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Meeting the needs of end users:
The three layers of cross-border payment solutions

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In *Let's give a voice to end users: Cross-border payments, attributes, and use cases,* we argued that end users' needs for cross-border payments extend beyond cost, speed, access, and transparency. We indicated that "end users may be more interested in optimizing these goals, to trade off among cost, speed, transparency, and access between themselves and in favor of other attributes, such as geographic reach and revocability/returns depending on the use case" (Harper & Quibria, 2023).

Several types of cross-border payment solutions have evolved to meet end users' needs across payment attributes and use cases. Three main operating models are established in the market, while other models are nascent. The main solutions can be differentiated through their approach to end user experience, rules and processes, and infrastructure—the three layers of a cross-border payment solution. In this paper, we examine the three layers and the solutions in the market, the way the solutions approach the layers, and how the solutions are interconnected in delivering value to end users. We conclude with two recommendations aimed at promoting a more nuanced cross-border payments policy dialogue.

But let's begin the discussion with a stylized payments vignette that emphasizes one of these layers—and what can go wrong when the capabilities provided in a layer are not as fully formed as needed for a given use case.

VISA

Let's consider: A student books tickets for Rio Carnival

Early in the new year, Aditi, an international medical student from Bengaluru, India toils at her laptop in the Bywater neighborhood of New Orleans, making plans to see another great Carnival celebration in the Western Hemisphere. Aditi is a parade fan, and the first order of business is booking seats for a few events at the Sambódromo da Marquês de Sapucaí, Rio's purpose-built parade area for Carnival. Online options abound—almost too many. She reviews countless websites and finds one that looks promising. The location and seating options look great, but this particular vendor accepts only some bank-account-based money transfer options, as well as some app-based peer-to-peer solutions. Aditi starts to use one of these options, which she mainly employs with friends, and then she pauses.

Her mind flashes back to some payment stories she has heard over the last couple of years. Although she has never personally lost money from e-commerce, or any type of commerce for that matter, she remembers a few incidents relayed by friends or heard on podcasts and radio programs. Aditi recalls the unlucky person who sent rent to a landlord using a mobile app, only to learn the rent money went to another party. What a nightmare that was to correct. She remembers friends back home telling her of similar incidents with utility payments. She also recalls a recent story involving a mother who learned her government benefits card was drained by bad actors who somehow copied her credential information. That mother had to sue, involve the police, and write letters to politicians—and there was still no recourse.

These were all domestic examples, to be sure, and she understandably wonders how difficult a resolution might be in a cross-border transaction, in which navigating problems would be more complex and unfamiliar. While rent or food were not at stake, who wants to lose a couple hundred dollars with no clear plan of action if something goes awry? Such is the stuff of a bad holiday. Aditi decides to keep slogging through websites until a good vendor option emerges that accepts some known and trusted global payment methods that could protect her if things go wrong.

Cross-border payment solutions meet end user needs across three layers of capabilities

As this medical student is recalling some domestic payment horror stories[1] and thinking about the international transactions she needs to complete, she is understandably very concerned about geographic reach and consumer protections, in addition to the foundational payment attributes of security, resilience, and integrity. Given this e-commerce purchase, she also cares a lot about speed of authorization, since ticket purchasing often requires fast action, and nobody wants to see an online transaction "processing" for too long—even a ten-second wait can seem like minutes in e-commerce.

The student is almost certainly not thinking, though, about the various capabilities through which her needs are being met. It's a testament to cross-border payments innovation over the last few decades that Aditi did not need to ponder the intricacies. But this paper will examine these issues, because promoting continued innovation and making improvements to cross-border payments require us to get a bit more granular in our policy thinking.

Building on a well-known framework set forth by the Committee on Payments and Market Infrastructures (CPMI, 2018), in which a payment solution consists of both a front end and a back end, we believe end-to-end cross-border payment solutions deliver capabilities across three layers (see Table 1 for more detail).

The **end user experience** layer provides customer-facing products and services including transactional accounts (e.g., card account, bank account) and customer experience (e.g., onboarding).

The **rules and processes** layer defines how payments are processed and executed (e.g., bilateral contracts, multilateral scheme rules), includes services that do not directly touch the end user (e.g., value-added services for payment service providers including banks), and includes processes required to execute the payment (e.g., liquidity management, FX management).

