are moving towards a world of mass personalization. Users are now habituated to their unique needs being proactively identified and solutions being provided with minimal intervention. With this shift in user behavior, AI’s usage in banking is becoming increasingly critical. Traditionally, banking products for corporates have been pushed by relationship managers, or corporates have had to reach out in response to their needs. This model has its limitations. The surge in the adoption of digital banking powered by AI will bring in a new wave of customer engagement and retention.

At Kotak, we have taken a step in identifying corporate banking needs and creating AI models to proactively reach out to customers with solutions that address their specific needs.

⁵³ International Monetary Fund, Working Paper, “A Multi-Currency Exchange and Contracting Platform”, November 2022.

Q: What transformations are needed in the future to address users' financial needs?

We currently live in a world where organizations are going above and beyond to meet customers' needs and drive engagement. Organizations are no longer sticking to their core businesses.

E-commerce companies and delivery organizations are all making forays into addressing the financial needs of users. Users are now used to having multiple needs met in one place. However, the banking industry, and specifically business banking, has yet to take a step in this direction. There is a growing need among corporates for a platform that addresses not just their banking but also their non-banking needs, which will help them grow their business.

We at Kotak are attempting to address this gap with a one-stop shop platform that will provide embedded banking and beyond banking solutions, giving corporates all the functionalities that will help them grow their business. We are delighted about what we are building and are eager to bring added value to growing businesses in India.

Insights from Pegasystems on How AI Can Transform Cross-Border Payments



Steve Morgan
Global Banking Industry Lead
Pegasystems



Kelly Wilson
Commercial & Corporate Banking Industry
Lead
Pegasystems



Ryan White
Product Manager, Smart Investigate for
Payment Exceptions
Pegasystems

The Current State of Cross-Border Payments

The payment ecosystem is undergoing a huge amount of change with real-time and cross-border payments, open banking and API enablement, payments-as-a-service and cloud-based solutions, and ISO 20022 standardization. With the emergence and wider adoption of ISO 20022, domestic and cross-border payment systems are converging on common formats. Furthermore, customer expectations around transparency, speed, and cost have evolved, becoming increasingly demanding and leading to banks making client experience their primary area of focus.

Where AI Can Help

AI is not new, but both its capabilities and areas of easy application are rapidly evolving. Case management workflow automation can use AI to self-optimize processes and improve the decisions and the workflow through applying machine learning to predictive models. Process analytics technology can analyze incoming data and decide on the best action to take in a specific case stage. Analysis of incoming data can be enhanced by event processing to detect patterns of interest in real-time data streams and by natural language processing of incoming text. The decision is based on the business rules and supported by predictive analytics.

This process is repeated every time the case requests a decision, and as the number of processed cases increases and model evidence accumulates, the predictive power of the models increases over time through machine learning. Integrating predictive modeling into payments exception management enables predicting the likelihood of case resolution outcomes, as well as the optimum escalation and routing.

There are several different areas where AI can be applied to cross-border payments:

- **Inquiry Avoidance:** Providing proactive updates on the status of a delayed payment using smarter AI-powered chatbots.
- **Improve Speed and Accuracy:** Automating data entry and pre-validation and verification to reduce payment errors.
- **Streamline Processing:** Using Generative AI to create summaries of payment investigation cases and customer interactions that can be documented internally and sent to clients.
- **Knowledge Assistance:** Aiding clients and customer service teams by using Generative AI within the bank's own process documents for a controlled source of information.
- **Enhance Security:** Identifying and preventing fraud and other financial crimes through analyzing transaction data and patterns of cross-border payments.
- **Provide Insights:** Providing insights into the root causes of exceptions.

A practical application of AI in cross-border payments is managing and avoiding client inquiries, which are expensive and time-consuming to handle. Leading firms have an ongoing focus on improving client service while reducing the number of inquiries. Pega has heard from multiple banks that approximately 50% of inquiries in commercial payments groups are about payment status.

AI can help improve client service by: (1) automating responses to inquiries about payment status, (2) enhancing smart chatbots to look up payment status, and (3) monitoring payment exceptions and proactively informing clients that their payment is delayed and estimating when it will be completed.

An area where AI can help with automating inquiry management is natural language processing (NLP) in email for case management, reading and routing emails directly to operations teams to resolve, bypassing a client service officer (CSO) and saving time and costs.

Clients that currently use email NLP with routing capabilities report that 30%-40% of requests can be auto-resolved. Machine learning continually helps the email NLP become more accurate.

Chatbots that can answer questions on a client portal are common in the retail world but less widely used in commercial payments. A chatbot linked to a robust customer service platform with Generative AI capabilities will be “smarter” and able to resolve commercial clients’ payment inquiries without the need to redirect to a live CSO.

Another use case to support client inquiries is to leverage Generative AI to build comprehensive summaries or overviews of payment inquiry cases. This could give users insight into what has happened in the lifecycle of a case with links to supporting documentation.

A snapshot of the case is also helpful to service operations teams when speaking to clients. A summary could be created and automatically sent to the client via a portal or email.

Conclusion

A rapidly evolving landscape for cross-border payment processing, along with continued client and bank demands for efficiency, creates a space where the effective application of technology is critical to success.

As AI continues to develop, it is likely to play an even greater role in improving cross-border payments and exceptions management. By identifying and predicting exceptions, automating exception handling, and providing insights, AI will help increase efficiency, reduce risk, and improve overall client satisfaction.

A Conversation with Bain & Company on the Innovations in Cross-Border Payments



Erin McCune
Payments Partner
Bain & Company



Jeff Tijssen
Global Head of FinTech
Bain & Company

Q: How do you see innovation in cross-border payments shape up across traditional rails and digital assets?

Although traditional rails have improved significantly via Swift gpi the enhancements have not yet been deployed by all banks, thus not all consumers and businesses benefit. And bank user interfaces and integrations with relevant software providers remain relatively unsophisticated compared to technology provider solutions, further hampering recognition of the fundamental improvements to correspondent banking.

The Swift messaging network does not affect settlement. Banks rely on accounts they hold with one another to move funds. That is why we believe that cross-border payments are the biggest potential disruption for digital assets, in particular digital currencies. Whether CBDC, stablecoin, or tokenized deposits (i.e., RLN), the ability to not just move the message, via Swift, cross-border, to initiate settlement through traditional rails in the local currency will fundamentally transform settlement.

For digital assets (especially tokenized securities, debt, and real-world assets) to achieve their full potential, there are three essential primitives, including regulatory clarity, digital identity, and cash-ledger on-chain at scale.

Among the latter two items that are under the direct control of industry investment, the most innovation is happening in digital currency to transform settlement. This is occurring through initiatives such as the UK Regulated Liability Network (RLN), which completed a cross-border pilot; the MAS Project Guardian, which has tokenized multiple sovereign currencies; and stablecoin legislation, which is a top priority in the UK; among myriad other initiatives.

We largely believe the greatest potential for innovation is in tokenized deposits, over stablecoins at scale and in lieu of direct CBDCs, because it does not impair credit formation and maintains a two-tier banking model.

Q: How do you see AI impacting cross-border payments?

We believe AI will have a profound operational impact on banks and non-bank cross-border providers, driving efficiency and improving analytics.

Traditional AI is critical to fraud detection and informs pricing models today. While traditional AI is designed to algorithmically support predictable scenarios, new foundation models and Generative AI generate original content based on existing data.

At full potential, we believe foundation models could substantively change business models and cost structures (e.g., it could drastically improve the speed and quality of customer experience and increase productivity).

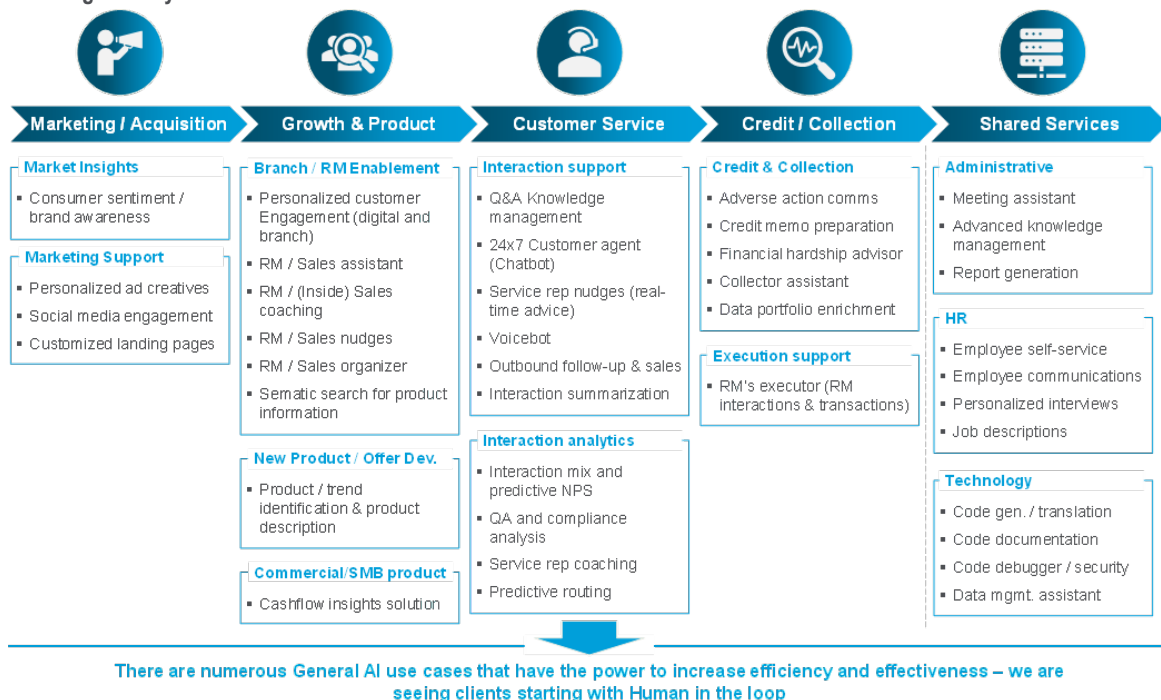
Technology is moving quickly and being deployed at a rapid pace across a growing body of use cases — knowing how to use it effectively is a scarce skill set. Companies that have decided foundation models and Generative AI are critical to their business models are moving quickly to build competence.

