



Unlocking Public and Private
Finance for the Poor

An abstract graphic on the left side of the page consists of several concentric, curved lines in shades of blue. These lines are interspersed with small circles and dots, some of which are connected by thin lines, suggesting a network or data flow. The overall shape is roughly circular and occupies the left half of the page.

EXPLORATORY PAPER

OPEN REGULATED GLOBAL PAYMENTS INTER-NETWORK

CONTENTS

1	CONTENTS	
2	ACKNOWLEDGEMENTS	
3	EXECUTIVE SUMMARY	
6	INTRODUCTION	
7	THE IMPORTANCE OF INTERNATIONAL REMITTANCES	
9	INTEROPERABILITY AND GENDER	
10	CHALLENGES WITH THE CURRENT LANDSCAPE	
12	THE ROLE OF INTEROPERABILITY IN INTERNATIONAL REMITTANCES	
16	PAYMENT LAYERS	
	1. Application interface: digital (mobile app, internet banking) or over the counter	16
	2. Regulated payment service provider	17
	3. Compliance	18
	4. Messaging: transfer of information in an agreed format	19
	5. Clearing: the process of updating the accounts of the trading parties	21
	6. Settlement: the exchange of money	21
24	THE PATH FORWARD	
	1. Account addressing	25
	2. Shared tokenized compliance	29
	3. Instant clearing and settlement	30
36	CONCLUSION	

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EXECUTIVE SUMMARY

The number of international migrants continues to grow. Today, around 4 percent of the world's population live outside their country of origin. Every year, migrants send more than US\$700 billion in remittances, most of which is destined for developing countries.

Despite the global importance of remittances, many migrants are unable to benefit from formal remittance systems. Current payment networks are expensive, slow and lack interconnectivity; often, for example, a migrant will pay cash to a remittance provider, who will charge a high fee to send the money to the recipient, who then pays a fee to convert the money into their local currency or to cash-out. Combining existing but disparate payments system would help to promote financial inclusion, improve the safety of funds and facilitate access to payment services for consumers.

This paper explores options for the future of international remittances: an open regulated global payments inter-network that leverages and cultivates existing infrastructure, specifically targeting low-value international remittances to address the needs of migrants around the world.¹

The slow, expensive, fragmented and non-transparent nature of the current remittances systems is an unsatisfactory experience for all parties involved in a transaction. High processing costs and a lack of standardisation across payment networks both impact end users, who often experience unexpected fees or delays in receiving their funds. These issues are forcing some users to move away from banks and money transfer agents towards financial technology (fintech) providers, who may be able to better meet their needs. However, the scope of fintech providers remains limited.

Ideal interoperable systems—such as telephones or email—can work with other systems, anywhere in the world, without restriction. An interoperable payments system has multiple benefits (current international remittance systems are largely interconnected but not interoperable). Such a system creates a network effect, which increases usage and boosts the economy. Networks that successfully allow easy remittances attract users, as can be seen in M-Pesa in Kenya and Swish in Sweden, among others.

There are several barriers to a payments system becoming truly interoperable. These include a lack of connectivity (money cannot be sent from anywhere to anyone), compliance issues (many providers rely on manual methods for customer due diligence) and a lack of transparency in exchange rates. A further challenge to interoperability is that many payment networks rely on unique or proprietary technology and compliance management. To achieve a broad reach, banks must join multiple networks, but this is an expensive and resource-intensive process.

¹ UNCDF is interested in better harnessing and cultivating the existing infrastructure that is already present, and not building any new infrastructure. Additionally, while one objective is to include low-income populations, it is not an exclusive or standalone objective.

To develop an open regulated global payment inter-network, six distinct payment layers for completing a transaction must be considered.

1. Application interface: digital or over the counter

There are two ways to send money: (i) assisted (i.e. in-person over a counter) or (ii) self-served (carried out digitally via a mobile app or website). Digital transfer applications need to overcome barriers in order to move millions of people to digital transfers. These include (i) variations in user interface and user experience (often cumbersome and not intuitive when switching from one to another), (ii) the opportunity for simplicity (e.g. the universally recognized green/red buttons on a mobile phone). Whilst this layer can benefit from some standardisation, ultimately it is up to providers to build appropriate solutions.