The **infrastructure** layer delivers the back-end requirements to support messaging, clearing, and settlement of the payment.

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[1] In addition to anecdotes from colleagues—including one in which fraudulent Sambódromo tickets were almost purchased—the authors were inspired by episodes of Planet Money (Horowitz-Ghazi, 2019) and This American Life (Glass, 2023) for the examples. Details were omitted or changed for brevity.

Table 1: Cross-border payment solutions deliver on end user needs through three layers

Layer	Description	Capabilities	Payment attributes delivered
End user experience	Cross-border products and services delivered directly to the end consumer or business	UI/UX	Accessibility across users Security (AML, KYC, cyber, fraud) Transparency Predictability of fees and timing
		Convenience	
		Brand	
		Onboarding	
		Authentication	
		Payment instruments	
		Transaction accounts	
		Customer service	
		Channel access	
		Loyalty and rewards	
Rules and processes	Rules and obligations of participants in the cross-border payment solution including the processes required to execute payment	Rules and standards of service	Accessibility across users Security (AML, KYC, cyber, fraud) Transparency Integrity / failure rate Resilience Speed of authorization and clearing Speed of settlement Speed of funds availability System availability Returns Information and data Reach Transaction liquidity Scale
		Value-added services (e.g., credentials, fraud detection, tokens, APIs)	
		FX management	
		Liquidity management	
		Refunds and disputes management	
		Membership management	
		Liability	
		Penalties	
		Participant economics	
Infrastructure	Information exchange and money movement enabling funds transfer from sender to receiver	Clearing	
		Authorization	
		Messaging	
		Settlement	
		Technical standards	
		Cybersecurity	

Source: VEEI analysis

Three main cross-border solutions are available today

There are three main cross-border solutions used in the market today that can be most easily differentiated through their approach to the three layers. They range on a spectrum from a more "closed" network approach to a more "open" network approach.

Closed-loop systems or proprietary networks take more of a closed network approach. They provide an end-to-end solution across all three layers, from owning the payor and payee relationship and experience, to setting the rules, to moving money between the accounts of the payor and payee on the same ledger. They are considered more "closed" because the payor and payee must both have accounts with the same payment service provider (PSP).

On the other end of the spectrum, **correspondent banking** takes a more open approach by allowing for any payor to send money to any payee regardless of where the payor and payee hold accounts. Anyone with a bank account can access correspondent banking, and the sender and receiver do not need to hold an account with the same provider at the end user experience layer. But this also means that bilateral agreements are required among a chain of banks, which must agree on rules and processes related to the payment. The actual end user experience is left up to the participating banks. This makes the network more open and accessible but can also make it more difficult to create a consistent customer experience.

Multilateral platforms sit in the middle of the solution spectrum and capture key benefits from both ends—being more accessible than the closed networks and being more efficient in driving end user experiences than totally open networks. Multilateral platforms or networks provide the infrastructure layer (or most of it), but they also provide the rules and processes layer that all members of the network follow to deliver a consistent and seamless experience. Those rules and processes are designed and implemented to foster an ecosystem focused on the end user experience with many participants. So-called card networks—or what we will call global networks or global platforms, since the "card" is increasingly unimportant for many use cases—are the best example of retail multilateral platforms.

We believe the benefits of global platforms, which facilitate a seamless cross-border retail experience for many use cases, have been missing from the cross-border payments policy dialogue in recent years, but a recent joint report from the CPMI, BIS Innovation Hub, International Monetary Fund (IMF), and World Bank (2023), provides an assessment of how multilateral platforms might bring meaningful improvements to the cross-border payments ecosystem. The report highlights the card networks as rare examples of global, multicurrency common platforms, and it examines the role of rules and processes in the functioning of multilateral platforms. We will discuss the role of rules and processes more in the following section.