With the steepness of the learning curve, we believe thoughtful leaders and first movers will create competitive advantage, despite different regulatory hurdles across regions.

Banking and payment companies we are working with on Generative AI are focused on a small number of use cases to start and are prioritizing based on:

- **Value-at-Stake:** Considering both initial implementation and scalability.
- **Ease and Speed to Build:** Considering the interaction complexity; integrations required; and availability of necessary data, inputs, and technology to leverage AI.
- **Risk:** Considering the level of inherent risk given the nature of interactions and data being leveraged (e.g., confidential, or personally identifiable information).

Figure 33. Banking and Payment Foundational/Generative AI Use Cases⁵⁴



Source: Bain & Company

Q: How big will FinTechs be in cross-border payments by 2030?

Outside of core B2B supplier payments, intercompany transfers, and settlement flows, FinTechs will continue to gain share due to streamlined onboarding, intuitive user interfaces, and affordable transaction fees and reasonable FX spreads. If we extrapolate current trends, Bain estimates that as much as 12.5% of B2B trade and consumer cross-border flows (with greater encroachment in consumer and small and medium-sized enterprise) could be executed by FinTechs in 2030.

Incumbent banks will retain more share if there are dramatic improvements to traditional infrastructure enabled by DLT. In the meantime, we anticipate that leading banks will hone partnership strategies, effectively extending increasingly rapid, transparent, and traceable infrastructure through embedded finance. Both businesses and consumers end users will benefit.

⁵⁴ Bain & Company, "How Would Generative AI be Used in Banking?", July 26, 2023.

[C] Building Best-in-Class Client Experience

Build It and They Will Come – Steps for Delivering a Best-in-Class Cross-Border Payment Client Experience

As businesses increasingly look to transact across borders, banks and FinTechs are racing to improve payment processes with an eye towards delivering a greatly enhanced client experience.



Clients are more comfortable with FinTechs and placing increasing trust in non-traditional banking and payment service providers. Banks must not only match, but also exceed, the level of innovation and customer centricity offered by our competitors. We need to make payments faster, more transparent, and easier to use, whether making a purchase online, paying bills, or spending money across the globe.

– CHRIS LEE, VICE PRESIDENT, BUY NOW PAY LATER, PAYMENTS AND UNSECURED LENDING, SCOTIABANK



According to McKinsey, “A seamless customer experience can be worth at least as much as a superior product or efficient process—building customer loyalty, reducing costs, making employees happier, and boosting revenues significantly.”⁵⁵

Clients are looking for a digital experience that is easy, fast, simple, personalized, transparent, and secure.⁵⁶ The key to success will be the degree to which the different players are able to design and execute solutions that make good on this promise.



Enjoyable client experiences are at the core of any successful business models, particularly within the payments space, and we believe ensuring a positive, simplified client experience from the start is key to winning in payments.

– MARWAN FORZLEY, CEO, VEEM



The following are several important steps that industry players should consider to both develop and deliver a best-in-class cross-border payment client experience:

- **Establish an End-to-End Mindset:** A superior client experience requires more than just superior technology. Without a doubt, evolving technology stacks are crucial to improving cross-border processes, but so too are the people behind these innovations. Shifting to a client-centric culture is key to achieving the ultimate client experience model.

⁵⁵ Nicholas Maechler et al., “Managing a Customer-Experience Transformation in Banking,” McKinsey & Company, October 2018.

⁵⁶ Qualtrics, “[Understanding the Banking Customer Experience](#),” accessed September 5, 2023.

“Digital leaders achieve earnings growth that is 1.8 times higher than digital laggards—and more than double the growth in total enterprise value. In the short term, digital technologies, and ways of working, offer productivity improvements and better customer experiences...The technology is important, but the people dimension (organization, operating model, processes, and culture) is usually the determining factor.”⁵⁷

This end-to-end mindset is also omni-channel, with more and more clients expecting a consistent, seamless experience whether they are interacting online, on mobile devices, or through application program interfaces (APIs).

- **Aim for Consolidation and Simplification:** One of the biggest client complaints is that they face too many portals and apps when making cross-border payments. As a result, processes are fragmented, which creates friction in the client experience. To improve the overall payment experience, the industry needs to aim for consolidation and simplification.

This means moving towards a single login and a set of shared services at an enterprise level to power experiences. Doing this allows for a consolidation of resources across a foundation of technology and governance and enables high-quality code to be at the core. An additional benefit is greater platform resilience, which is also important for a reliable payment experience.

- **Harness the Power of Data:** Gathering and analyzing data is at the heart of efforts to deliver a superior client experience. The ability to centralize data — which is often scattered globally in a variety of systems and becomes duplicated over time, causing complexity in reconciliations — and enable a person or machine to draw insights from it is paramount.

Typically, organizations build various systems, applications, and data storage mechanisms over time, creating an environment where data becomes fractured. This leads to an inability to leverage the data that otherwise could be used to simplify the client experience through the pre-filling of forms or quickly resolving queries. When data is not harnessed effectively, the end-user experience becomes suboptimal.

Conversely, metadata-driven taxonomies enable transparency in the payments' context, providing the ability to track a payment (through tagging) at any stage of its lifecycle. This offers service teams real-time visibility into anomalies, as well as providing clients with critical information in a self-service model, which can be a real game-changer in terms of client experience.

- **Focus on a Dynamic, Well-Designed, Intuitive Journey:** Payment experiences are inherently repetitive and complex. This is why industry players must put themselves in the shoes of clients to address the problems they will likely experience.

Moving away from internal organizational designs, which can center around product or vertical constructs, improves the journey offered to clients, making it more intuitive. For example, treating foreign exchange (FX) as a horizontal offering across payments and adjacent businesses will reduce complexity and in turn elevate the franchise-wide experience for clients.

⁵⁷ Patrick Forth et al., “Flipping the Odds of Digital Transformation Success,” Boston Consulting Group, October 29, 2020.

Achieving a design-led experience that revolves around the users of a product requires an understanding of their businesses and challenges. It does not just start and stop with onboarding; it is the entire end-to-end lifecycle that requires putting clients front and center. Delivering a best-in-class user experience sets a business apart from the rest of the playing field.

“Changing customer behaviors mean banks need to continually curate unique journeys and propositions to meet evolving customer expectations.”⁵⁸

- Prioritize Architectural Validation and Thorough Testing:** Ensuring the architectural integrity of systems and processes is essential. Elevating the technical architecture allows for robust validation services that can uncover and pinpoint potential anomalies in data and processes. When coupled with robust testing (e.g., sandbox environments, where programs can be run without affecting the application, system, or platform on which they run), upfront validation before transacting can alleviate any friction in the client experience down the line. Validation of the architecture and thorough testing are key to ensuring a seamless cross-border payment process that fulfills clients' needs.

Figure 34. Building Best-In-Class Client Experiences

Building Best-in-Class Client Experience



Establish an End-to-End Mindset

Shifting to a client-centric culture is key to achieving the ultimate client experience model.



Aim for Consolidation and Simplification

Moving towards a single login and a set of shared services at an enterprise level to power client experiences.



Harness the Power of Data

Gathering and analyzing data is at the heart of efforts to deliver superior clients experience.



Focus on a Dynamic, Well-Designed, Intuitive Journey

Putting yourself in the shoes of clients to address the problems they will likely experience.



Validate Architecture and Test Thoroughly

Prioritizing upfront validation coupled with robust testing can alleviate any friction in the client experience.

Source: Citi GPS

The Race to Deliver a Superior Client Experience Is On

The race to deliver the best experience is on, as FinTechs and banks vie to put the best solutions forward that meet the growing cross-border payment needs of corporate clients. FinTechs have some natural advantages in this race. Many are taking market share within this space because they do not have to manage the overhead of legacy technology, which makes transformation much harder for banks. FinTechs also tend to be non-traditional players that do not have brick-and-mortar facilities, such as data centers, to support.

⁵⁸ Ernst & Young, [“Case Study: Why Real-Time Customer Journey Curation Is the Future of Banking,”](#) accessed September 5, 2023.



Banks and FinTechs are at two different starting points. Banks have large numbers of customers and enjoy their strong trust. Most banks have also built an extensive footprint across their market (s). By contrast, FinTechs often rely on banking infrastructure to offer products and service (e.g., correspondent banking services). Considering these differences, banks have a natural advantage with their wider customer base and extensive regulatory and risk expertise built over decades.

– UNICREDIT S.P.A.



These digital natives are well-suited to nimbly develop within the cloud, giving them a strong advantage as they continuously evolve technology to deliver seamless client experiences. A cloud-based platform offering, which is a logical collection of capabilities, improves speed to market (on-demand infrastructure), cost efficiency (reduction in physical facilities), scale (resiliency through auto-scaling), global reach (regionalization of availability), and risk reduction (technology kept up to date for security and upgrades deployed with zero downtime) across the client experience.