2. Regulated payment service provider

Regulated payment service providers include banks, remittance service providers, money transfer operators and fintechs. In most international remittances, several providers may be involved in a transaction. However, it is unlikely that one provider will be present in all send and receive markets. Interoperability is therefore essential; the ultimate goal is for a provider to enable their customers to send funds to anyone, anywhere in the world.

The role of current providers remains unchanged, and this paper does not seek to disintermediate any existing providers in either the send or the receive markets.

3. Compliance

Today, compliance is a major cost driver for remittance and a major barrier to interoperability. One way to gain efficiency is to allow compliance to be completed at the send country level and to be recorded and shared with all the parties in a transaction using a digitally signed token issued by a trusted compliance provider. A good example of this is [Deutsche Bundesbank's Amplus initiative](#), which includes know your customer (a standard practice that allows providers to identify the customer they are working with), anti-money laundering/combating the financing of terrorism, and anti-bribery and corruption checks.

4. Messaging: transfer of information in an agreed format

A lack of interoperability due to different standards and formats creates significant delays and inefficiencies in processing payments. Now, the world is moving towards one common global and open standard for payments messaging: ISO 20022. It is expected to play an important role in the interlinking of payment systems and, more generally, addressing data quality and quantity restrictions in cross-border payments.

Messaging standards are 'behind the scenes'; they are not visible to customers. However, customers need to supply basic data to help providers identify the customer's intended recipient of the funds. This is known as account addressing. There have been several attempts to standardize account addressing, with the International Bank Account Number making the most progress.

The simplest way forward could be to use mobile numbers – while some people have multiple accounts, one account (bank, mobile money or micro financial institution) will default to one mobile number. Using the mobile number as an account identifier can be very powerful. WhatsApp is a well-known example of this.

5. Clearing: the process of updating the accounts of the trading parties

Clearing happens once a regulated service provider has received funds from a migrant with instructions to send those funds. Clearing does not mean that money changes hands (that is the next stage: settlement), but the records of the two parties are updated. There are two types of clearing: (i) bilateral clearing and (ii) central clearing. In bilateral clearing, the parties to the transaction undergo the legally necessary steps to clear the transaction. Central clearing uses a third party—usually a clearinghouse—to clear transactions.

6. Settlement: the exchange of money

Funds are settled using either deferred settlement, prefunded transaction accounts or real-time settlement models. Currently, the prefunding model is widely used in international remittances. This means that, globally, there is somewhere between US\$5–15 trillion in transaction accounts at any time. This is expensive (cost of funds) and risky (due to exposure to foreign exchange losses) and a key reason for the high cost of international remittances. In the future, real-time or just-in-time settlement has the potential to become the preferred settlement method for international remittances, where the same money sent by the sender will be the money received by the receiver.²

Conclusion

The infrastructure to achieve total interoperability largely already exists but needs to be better harnessed. Creating an open regulated global payments inter-network, by leveraging and cultivating existing infrastructure, any regulated service provider will be able to send money to anyone, anywhere in the inter-network. Further, when governed by a trusted neutral entity, an open regulated global payments inter-network will significantly speed up total interoperability, reduce the cost of transactions and provide some of the world's many migrants with an easy, efficient way to digitally transfer money to their home countries.

² Today the sender's money doesn't move in real-time, even when the funds are being sent in the same currency across borders, for example, Euros or CFAs. Cryptocurrencies like Bitcoin, carry the value during the movement and settlement is therefore instant. It remains to be seen how CBDCs will be designed and if it would be possible for the value of fiat currency to move in real-time vs. only a representation of the value.

INTRODUCTION

Currently, even though payment systems have become more standardized, there isn't a global interoperable payment system, that works like the Internet. Instead, there is a collection of siloed payment networks that lack the effective interconnectivity to deliver on the needs of today's customers. Further, due to the high costs and inefficiencies of cross-border payments, many consumers are shut out of formal remittances. An efficient payments system helps to promote financial inclusion, improve the safety of funds, and facilitate access to and use of additional payment services for end users.

This paper explores options for the future of international remittances: an open regulated global payments inter-network that leverages and cultivates existing infrastructure, specifically targeting low-value international remittances to address the needs of migrants around the world. Specifically, this paper examines the following aspects of cross-border payments:

- application interface
- regulated payment service provider
- compliance
- messaging, specifically account addressing
- clearing
- settlement.

Governance and identity or electronic know your customer (eKYC) systems have been excluded. Risks and unintended consequences will be considered in a subsequent paper.