Table 2: Cross-border payment solutions use different approaches to deliver capabilities across the three layers

	More closed ←		→ More open
Layer and description	Closed-loop systems	Multilateral platforms	Correspondent banking
End user experience Cross-border products and services delivered directly to the end consumer or business	Providers such as global transaction banks and digital wallets provide end-to-end solutions operating their own rules and standard of services and settlement rules supported by their own SLAs to offer consistent level of service	Participating banks provide an end user experience with some minimum requirements set by the network or the local payment scheme (e.g., identification, protection, branding)	Participating banks each control their own end user experience
Rules and processes Rules and obligations of participants in the cross-border payment solution including processes required to execute payment		Global platforms may offer some end user experience capabilities such as channel access	Participating banks establish their own rules and standards of service through bilateral agreements that define how settlement happens, revenue sharing, and cut off times
		Global platforms provide a common set of rules and standards of service across participants to support common ground and do clearing and additional value-added services (e.g., credential enrichment, fraud service)	SWIFT messaging and technical standards to exchange data without clearing
Infrastructure Information exchange and money movement enabling funds transfer from sender to receiver	Settlement occurs through correspondent banks or linked central bank accounts		

Note:
- The three solutions are not equivalent and operate differently across each of the three layers.
- Each solution should be considered differently (as opposed to a one-size-fits-all approach) given each offers different capabilities across the three layers to meet end user needs and contributes to the cross-border ecosystem in different ways.

Capabilities offered by solution

Source: VEEI analysis

As shown in Table 2, settlement for all three cross-border payment solutions leverages correspondent banks or central bank accounts at the infrastructure layer. Therefore, improvements at the correspondent banking infrastructure layer can provide benefit to all cross-border payment solutions and all end users.

For example, front-end solutions that provide the end user experience layer may be unable to meet certain end user needs due to the limitations of back-end correspondent banking. A small local bank using correspondent banking can provide end-to-end tracking of the payment only when the back-end correspondent bank offers the technical standards to enable it, such as a unique end-to-end transaction reference number. The capabilities of correspondent banking are critical to all cross-border payment solutions because they enable the two layers above (rules and processes and end user experience) to better meet end users' needs.

Unique capabilities across each layer help solutions fit particular use cases

The different capabilities that the three solutions provide across each layer make each of them well-suited to particular use cases. As a result, different use cases tend to rely on certain solutions more heavily than others based on end user needs.

Closed-loop systems operate across all three layers to provide a comprehensive solution to end users. Examples include digital wallets, money transfer operators, and e-money solutions moving money within their own ecosystem. However, there are typically trade-offs involving flexibility, accessibility, and applicability across use cases or geographies, given that closed networks require the sender and the receiver to hold accounts with the same closed-loop system.

Because closed-loop networks own the end-to-end experience, they are well-suited for many consumer-to-consumer (C2C) and consumer-to-business (C2B) vertical payments in which end users value product attributes such as convenience and notifications, along with a higher degree of transparency and predictability, even for a limited set of corridors.

Correspondent banking primarily offers capabilities in the infrastructure layer. Correspondent banking provides an open infrastructure layer to enable payment services and typically uses a combination of contractual relationships between banks and international messaging services such as SWIFT[2] across an evolving network of global corridors.

In correspondent banking, individual banks must align on rules and processes and the end user experience through bilateral agreements with their correspondent partners. Each agreement may have different terms and conditions, and so the resulting heterogeneity and complexity limits the ability to meet end user needs easily and consistently across corridors.

Correspondent banking offers the underlying settlement rails for actual money movement for the other solutions. It also provides open access to front-end solution providers, which in turn offer capabilities in the end user experience layer to deliver on payer and payee needs.

Although it is not perfectly suited to all the needs of end users, correspondent banking's reach across most countries and the ability of correspondent banks to provide liquidity can be particularly valuable to large corporate and micro, small, and medium enterprises (MSMEs) for business-to-business (B2B) payments.

Multilateral platforms (especially the global ones like the global networks) provide the infrastructure and rules and processes layers—and the end user experience layer in some instances—to incentivize innovation and create a robust merchant, issuer, and acquirer ecosystem.

[2] SWIFT is a global member-owned cooperative that primarily provides standardized financial messaging services to support payments, securities, trade finance, FX/treasury, and market infrastructures.

Global platforms offer authorization, clearing, and netting in the infrastructure layer among participating banks, and leverage correspondent banking accounts to move money. Global platforms can also compensate for correspondent banking's inefficiencies providing real time approval or declines of sales transactions.