“Nearly 80% of American consumers say that speed, convenience, knowledgeable help, and friendly service are the most important elements of a positive customer experience. Prioritize technologies that provide these benefits rather than adopting new technologies for the sake of being cutting edge.”⁵⁹

Time and again, we have seen digital disruption fundamentally erode value across many industries including: music sales, video rentals, travel booking, and newspapers. In each of these cases, incumbents either transformed or became marginalized. Digital disruption in these industries resulted on average in a 44% share-shift from physical to digital business models over a 10-year period. Furthermore, digital disruption accelerates over time — market share shifts gradually (by around 1.6% per year) until an inflection point around year four, when traditional market share losses rapidly accelerate to over 6% per year.⁶⁰

The growth of the internet has also led to financial services facing new competitive threats. Finance is being re-imagined and re-created by FinTech and BigTech players — especially in emerging markets given the proliferation of mobile payments, growing middle class, and favorable governmental policies in many of those regions.

Traditional banking is being challenged not by small FinTech startups but rather by established tech giants (particularly in emerging markets) leveraging their strong customer bases, vast user data pools, agile technology platforms, and deep funding pockets. BigTech giants are eroding the boundaries between industries as they seek to be all things to all people. While payments and transaction services are often the first area of disruption by BigTech, the end objective is the creation of an integrated financial ecosystem as part of a holistic customer engagement strategy.

Additionally, traditional banks must also deal with constantly evolving regulations — balancing privacy and security concerns with the creation of an optimal client experience. Simply offering new solutions is often not enough.

⁵⁹ PWC, [“Experience Is Everything: Get It Right.”](#) accessed September 5, 2023.

⁶⁰ Citi GPS, [“Digital Disruption: How FinTech Is Forcing Banking to a Tipping Point,”](#) March 2016.

“Marketplace differentiation is no longer determined by location, price, or product, but by customer experience. This is particularly true of banks, as they offer similar products, and many consumers perceive little difference between them.”⁶¹

Clients seek to be aware and in control of their money movement, and technology offers us an opportunity to help provide that transparency. Investing in options for clients to define the parameters of anomaly detection, platform-designed automated controls, and actionable real-time data insights are all key to providing clients with a sense of safety and control.

There are many important considerations for designing and executing a truly client-centric experience. Banks, along with FinTechs, have an opportunity to develop highly effective solutions that address the needs of global clients. If achieved successfully, these solutions will truly differentiate the players that implement them, providing cross-border payments that deliver on the promise of a best-in-class client experience.

⁶¹ Qualtrics, [“Understanding the Banking Customer Experience,”](#) accessed September 5, 2023.

A Conversation with Veem on the Future of Cross-Border Payments



Marwan Forzley
Co-Founder and CEO
Veem

Q: Where do you see the largest opportunity to grow in cross-border payments?

Marwan: The biggest opportunity in cross-border payments is turning an expensive and cumbersome experience into a simple experience. When you make consumer purchases, you do not think about how long it will take, the number of intermediaries, etc. However, the reality for business payments is quite the opposite. Cross-border business payments present a completely different opportunity to take something very complex and simplify it with the help of digitization and process optimization.

At Veem, we want to build a uniform consumer experience for business cross-border payments that is just as simple as domestic payments. The consumerization of business payments is an aspect we at Veem are quite fixated on — this is the biggest opportunity in cross-border payments.

Q: Why, in your view, are consumers using FinTech for their cross-border needs as opposed to banks?

Marwan: Consumers are using FinTechs likely for the combination of better user experience, lower fees, and real-time and active customer support.

Personally, I would rank fees to be the least important of the three categories cited above. In my view, people often fixate on fees, but it is rather unlikely for fees alone to motivate consumers to adopt alternative payment platforms.

I believe customers are most motivated by a richer customer experience, in comparison to what they get today. Traditional cross-border payments can get complicated with different operational timings, need to visit physical centers to initiate payments, complex fee structures, etc. Meanwhile, customers are getting conditioned to the smooth experiences they enjoy in consumer payments using mobile wallets, seamless e-commerce payments, etc. They are starting to expect the same for business payments as well.

The second aspect to consider is customer support. Customers love the idea of logging onto a website and chatting with customer support if they face any issue. Customers just want someone to solve their queries promptly and accurately.

An ordinary customer does not understand how payments work, and neither do they care to know. They just want to be assured that their cross-border payment is received in the other country on time, and they expect prompt redressal of their queries. Customer support in large organizations can be cumbersome and require discussions with multiple departments; FinTechs tend to offer a better solution.

Q: What challenges do companies face in commercializing the opportunities in cross-border payments?

Marwan: Let's start with consumer payments. If I am sending money to my sister, it is rather simple. The decision-making is much simpler — I know I need to send her \$500. I do not need to get pre-approvals or fill in extensive. In terms of execution, I also know her bank account details, where I need to send the money. Hence, making such payments can be easy.

By contrast, in a business setting, the decision-making for making payments can be very complicated. One needs to understand clearly who the payment needs to be made to — is it internal or external? One also needs to go through approval processes before making the payment. Additionally, one also needs to figure out the accounting systems — for example, how do you record payment transactions in your book? How do you reconcile differences in cash flow? For cross-border payments, things get complicated further with different FX rates and charges and other correspondent banking complexities.

We believe the opportunity here is to systematically take these issues one at a time and simplify it in constructs that people are familiar with. We could offer businesses multiple options — e.g., Do you want your payments to be done quickly or slowly? Do you want them plugged into your accounting system? Do you want to see the FX rate and other charges? This gives customers a lot of choices and helps create an experience that is more engaging and transparent.

Q: How do you view the competitive landscape evolving in cross-border payments?

Marwan: Any market that is big and faces multiple pain points is likely to attract several participants (e.g., banks, FinTechs, and others).

I view competition very positively. A good market is a one with a lot of competition and challenges — this presents opportunities. If you are the only player in a market, it is not good news.

We have seen in a few instances that companies think of payments as something easy to add on. For example, a company is in another domain, offering customers a completely different set of products or services, and they simply add on domestic and/or cross-border payments. One needs to understand that payments is a complicated business and a regulated one with a lot of nuances. While many companies fantasize about doing payments, in practice, there are only a few that are consistent at it and run it with high volumes and for the long term.

However, considering the payments market is big and complicated, I expect to see a lot of competition in the space.

Q: Do you think banks still have the right to win in cross-border payments, or is this now a FinTech game?

Marwan: In my view, the payments game has ample opportunities for both banks and FinTechs. Banks and FinTechs have different strengths, and they tend to leverage them differently.

Banks have incredible assets — they have a strong relationship with their customers, and they carry balances on their behalf. Banks also have a lot of back-end infrastructure. However, banks are not the best at offering great customer experiences, neither from a design nor customer support perspective.

By contrast, FinTechs are great at offering excellent customer experience, but you cannot run a FinTech on your own — you need support from a bank.

One needs to marry banks and FinTechs together in partnerships to offer the best products and services to customers. FinTechs can offer the rich customer interface, experience, and support, while banks provide access to their customer relations or accounts and the infrastructure rails.

I see a lot of opportunities in the market for both kind of players to co-exist and win.

Q: How critical are APIs for the integration of FinTechs and banks in the payments space? What, in your view, is the role of APIs?

Marwan: Today, we live in a very socially active world. If a customer does not like something, they simply blog or tweet about it or send across a review. This simply wasn't the way things worked 10 years ago. We all expect things to run instantly; batch-based processing simply misses the point of where customers are today. Customer expectations are very different these days.

Customers do not have the patience to understand how things work — they just want to get over with it quickly. In my view, the experience, ruggedness, and scalability of APIs are super important today.

Q: How do you see innovation in cross-border payments? How do you think that evolution might shape up across concepts like traditional rails, digital assets, and artificial intelligence?

Marwan: There are a lot of opportunities for new innovations. We are likely to see a lot more payments to wallets, more real-time payments.

Digital assets also have a role to play in simplifying cross-border payments across a few markets and eliminating intermediaries along the way. This could help make payments faster and smoother as you take costs out of the system.

The other big opportunity that is often missed in discussions relates to KYC (Know Your Customer) rules in cross-border payments. There is a lot of heavy lifting to be done in aspects related to KYC rules versus payment plumbing. There are significant opportunities in automating KYC and KYB (Know Your Business) processes and doing it in a more scalable manner.

Q: What are the other aspects of payment that organizations (FinTechs or banks) should think about? What else needs to be uplifted?

Marwan: I believe we need more real-time tracking as well as more reporting on the status of cross-border payments.

There are several instances when payments are stuck in the process (e.g., for want of more documentation) and we do not even know about it. Improving communication, especially around payment statuses, could go a long way to better managing customer experience.

Q: What else should banks and FinTechs be thinking about when they consider the future of cross-border payments?

Marwan: In my opinion, it is most important to keep the customer in mind and focus on simplifying the customer journey.

For customers, the entire process of cross-border payments is a mystery — why aren't cross-border payments just as simple as sending an email or sending a message on social media? This is the level of simplification customers want.

While this may sound crazy for the world we are in, for customers this is the basics. In 2023, if payments are electronic, why are they not moving instantly? Why does it take 2-3 days? This is where the future of cross-border payments is headed.

[D] How Do Cross-Border Payments Work?

In previous chapters, we explored innovations within the cross-border payments space — what drives it, how it is happening, and what it means for incumbents and challengers. In this chapter, we explore existing and legacy payment models and the pain points inherent within them.

So how do cross-border payments work and what do we mean by “cross-border payments”? Does money actually move across borders?

Let us start with definitions.

A cross-border payment is a financial transaction. It involves someone making a payment (a payer) and someone receiving a payment (a payee or a beneficiary) from different countries. It is a broad term and can include both wholesale and retail payments.



Cross-border payments are financial transactions where the payer and the recipient are based in separate countries. They cover both wholesale and retail payments, including remittances.

– BANK OF ENGLAND⁶²



Cross-border payments can be made using a range of different payment instruments. These include a bank transfer, a mobile payment, or a card payment.

In a cross-border payment scenario, central banks use local payment rails to settle what is owed between different parties in the transaction. One common belief is that the money moves between different countries. This is not necessarily the case.

The Society for Worldwide Interbank Financial Telecommunication (Swift) is a critical stakeholder in the process. It acts as the messenger for the different parties to communicate with each other and is primarily used for commercial high-value payments. There may be instances where Swift is used for remittance payments between individuals. However, cross-border payments using newer money formats, such as stablecoins and cryptocurrencies — which do not involve the use of Swift as an intermediary — are emerging.

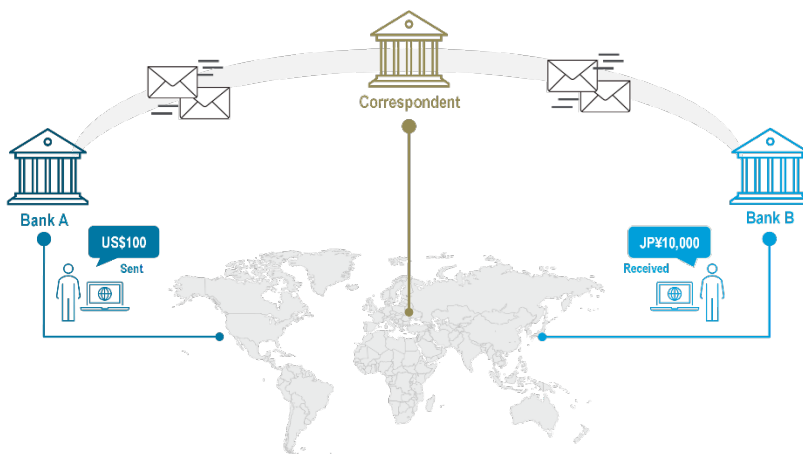
Another common misconception is that Swift sends payments. It does not; it sends messages. The messaging reflects commitments between banks, like an IOU, which is passed through a chain. These are commitments of debit and credit entries in the bank’s technical system. Before we turn to the core Swift messages, see Figure 35 below for an illustration of a cross-border payment flow.

The easiest example of a cross-border payment is where two banks in different countries have a direct relationship with each other. This is rare, as most banks do not have a direct relationship and must transact via an intermediary bank, called a correspondent bank.

⁶² Bank of England, [“What Are Cross-Border Payments?”](#), accessed September 1, 2023.

The role of the correspondent bank (another key stakeholder alongside Swift in the cross-border payments ecosystem) is to provide accounts for the two banks. In the example below the payer is sending \$100 via bank A to the receiver in Japan who has an account with Bank B with the correspondent bank in the middle. Notably, in practice, the majority of payments are done with one or two correspondent banks in the middle.

Figure 35. Cross-Border Payments Using a Correspondent Bank⁶³



Source: Bank of England, Citi GPS

Most payments are processed in an automated fashion, but due to complex sanctions regulations that are extremely difficult to automate, some payments require manual investigation to ensure they do not violate sanctions.

Other common reasons for manual intervention include repair of incorrectly formatted payments. While such repairs are often described as friction, they are in fact value-added services offered by the correspondent. By contrast, domestic payment schemes often simply just reject incorrectly formatted payment transactions until the sender inputs them correctly. AML checks are done *ex post facto*, while checking for compliance with KYC requirements is done at the account opening stage and not on a transaction basis.

Different Payment Methods

1. Electronic Funds Transfer or Wire Transfer (Most Common)

The most common method of transmitting a cross-border payment is via an electronic funds transfer (or wire transfer). These payments are commonly referred to as correspondent bank transfers, wires, RTGS transfers, or telegraphic transfers. Despite these slight deviations in name, all share the common principle of a message being sent from one bank to the next to create an accounting entry.

For the last three decades, these transfers have been executed almost exclusively on the Swift network with banks crossing over geographical jurisdictions. From the electronic automation of Swift FIN messages in 1993 and development of Straight-Through Processing (STP), the fundamentals of the process of these payments had not changed until 2017, when Swift gpi was introduced; however, the core principles underlying this process are the same as outlined by the Financial Stability Board (FSB):

⁶³ Bank of England, "[What Are Cross-Border Payments?](#)," accessed September 1, 2023.

- **Validation:** Checking that the payment contains sufficient information for processing and ensuring regulatory compliance.
- **Transmission:** Ensuring that the format can be sent to the next bank, and the notification to the sender.
- **Funding:** Releasing the funds.

These payments and the surrounding information available have been built on the foundations of Store-and-Forward messages from their inception until the launch of Swift gpi in 2017. This was the first time the network layer for these payments mandated additional tracking that could be done in a dynamic fashion. There have been significant advances in the interbank messaging space in the last 5-6 years due to demand and alternative payment experiences emerging due to competition. In 95% of cases, payments of this nature can be tracked until reaching the beneficiary with near real-time status updates.

2. Cross-Border ACH or Instant Payments

While less common, over recent years, several Automated Clearing House (ACH) and Instant Payment schemes have allowed delivery of payments originating overseas to beneficiaries within the local market. This method is attractive for customers who demand that full amounts be delivered to the beneficiary of the payment, particularly with Instant Payment schemes offering near instant settlement and often having extended availability to support payments outside of banking hours.

However, cross-border connections into these local schemes are limited due to lack of standardization of payment formatting, or limitations related to scheme rules or regulations.









3. Alternative Payment Methods

As described earlier in the report, alternative payment methods are increasingly gaining traction for cross-border payments use cases as they may offer more cost-effective, faster, and more transparent options compared to traditional wires.

Primary Ways to Make Cross-Border Payments

There are three primary flow types for cross-border payments, which we discuss in detail in subsequent pages.

Figure 36. Cross-Border Payments Using the Correspondent Banking Network

Payment Type	Payment Type Description	Used for Cross-Border	Used for Domestic
 Wire / Electronic Fund Transfers (e.g., Fedwire, CHAPS, TARGET2)	Transactions by which funds are electronically moved, often cross-border, from one bank to another and/or from account to account, through bookkeeping entries. Generally used for large-value, time-critical payments.	Most Common	Common
 Low-Value Solutions (e.g., ACH, SEPA, BACS)	Transactions moving typically domestic, non-urgent, low value, high-volume payments (e.g., government payments, corporate payroll, vendor payments). These are processed using a customer's bank account and routing information via an e-payment network for financial institutions using batch processing and a store-and-forward system.	Uncommon	Most Common
 Faster/Instant Payments	Systems have been introduced in many countries to handle in almost real-time, typically low value, domestic payments historically often processed by automated clearing house. We discuss some of these in greater detail in the subsequent chapter.	Uncommon	Common
 Cash	Cash in its physical form is the simplest and most broadly accepted form of payment globally. However, the growing popularity of e-commerce and digital channels is fueling the war on cash.	No*	Common
 Checks	A check is an order instructing a bank to pay/transfer a given sum of money to the beneficiary/bearer. Use of checks as a payment channel for consumers/businesses has declined, both for point-of-sale and third-party transactions. However, checks still have significant usage in select countries (e.g., U.S., UK, France, India) due to the low cost to end-user, convenience, tradition, or absence of a high-volume system for low value electronic payments.	No*	Uncommon
 Debit / Credit Cards	A card – either linked (debit) or unlinked (credit) to a bank account –used to withdraw money or pay for goods and services online or at point-of-sale.	Very Uncommon	Very Uncommon
 Others (built on Fiat rail)	Includes mobile payments and mobile wallets.	Uncommon - Infancy Stage	Common in specific markets only
 Digital/Virtual Currencies	Includes Central Bank Digital Currencies (CBDCs), cryptocurrency, and stablecoins.	Very Uncommon - Infancy Stage	Very Uncommon - Infancy Stage

* There are extremely limited edge cases where disbursement leg of payment is in check or cash.

Source: Citi GPS

Flow Type 1: Sender and Beneficiary Agree to Settle in a Commonly Used “Internationalized Currency”

What payment methods are commonly used?

The primary method of payment for these transfers is via an electronic fund transfer (wire). Figure 37 below depicts how this typically works.

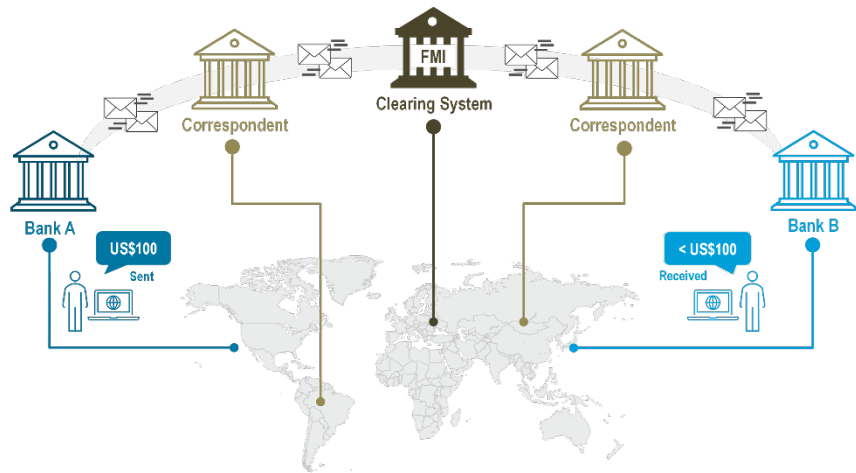
The sender of the payment (remitter) holds an account relationship with Bank A. Bank A holds an account relationship with the first correspondent, who in turn holds an account relationship with the central bank or clearing system.