They also enforce a common set of rules (e.g., for authorization, clearing, settlement, fraud detection) and provide value-added services (e.g., credential enrichment, tokenization, payment account reference numbers), which enable front-end solution providers to offer a consistent and predictable service level to end users.

Global platform rules and processes are designed to minimize risks and provide a common, secure, reliable, and convenient global payments experience. They govern the use of, and access to, a given system to protect participants in the network by setting parameters around system participation, transaction requirements, risk and security controls, and dispute resolution processes, among other measures. The rules and processes allow a high number of parties to use a platform efficiently, and they provide the certainty and clarity that all system participants need in order to contribute to a global, seamless, and secure digital payments ecosystem. The rules and processes became even more important during and after the COVID-19 pandemic, when digital payments were rapidly adopted for some use cases and sub-use cases.

Global networks are particularly well-suited to processing a high volume of low value payments, leveraging network rules for net settlement as well as refunds/exchanges across participants. This capability is particularly useful for the e-commerce use case, although it is increasingly being extended into other use cases such as remittances, disbursements, and B2B payments and their sub-use cases. For a closer look at the rules, processes, and value-added services of Visa, a global multicurrency network, see Box 1.

In addition to the three solutions discussed above, there are emerging infrastructures such as interlinks across domestic payment methods, including instant payment systems, interoperable or linked central bank digital currencies, cryptocurrencies, and stablecoins. We do not examine these methods in this paper as they are currently nascent, limited in adoption, and still working toward addressing end user needs for use cases and sub-use cases.

Box 1: A look at rules and processes for Visa—a global multilateral and multicurrency platform

According to a January 2023 report published jointly by the CPMI, the BIS Innovation Hub, the IMF, and the World Bank, multilateral platforms that adhere to a single rulebook can bring improvements to the cross-border payments ecosystem. Visa is one of only three global, multi-currency multilateral platforms that operate today, and one of two for retail payments.

The Visa Rules are a fundamental rulebook for all Visa system participants. These rules provide the minimum requirements to ensure the security, soundness, integrity, and interoperability of the Visa payments system. On a practical level, the Visa Rules govern how issuers and acquirers can use and access Visa's global network, products, and services to serve their clients (cardholders and merchants). When necessary, Visa's global rules are also adapted to ensure compliance with local regulations and requirements.

<table>
<tr><th colspan="2">Rules and processes layer</th><th>Visa overview</th></tr>
<tr><td colspan="2">Rules and standards of service</td><td rowspan="4">The Visa Rules constitute a single rulebook that protects participants in the network by setting parameters around, among other things, system participation rights, transaction requirements, consumer protection, risk and security controls, settlement procedures, defaults, and dispute resolution processes.</td></tr>
<tr><td>Licensing</td><td>Transaction processing</td></tr>
<tr><td>Issuing</td><td>Risk</td></tr>
<tr><td>Acceptance</td><td>Dispute resolution</td></tr>
<tr><td colspan="2">Value-added services categories</td><td rowspan="6">Visa provides value beyond the rules by offering common products and services across different categories.

Examples include:
Visa Credential Enrichment Service, Visa Token Service, Fraud Management. Essentials, Visa Advanced Authorization, Visa Transaction Controls, Visa Risk Manager, Visa Analytics Platform, Digital Payment Suite, Visa Multinational Program, Visa Offers Platform, Visa Rewards Platform, Dispute Representment, Visa Dispute Management Services, and Rapid Dispute Resolution.</td></tr>
<tr><td>Credentials</td><td>APIs</td></tr>
<tr><td>Fraud detection</td><td>Tokens</td></tr>
<tr><td>Risk management</td><td>Analytics</td></tr>
<tr><td>Channels</td><td>Loyalty and rewards</td></tr>
<tr><td>Disputes</td><td></td></tr>
</table>

Reminder: The following Visa basic services are provided within the infrastructure layer

- **Authorization:** The process by which an issuer approves or declines a cardholder's transaction before a purchase is finalized. Occurs in real time.
- **Clearing:** The process by which Visa collects transaction data from the acquirer, validates the transaction, calculates fees and charges, and delivers the validated information to the issuer for posting to the cardholder's account.
- **Settlement:** The process of calculating and determining the net financial position of each client for all transactions that are cleared by VisaNet.