Meanwhile, the receiver of the payment holds an account relationship with Bank B, who in turn holds an account relationship with the second correspondent bank. The second correspondent bank also has an account relationship with the central bank or clearing system.

In this example, both correspondent banks will be domiciled in the U.S., as only U.S. domiciled banks (or subsidiaries or branches thereof) can hold an account with the Federal Reserve (or be a member of CHIPS).

In this example, we can assume that Bank A and Bank B are not U.S.-domiciled banks and, as such, the most common method of communication between Bank A and their correspondent and Bank B and their correspondent is via the Swift network. This is typically how almost all cross-border payments in U.S. dollars are executed.

Figure 37. Cross-Border Payments Using a Correspondent Bank with Transaction Settled in an Internationalized Currency



Source: Bank of England, Citi GPS

What are the prominent pain points with these types of payments today?

Figure 38. Prominent Pain Points in Cross-Border Payments Using a Correspondent Bank, Settled in an Internationalized Currency

Speed	Cost	Transparency
Straight-through processing (STP) and within operating hours (Low pain point)	Medium pain point	Upfront (High pain point)
Outside/non STP (High pain point)		Post-facto (Low pain point)

Source: Financial Stability Board, Citi GPS

As identified by the Financial Stability Board (FSB), these types of payments typically hit friction in the categories of speed, cost, and transparency.⁶⁴

⁶⁴ Financial Stability Board, *Enhancing Cross-Border Payments: Stage 1 Report to the G20: Technical Background Report*, April 9, 2020.



A general perception is that cross-border payments are lagging behind domestic ones and present four main categories of challenges, namely: cost, speed, access, and transparency.

– FINANCIAL STABILITY BOARD⁶⁵



- **Speed:** Typically, 95% of these payments are confirmed as credited within one day, according to Swift.⁶⁶ However, challenges could arise either due to different time zones between the sender and receiver or compliance-related concerns.

There is also increased slowness during bank holidays or during non-processing days for one or more of the banks (e.g., a transaction might occur on a weekend or holiday for a U.S. bank despite being a working day for the sender and receiver).

Banks within this payment flow also need to adhere to regulatory frameworks outlined by their regulators, which will most likely involve different requirements for each bank in the payment chain.

At present, the primary expectation from this type of payment is for it to arrive within the intended transaction date. Instant settlements are not an expectation of this type of payment, as primary recipients tend to be corporates, which manage their treasury operations on a value date basis.

It is also possible to make urgent payments within this flow type for certain customers (e.g., a ship awaiting to depart a dock or an intraday payment for investments). Although that is a subset of the overall transaction flow, this causes sufficient pain for the customers if these are delayed in any way.

We are also seeing a shift in trends, as experiences from instant payments and other similar models drive new expectations. Several projects are under experimentation to address changing needs.

Prominent examples of industry-wide initiatives include SLAs (Service Level Agreements) enforced as part of Swift Go to tackle smaller value transactions, upfront validation services in Swift pre-validation, and end-to-end message validation as part of Swift Transaction Manager.

In addition, central banks and supported FMIs are moving to longer operating hours to cater for time zone differences and support settlement for ancillary systems.⁶⁷

⁶⁵ Ibid.

⁶⁶ Swift gpi, Newsflash," PDF, September 2020.

⁶⁷ Financial Stability Board, *G20 Roadmap for Enhancing Cross-Border Payments: Consolidated Progress Report for 2022*, October 10, 2022.

- **Cost:** There are higher costs associated with cross-border payments for several reasons. First, there are more parties to the transaction, with each providing a service and charging for that service.

Second, the associated compliance costs for cross-border payments tend to be higher due to additional screening. For example, domestic payments may not need to be screened for sanctions in a market if mandated by the regulator, as this is done by the sending bank on their clients and receiving bank on their clients at a separate stage from the payment. Alongside sanctions, there are also other compliance considerations for the parties to ensure the payments they are supporting for their clients are in line with expectations of that relationship. Intermediaries need to perform extensive KYC and AML checking, which adds to overall costs, which are typically recovered via cross-border payment services.

Third, in many cases intermediary banks are providing balance sheet allocation to the sending banks, which necessitates allocating either additional cash or collateral to the central bank and/or FMI to ensure operations run smoothly. In some cases, this is passed as a separate fee to the sending bank; however, it can also be part of overall transaction pricing.

Fourth, these payments, due to the number of parties in the chain, often need to be repaired, especially if not formatted correctly. This leads to increased cost, as repairs involve manual intervention to move the transaction along.

Lastly, different banks in the chain may have different pricing strategies. More specialized sending or beneficiary institutions (e.g., local community banks) may not be in the cross-border payments volume and therefore charge premium pricing for this “convenience” service. It only takes one bank in the chain to have high fees for the whole transaction to become a cost burden for the sender and receiver.

All these factors lead to an overall variable/fixed cost that is recovered from increased sender fees or increased fees taken from the principal of the payment.

- **Transparency:** The level of transparency of these payments has increased dramatically since the inception of Swift GPI. Prior to 2017, the sender or sending bank largely lacked information about when these payments were credited to the beneficiary, how much was credited, and any issues with the payment.

Now, 95% of these transactions can provide status updates and the value credited to the beneficiary. This, however, is all available on an *ex post facto* basis only. There are still outstanding pain points for the remitter of a transaction, which include uncertainty around the speed and value that will be delivered.

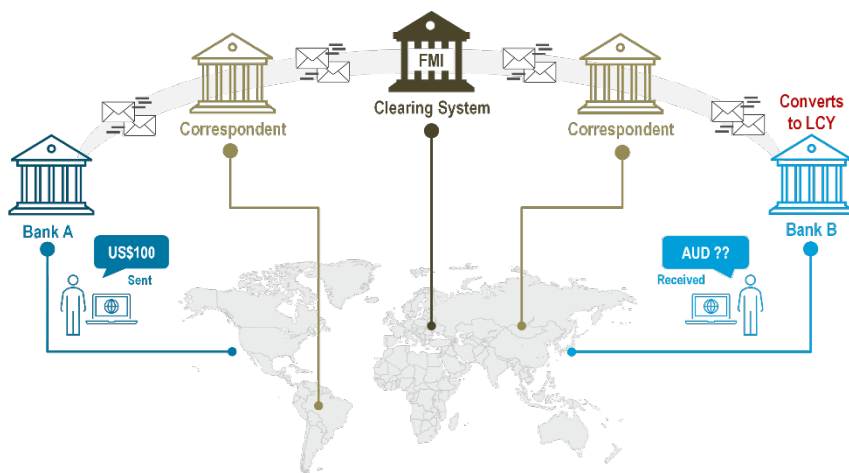
Many sending banks, mostly enabled by their intermediaries, have created guaranteed principal-type products to cater to this; however, this leads to a separate fee or claims process between the correspondent banks, and in turn usually means these costs are then passed on to the remitter. Swift's transaction manager has plans to provide fee transparency using APIs to gain real-time information from each party on the charge, but it will take industry adoption for this to scale.

Flow Type 2: Beneficiary Expects to Receive Funds in Their Local Currency — Most Used in Retail Use Cases

(a.) When payments are processed as Flow Type 1, with the beneficiary bank converting FX:

The flow chart for this type of payment (Figure 39) is similar to the one discussed earlier, with a modification wherein one of the banks in the payment chain performs the FX conversion as a service and still delivers the payment as a wire. The pain points discussed in “Flow Type 1” above also apply here, with an added increase since FX conversion is involved.

Figure 39. Cross-Border Payments Using a Correspondent Bank, Transaction Settled in Beneficiaries' Currency



Source: Bank of England, Citi GPS

What are the prominent pain points with these types of payments today?

Figure 40. Prominent Pain Points in Cross-Border Payments Using a Correspondent Bank, Settled in Beneficiaries' Currency

Speed	Cost	Transparency
Medium to High pain point	Medium to High pain point	High pain point

Source: Citi GPS

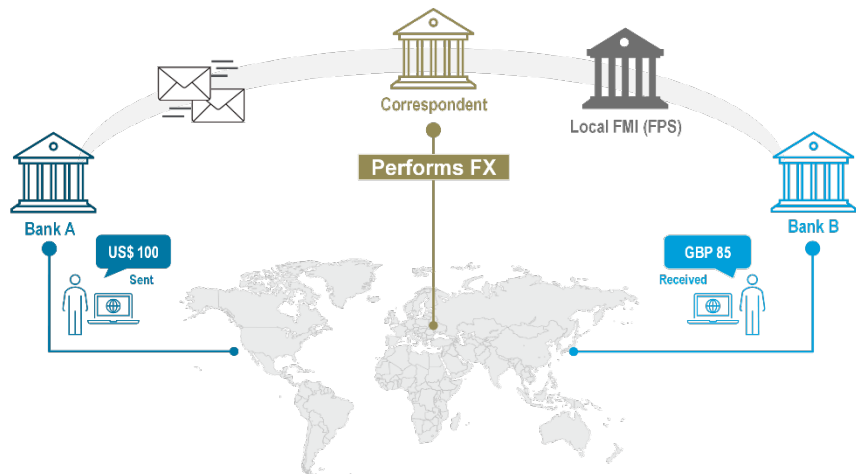
(b.) When payments are processed using local payment infrastructure

There is an ongoing shift to using local payment infrastructure for this flow where possible. This way, the bank on the sending side or connected to the local FMI (e.g., correspondent Figure 41) does not need to hold account relationships with all the receiving banks. This payment method is described as ACH or Faster Instant Payment in the payment methods table (see Figure 36).

For simplicity, let us use an illustration (Figure 41). The sending bank in this case (Bank A) is based in a location other than the UK, and the payer wants to pay a beneficiary in the UK in British pounds. The correspondent in this case would be based in the UK as a prerequisite to be a direct member of the FMI. As part of the service, either the correspondent or the sending bank (Bank A) would perform an FX conversion from U.S. dollars to British pounds, which allows the transaction to qualify for processing in the domestic scheme (notably, there are also other requirements, such as for formatting and value).

While this functionality is not available across all locations globally — for example, the Eurozone’s Single Euro Payments Area (SEPA) scheme does not allow payments originating outside of the SEPA geographical scope — an increasing number of local schemes are allowing cross-border access.⁶⁸

Figure 41. Cross-Border Payments Using a Correspondent Bank, Transaction Settled in Beneficiaries’ Currency via Local Payment Infrastructure



Source: Bank of England, Citi GPS

What are the prominent pain points with these types of payments today?

Figure 42. Prominent Pain Points in Cross-Border Payments Using a Correspondent Bank, Settled in Beneficiaries; Currency via Local Payment Infrastructure

Speed	Cost	Transparency
Low to Medium pain point (depending on FX pair)	Low to Medium pain point	Low to Medium pain point

Source: Citi GPS

⁶⁸ Financial Stability Board, *G20 Roadmap for Enhancing Cross-Border Payments: Consolidated Progress Report for 2022*, October 10, 2022.

- **Speed:** Speed of payment is typically not a significant hurdle in this payment flow, although it can vary based on the payment currencies involved. If currencies cross over on unfavorable time zones or highly illiquid currencies, the FX leg that needs to be performed can only be settled on next day (D+1) or two-day settlement (D+2) currencies. Therefore, while this is not a common issue for G10 payments, it can manifest when the currency is from an emergent market economy.
- **Cost:** Costs in this payment flow do not tend to have the same transaction fee-related friction discussed in Flow Type 1. This is likely due fewer parties in the chain and lower cost of the FMI at delivery. These payments tend to be of significantly lower value and hence do not carry large intraday reserve costs.

However, FX costs in this model do create more friction. There are many reasons why, for example:

- The market for one of the currencies is not open, so interbank quotes rise as FX quoters need to cover the risk.
- If a correspondent bank is requested to hold a rate (or fix it) for a period, there is an FX or market risk they need to consider.
- The correspondent or sender may need to hold many currency accounts with external providers to settle the FX leg, and this is recovered via customer spreads.

Recent competition from FinTechs and neobanks has specifically targeted FX payments as an area to gain wallet share, and the market is witnessing compressed FX spreads as a result. This is particularly evident in markets where new entrants have taken significant wallet share.

- **Transparency:** Similar to costs, transparency on fees and timing in this payment flow do not tend to have the same transaction fee-related friction discussed in Flow Type 1. However, the transparency on FX is lacking through traditional rails (i.e., Swift).

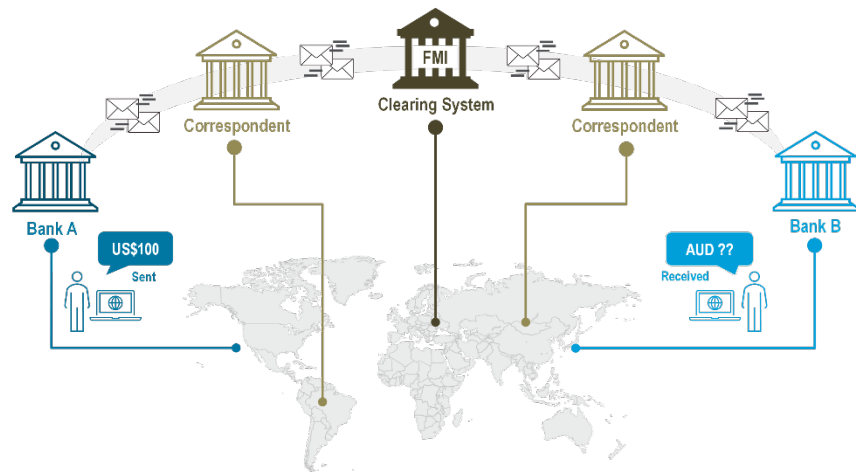
As mentioned in the Cost section above, holding or fixing rates can be expensive, so to be more competitive in FX spreads, sending banks look to use spot rates (live rates) for these transfers. The downside of this is that if the sending bank is not doing the FX themselves, they need to interact with a provider or correspondent in a dynamic way.

Traditional Swift rails are not designed for a dynamic connection, but for a store-and-forward model. This leads to a lack of transparency on the exact rate and, consequently, on the exact amount that will be delivered to the beneficiary. To overcome this, many banks, both traditional and digital, have moved to dynamic connectivity (either for FX rates alone or for both rates and payment initiation). This is still out of the norm for traditional banks, but new entrants are frequently using this model to solve for friction.

Flow Type 3: Sender and Receiver Are Both Financial Institutions

The payments in this scenario are exclusively processed using electronic fund transfers (wire transfers). The primary difference between this flow type and the ones discussed earlier is that the sender and receiver in this case are banks themselves (Bank A and Bank B).

Figure 43. Cross-Border Payments Where Sender and Receiver Are Financial Institutions



Source: Bank of England, Citi GPS

What are the prominent pain points with these types of payments today?

Figure 44. Prominent Pain Points in Cross-Border Payments Where Sender and Receiver Are Both Financial Institutions



Source: Citi GPS

- **Speed:** Many of these payments are for treasury obligations, wholesale FX, trading settlements, bilateral obligations, etc. and as such can be time sensitive.

In addition, they tend to be larger than corporate and retail payment flows and therefore require sufficient pre-funding or balance sheet allocation for support. It is therefore important that delays do not occur on this flow, stemming from some of the challenges we discussed in Flow Type 1 earlier (e.g., differences in operating hours of various clearing systems, sanctions reviews of potential matches, and manual interventions resulting from differences in standards between countries.)

The smaller number of parties in the flow, which also tend to be regulated financial institutions, helps with speed, as screening and compliance delays are not as typical.

However, one major speed-related pain point is that these transactions can also be related to squaring end-of-day positions for the bank, and it is therefore vital that they are resolved in a timely manner, as long balances potentially increase credit risk for the sender versus their correspondent provider, while short balances create challenges for the treasurer to stay within liquidity ratios.

- **Cost:** As this transaction chain contains fewer parties, the typical cost is lower, and the sender and receiver agree on the cost with their provider.
- **Transparency:** Transparency does not tend to be a major pain point for this flow type, as fee arrangements from the principal to the transaction are very rare and, if present, are set by the sender. Given that these generally need to be delivered only on the value date of the transaction, the sender can also track these payments over the Swift network.

[E] Conclusion

As this report outlined at the outset, the opportunity within cross-border payments is not only significant; it is growing. There is an open playing field to exceed GDP in cross-border payments and enjoy high-single-digit growth for those that are willing to invest and innovate within the cross-border payments business. While the landscape was somewhat homogeneous a decade ago, new entrants into the market have introduced differentiation and innovation through focusing on the client experience and delivering new technology that is addressing long-standing pain points the industry has faced.

As a result, the share of the market is already changing, and the future landscape on who will realize the largest gains and losses in their market share will shift over the next few years. The successful players will be able to deliver solutions that meet the needs of clients within cross-border payments, simply: speed, cost efficiency, and transparency in client experiences, which is supported by an increasingly wide selection of payment methods and options.

The pace of innovation in response to addressing the long-standing pain points is extensive across the industry, and this is seen across digital assets, with blockchain solutions and traditional fiat currencies, and with new alternative payment methods and channels moving towards 24x7. What remains clear is that the road ahead will require effort, commitment, and investment in innovation to expand existing capabilities that must be balanced alongside the need to meet regulatory compliance and manage technology infrastructure. There is no need to “go it alone;” understanding what your strengths are and forming partnerships with other players that excel in a particular area to deliver new innovation that complements your offering, is an optimal path to success.

Getting the fundamentals of a best-in-class client experience right; committing to leveraging existing cutting-edge technologies, such as APIs, to enable those experiences; and embracing some of the innovation on the horizon in areas, such as AI, all form crucial building blocks in the journey to grow within cross-border payments. Some chances will need to be taken on technologies that have not yet scaled, but one thing is clear: To be on the winning side of moving \$250 trillion in the next five years, the time to act is now.

Appendix: Knowledge Building Blocks

There are key enablers that will pave the way for the future of payments. We outline below some of the key payment types used today, the risks, and the key innovation foundation layers. The pain points and opportunities highlighted throughout this report would not be possible without these foundational considerations.

Commonly Used Payment Products

- **Cash:** Cash in physical form is the simplest and most broadly accepted form of payment globally. However, the growing popularity of e-commerce and digital channels is fueling a war on cash.
- **Checks:** The use of checks as a payment channel for consumers and businesses has long been declining, both for point-of-sale and third-party transactions. However, checks still enjoy significant usage in select countries (e.g., the U.S., UK, France, and India). This is often due to factors such as low cost to the end-user, convenience, tradition, or the absence of a high-volume system for low-value electronic payments.
- **Debit/Credit Cards:** These are used to withdraw money or pay for goods and services online or in shops.
- **Low-Value Solutions, e.g., Automated Clearing House (ACH), Single Euro Payments Areas (SEPA), Bankers' Automated Clearing Services (BACS):** These are forms of e-payments that are typically domestic, non-urgent, low value, and/or high-volume (e.g., government payments, corporate payroll, or vendor payments). They are processed with a customer's bank account and routing information via an e-payment network for financial institutions that uses batch processing and a store-and-forward system.
- **Wire/Fund Transfers, e.g., Fedwire, Clearing House Automated Payment System (CHAPS), TARGET2:** These are transactions by which funds are electronically moved, often cross-border, from one bank to another and/or from account to account through bookkeeping entries. They are generally used for large-value, time-critical payments. U.S. dollar transactions are executed via Fedwire and CHIPS, and foreign currency wires via Swift.
- **Faster Payments:** Several systems have been introduced in many countries to handle almost real-time, typically low-value, domestic payments, historically often processed by an automated clearing house.
- **Other Forms:** These include mobile payments, mobile wallets, and digital and virtual currencies.