Source: VEEI analysis, expert inputs

Let's look forward to a more granular cross-border payments dialogue

The analyses in *Let's give a voice to end users: Cross-border payments, attributes, and use cases* and those in this paper highlight the heterogeneity of the cross-border payments space. Not only are there challenges inherent in a common set of aspirational targets across disparate use cases for which end user needs vary considerably, payment solutions deliver capabilities across three layers differently, which makes discussions of cross-border payment innovation and improvement a bit more complex. In light of what we have discussed in these two papers, we propose[3] that:

Improvements to cross-border payments should be determined according to granular use-case: The cross-border dialogue will need to go beyond the four common attributes of speed, cost, access, and transparency to address the improvement areas most valuable for end customers (e.g., decline rates and refunds for C2B e-commerce payments; data and information to support reconciliation for B2B payments).

We believe use case-specific working groups involving the appropriate public and private sector stakeholders can expand on and validate these improvement areas and foster learnings from other use cases to address them. Working groups on e-commerce can include global networks, gateway providers, leading bank acquirers, and marketplaces; while those on B2B could include correspondent banks, consortiums, accounts receivable / accounts payable providers, etc.

Focus should be on the value of capabilities provided to meet needs: We must ensure that the dialogue around measuring progress on the aggregate retail cost target focuses on the capabilities required to deliver value to end users—beyond just the basic money movement. These capabilities further vary across solutions, corridors, and the business model of the provider (e.g., an open network provider focused on an expanded set of corridors offering consistent rules and value-added services vs. a closed network provider focused on a narrow set of corridors). This becomes critical to avoid any unintended consequences from a one-size-fits-all approach that views cross-border payments through a lens of uniformity. For example, broad-brush cost targets run the risk of disincentivizing continued private sector investment and innovation to meet end user needs or of reducing the level of service for attributes that drive most of the value for end users.

With attributes, use cases, and payment capabilities having been discussed in these last two papers, the Visa Economic Empowerment Institute will next offer use case-oriented insights on improvement opportunities, which differ by use case, corridor, and context; and on measuring progress in cross-border payments improvement at a more granular level.

We hope these papers and those that follow will contribute to a robust and productive discussion of how best to continue cross-border payments innovation and monitor progress along the journey.

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[3] These two recommendations are repeated from *Let's give a voice to end users: Cross-border payments, attributes, and use cases*. This paper provides more background on the second recommendation.

Sources

Committee on Payments and Market Infrastructures (CPMI). (2018, February). *Cross-border retail payments.* https://www.bis.org/cpmi/publ/d173.pdf

CPMI, BIS Innovation Hub, International Monetary Fund, & World Bank. (2023, January). *Exploring multilateral platforms for cross-border payments.* https://www.bis.org/cpmi/publ/d213.pdf

Glass, I. (Host). (2023, January 20). The Runaround [Audio podcast episode]. *This American Life.* https://www.thisamericanlife.org/789/the-runaround

Harper, C., & Quibria, N. (2023, January). *Let's give a voice to end users: Cross-border payments, attributes, and use cases.* Visa Economic Empowerment Institute. https://usa.visa.com/content/dam/VCOM/regional/na/us/sites/documents/veei-lets-give-voice-to-end-users.pdf

Horowitz-Ghazi, A. (Host). (2019, June 26). The Cost of Getting Your Money Back [Audio podcast episode]. *Planet Money.* National Public Radio. https://www.npr.org/2019/06/26/736352315/episode-922-the-cost-of-getting-your-money-back

About Visa Inc.

Visa Inc. (NYSE: V) is the world's leader in digital payments. Our mission is to connect the world through the most innovative, reliable, and secure payment network–enabling individuals, businesses, and economies to thrive. Our advanced global processing network, VisaNet, provides secure and reliable payments around the world, and is capable of handling more than 65,000 transaction messages a second. The company's relentless focus on innovation is a catalyst for the rapid growth of digital commerce on any device for everyone, everywhere. As the world moves from analog to digital, Visa is applying our brand, products, people, network, and scale to reshape the future of commerce.

For more information, visit About Visa, visa.com/blog and @VisaNews.