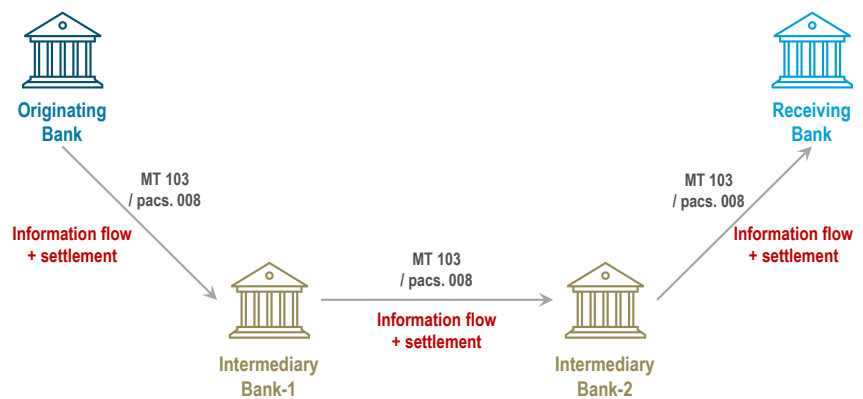
Methods for Executing Cross-Border Payments

There are two predominant methods of executing cross-border payments using correspondent banking:

[1] The Serial Method

An MT103 message, a Swift message format used for commercial payments instructions (or equivalent), is sent from the originating bank to the receiving bank through intermediaries. The information regarding the payment and the settlement instruction are sent together in the MT103 message (which is used for a Single Customer Credit Transfer, as shown in Figure 45). A direct account relationship exists between the different pairs of banks in the chain.

Figure 45. A Correspondent Transaction Using the Serial Method⁶⁹

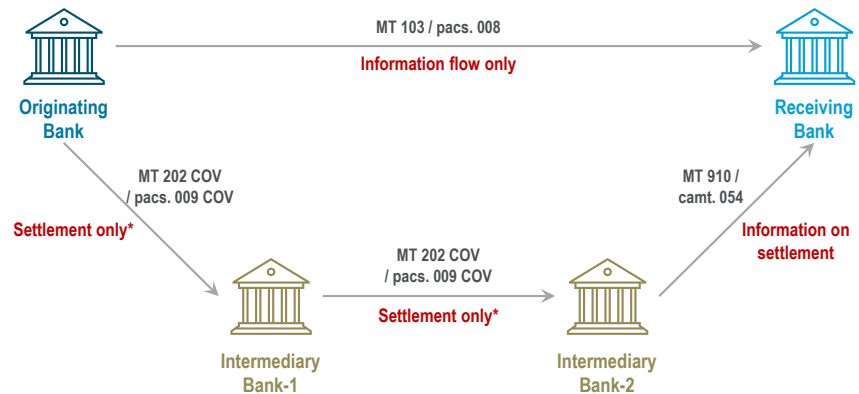


Source: Bank for International Settlements, Citi GPS

[2] The Cover Method

Unlike in the above-mentioned serial method, the payment and settlement information are not sent together. They are separated. The MT103 message with the payment information is sent through the Swift network from the originating bank to the receiving bank. The settlement information is sent via intermediary banks through correspondent banking relationships.

⁶⁹ Bank for International Settlements, Committee on Payment and Market Infrastructure, "Correspondent Banking," July 2016.

Figure 46. A Correspondent Transaction Using the Cover Method⁷⁰

* The information on the underlying customer credit transfer is also provided, e.g., for the reason of regulatory screening requirements, AML, controls, etc.

Source: Bank for International Settlements, Citi GPS

Risks in Cross-Border Payments

[1] Regulatory Risks

The cross-border payments space — particularly the payment data that is put in a payments message — is highly regulated and subject to Financial Action Task Force (FATF) requirements on wire transfers (FATF requirements, standards, and recommendations are implemented at local level by the different FATF members).

There are very specific requirements for the information that must be included in the payments message — such as information on the beneficiary and the originator — throughout the transaction. There have been instances in practice where not all the data have been passed on in MT202 Swift payment messages (used in the cover method described earlier), even though there is a regulatory obligation to do so.

The data that are included in payment messages and its traceability are critical to helping prevent, detect, and investigate money laundering and terrorist financing. This risk of “missing data” is exacerbated in the retail space, where new technology and platforms are starting to be deployed. A good example is remittance providers starting to offer cross-border payments via stablecoins, which are wallet-to-wallet transfers and thus do not have payment message fields, like in Swift, for the payment data to flow down the chain. We discuss ISO 20022 further later in this Appendix.

What is clear is that regulators are looking to respond with a laser focus on fostering innovation, customer protection, and operational resiliency. This has led to the creation of regulatory frameworks such as the EU Payment Services Directive (PSD2) and the upcoming PSD3, which expands the scope of previous regulations (e.g., including e-money providers).

⁷⁰ Ibid.

[2] Cyber Risk

Cross-border payment processing is vulnerable to fraud and cyberattacks. Maintaining high levels of security is therefore one of the main considerations in cross-border payments.

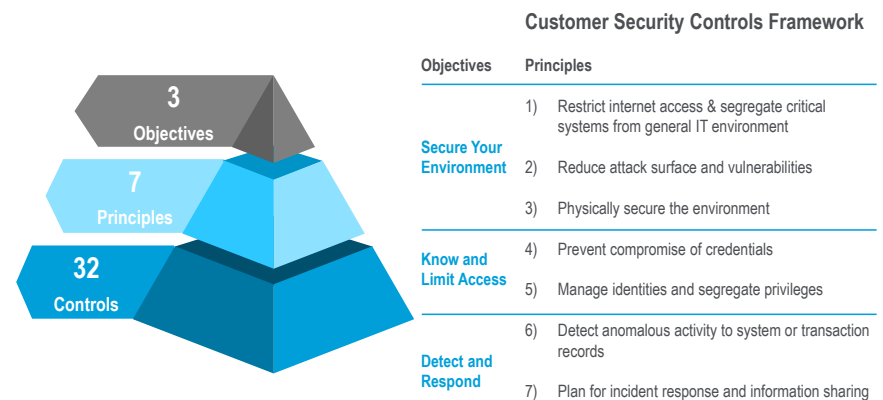
Over 11,500 institutions in more than 200 countries use Swift, with an average 44 million messages sent daily.⁷¹ Although Swift has not been hacked directly, banks and payment transactions using Swift messages have been hacked over the years.

A case in point was 2016, in what is commonly referred to as the Bangladesh Bank cyber heist. Hackers issued 35 fraudulent Swift payment instructions to illegally transfer \$951 million from a Federal Reserve Bank of New York bank account belonging to Bangladesh Bank. Swift quickly launched a new “Customer Security Programme” (CSP) on the back of the attack.

According to Swift, CSP’s purpose is to drive industry-wide collaboration against cyberthreats and reinforce and safeguard the security of the wider ecosystem. Information gathered through the CSP is anonymized and shared in regular updates to Swift members through the Swift Information and Analysis Centre. Updates discuss how tactics, techniques, and procedures of cyberattackers have evolved so firms can deploy preventative measures to detect fraud before it happens.

The CSP includes initiatives set out in the Customer Security Controls Framework (CSCF), The Customer Security Controls Policy, and the Swift Information Sharing and Analysis Centre (ISAC). Changes to the CSCF came into force in July 2022 requiring firms to go through a self-attestation exercise, supported by an independent assessment, to demonstrate compliance.

Figure 47. Security Controls Framework⁷²



Source: Swift, Citi GPS

⁷¹ Swift, “Swift Traffic Highlights,” PDF, accessed on July 24, 2023.

⁷² Swift, “Swift Customer Security Controls Framework,” accessed on July 24, 2023.

These developments demonstrate a continuous and urgent need for firms to invest in the most sophisticated technology to detect fraud and cyberattacks before they happen and to share information and learnings so preventative measures can be implemented throughout networks quickly. They also highlight the need for firms to continuously train their employees to recognize potential cyber risks in a timely manner.⁷³ It also shows how key trust is in the cross-border payment chain, with well-established processes and experience at the forefront of protecting against these types of attack.

Ninety-one percent of Swift customers, representing 99% of Swift traffic, attested to their compliance with controls set out by the latest Customer Controls Security Framework, a set of security controls that serve as the cornerstone of the CSP. In addition, banks have improved response security controls such as the ability to stop or recall fraudulent payment instructions where these are identified quickly enough.⁷⁴

Key Innovation Foundation Layers

ISO 2022 as a Common International Standard

Fragmented Messaging Standards: Payment systems across markets use different messaging standards. While this does not hinder domestic payments, the fragmentation represents one of the major frictions in cross-border payments.

To drive interoperability between different payment standards for cross-border payments, the financial system has relied on the Swift Message Type (Swift MT) messaging standard. However, translations between the Swift MT and domestic proprietary standards sometimes lead to data truncation and fragmentation issues, delaying the processing of cross-border payments and driving up costs. The prevalence of unstructured data in the Swift MT standard further undermines automated straight-through processing (STP), making cross-border payments slower and more costly.

Increasing adoption of International Organization for Standardization (ISO) standards is likely to address this challenge. ISO 2022 is a global and open financial messaging standard for financial institutions, set by the International Organization for Standardization, an independent, non-governmental standard setting body. It provides a common language that can be used in every kind of financial transaction, including cross-border payments.

Necessity of Migrating to ISO 2022: Globalization has highlighted the need for greater interoperability than is possible under current standards. Increasingly, client demands require digital STP and reconciliation, which is difficult under the current fragmented standards. Furthermore, anti-money laundering (AML) and fraud compliance requirements demand that banks be able to rapidly process large amounts of data, which can be streamlined with ISO 2022.

Benefits of ISO 2022: Global migration to ISO 2022 could help streamline message flows, harmonize market practices, and help market participants agree on minimum required data models to enhance global interoperability and seamless processing of cross-border payments end-to-end.

⁷³ For more information on developments since the heist, please refer to the Swift ISAC report *Three Years On from Bangladesh: Tackling the Adversaries*, April 2019.

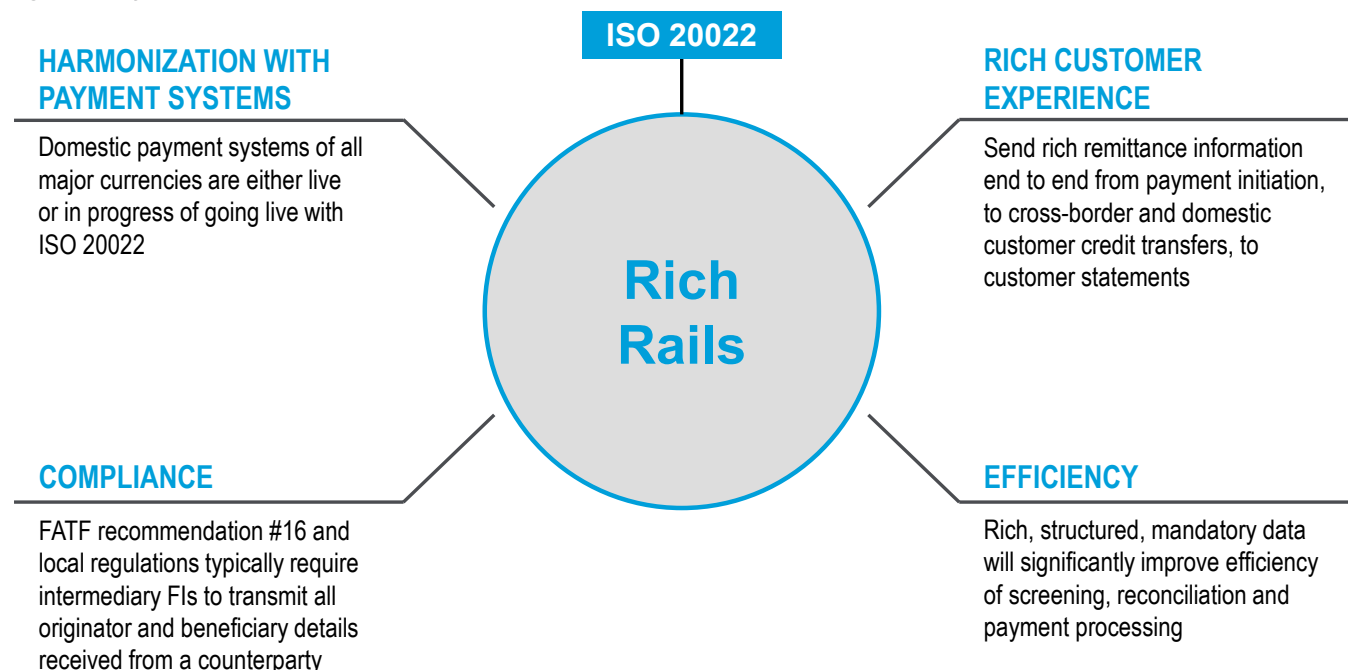
⁷⁴ Swift, "[How Cyber Attackers 'Cash Out' Following Large-Scale Heists](#)," September 2, 2020.

This, in turn, allows faster development of payment platforms and more frictionless cross-border payment solutions for clients. It also introduces back-office efficiencies by eliminating the need for translations between various formats. Furthermore, it is likely to improve operational resilience by making it easier to switch traffic from one payments system to another in case of outages.

ISO 2022 allows for richer and more structured data to be shared via standardized messages, compared with most proprietary standards including Swift MT messages. The structured data helps make transaction screening for compliance more efficient — for example, for anti-money laundering or fraud prevention purposes — resulting in faster and cheaper cross-border payments.

Limiting free format fields also makes STP more efficient and simplifies reconciliation.

Figure 48. Key Benefits of ISO 2022



Source: Citi Treasury and Trade Solutions

Road Ahead: With most of the world's payment systems set to adopt the ISO 2022 messaging standard by 2025, the coming years will be crucial for harmonizing its use to reach its full potential to make cross-border payments faster, cheaper, and more transparent. ISO 2022 will be a fundamental part of setting the foundations for data moving forward.

Key challenges related to ISO 2022 include: (1) achieving the wide-scale industry adoption necessary to enjoy the full potential benefits; (2) completing the significant and complex migration process, both from an industry and a market infrastructure perspective (many data formats that have been used for over 40 years will need to be replaced); (3) dealing with the impacts on many different systems of banks' infrastructure, which may not all move at the same schedule; and (4) handling the significant increase in data, as ISO 2022 contains two to three times more data than previous systems.

In short, many experts believe that things will get worse before they get better. In certain markets, growing pains are likely as we transition to ISO 20022. For example, in the U.S., CHIPS and Fedwire are moving to the new standard on substantially different schedules, which will introduce the need for translation during the period of *divergence*.

While many institutions in the industry are likely to face challenges as they juggle numerous ISO 20022-related projects that all require substantial budget and resources, the industry must work together to implement ISO 20022 to move to a new foundation of global payments infrastructure. Implementation will ultimately help banks deliver next-level payment solutions to clients, extract efficiencies, and improve operational resilience.

The Role of Application Programming Interfaces (APIs) in the Future of Payments

An API is an automated call and response channel that comes with messaging standards and operating protocols and enables connected systems or institutions to exchange information interactively and in real-time, allowing greater communication transparency and speed.

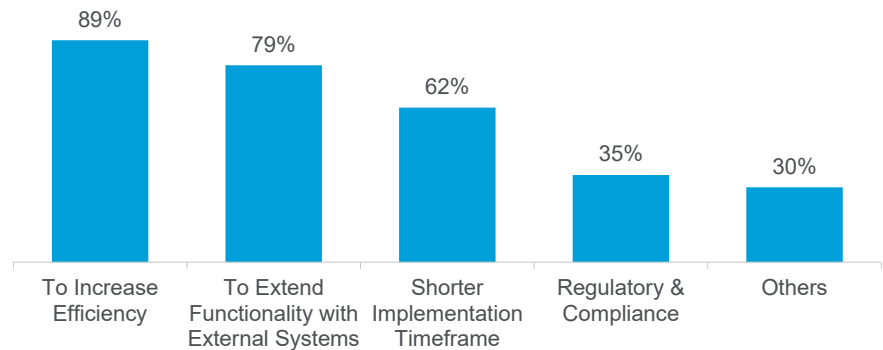
APIs are gaining ground, with levels of readiness across the industry varying, but full adoption by banks for payments processing and messaging is not yet widespread.

Since the design of APIs is geared toward immediate call and response, they are much better suited to facilitate an instant, real-time, 24x7 payments experience than traditional “MT” messages.

APIs’ key use cases encompass improving speed and efficiency, extending the functionality of internal systems, and streamlining regulatory compliance (Figure 49). There is tremendous potential for APIs as a channel to deliver optimal payment and retail payment experiences for both retail and corporate clients. The Bank for International Settlements is pushing for industry harmonization of API protocols for cross-border payments.⁷⁵

⁷⁵ Finextra, “[BIS Panel to Promote Harmonization of API Protocols in Cross-Border Payments](#),” May 30, 2023.

Figure 49. Key Motivation for the Implementation of APIs in Payment Systems Across the World in 2021



Source: Statista, Citi GPS

Open Banking API Standards

Significant progress is underway in developing open banking API standards across the world. Open banking is also known as “open bank data” as the practice allows third-party providers access to consumer banking transactions and other financial data from banks and non-banks via APIs. Below are some prominent examples:

- **Europe and the UK:** A number of standards are being developed in the region. The EU-wide PSD2 directive initiated the movement and led to the creation of the UK Open Banking Standard. It then spread throughout Europe via similar Pan-European initiatives (STET in France, Berlin Group, and Swiss Open Finance API (SOFA) by the Swiss financial industry).
- **Asia-Pacific:** South Korea was the first country to launch a common API infrastructure. Singapore and Hong Kong are at the vanguard of developing one, and many other countries working to implement them.
- **Africa:** Efforts to develop an open banking API standard are underway in Rwanda and Nigeria. FinTechs pushing for open banking in South Africa have released a white paper on the topic and have distributed it to banks.
- **South America:** Mexico and Brazil have launched API standards similar to the UK Open Banking Standard. Argentina has also committed to release standards soon.
- **North America:** We see some pushes in the direction of an open banking API standard by the U.S. Treasury Department, the U.S. Consumer Financial Protection Agency, and major banks. The Canadian government is creating API playbooks.

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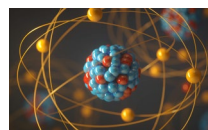
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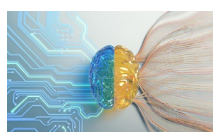
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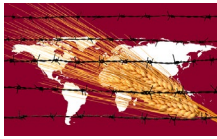
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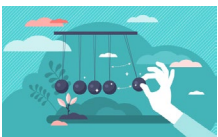
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