This paper outlines the existing remittance landscape and explores options for creating an open regulated global payments inter-network for retail/low-value international remittances to address the needs of underserved migrants. An open regulated global payments inter-network is not a replacement for those who are well served by the existing remittance system, such as people who have International Bank Account Numbers (IBANs)³ and access to real-time cross-border remittances. Such a vision is consistent with the Group of Twenty (G20) [roadmap for enhancing cross-border payments](#), which includes actions to implement the building blocks needed to overcome the challenges that prevent safe and efficient cross-border payments, including remittances.

³ An IBAN is an internationally agreed system of identifying bank accounts across national borders that facilitate communication and processing of cross-border transactions with a reduced risk of transcription errors. An IBAN uniquely identifies the account of a customer at a financial institution. As of May 2020, 77 countries were using the IBAN system.

THE IMPORTANCE OF INTERNATIONAL REMITTANCES

Globally, an estimated 281 million people, or 3.6 percent of the world's population, live outside their countries of origin. Around 48 percent of international migrants are women.

In 2022, remittances to low-and middle-income countries (LMICs) are expected to increase by 4.2 percent to reach \$630 billion.⁴ Although remittances to LMICs fell in 2020 by 1.7 percent⁵ (compared with the original prediction of 20 percent) due to the COVID-19 pandemic, their relative importance as a source of external financing is expected to increase.

Remittances now stand more than threefold above official development assistance (ODA) and, excluding China, more than 50 percent higher than foreign direct investment (FDI). Even as FDI flows seem to be recovering in 2021, remittance flows to LMICs excluding China are on track to surpass the sum of FDI and ODA flows. For LMICs, the total remittances received not only complement ODA but also serve as a resilient income source for household consumption, emergencies and investments, and sometimes as the prime source of income.

The United Nations 2030 Agenda for Sustainable Development (2030 Agenda), particularly Sustainable Development Goal (SDG) 10, recognizes the developmental contribution of remittances to reduce inequality within and among countries. The 2030 Agenda also addresses the persistent issue of high transfer costs. SDG target 10.c aims to reduce high transfer costs to less than 3 percent on average and to eliminate remittance corridors with costs higher than 5 percent by 2030. However, international remittance costs can still be very high – over 10 percent for some channels. In the first quarter of 2022, the average cost of sending \$200 to LMICs remained high at 6.09 percent; sending this amount to sub-Saharan Africa cost 7.84 percent, the most expensive of any region.⁶

Despite their importance, remittances tend to flow in distinctly suboptimal ways. Migrants earn in the currency of their host country, and when it is time to send money home, they will pay cash to an over-the-counter remittance provider. This provider may charge high transaction fees to send the money to the recipient, who will often pay a high fee to convert that remittance into the currency of the home country in turn. Remittances may also move through unregulated informal channels (again, as physical cash or 'hawala'⁷), exposing both

⁴ World Bank Migration and Development Brief 36 (<https://www.knomad.org/publication/migration-and-development-brief-36>, accessed 20 June 2022)

⁵ "Recovery: COVID-19 crisis through a migration lens", Migration and Development Brief 35, World Bank Group, Washington, DC, November 2021 (<https://www.knomad.org/publication/migration-and-development-brief-35>, accessed 12 January 2022).

⁶ The World Bank: Remittances prices worldwide quarterly, March 2022 (https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q122_final.pdf, accessed 20 June 2022).

⁷ A popular and informal value transfer system based not on the movement of cash, or wire transfers between banks, but instead on the performance and honour of a huge network of money brokers known as hawaladars.

senders and recipients to the inherent risks of carrying cash, money laundering and crime/terrorist financing, and preventing governments from having a clear understanding of their country's foreign currency flows.

In short, cross-border remittances at large have been facing challenges of high cost, low speed, limited access and limited transparency, all caused by frictions in the existing processes for these payments, which result from a lack of or limited interoperability between payment networks⁸ and harmonization of compliance requirements across jurisdictions.

⁸ BIS, Bulletin Issue 49: [Interoperability between payment systems across borders](#)

INTEROPERABILITY AND GENDER

The gender gap in financial inclusion is stubborn. Between 2011 and 2017, the world saw strong progress which brought 1.2 billion people into the global financial system for the first time. But, the gap between the proportion of men and women who had an account with a financial institution in low- and middle-income markets stayed stuck at 9 percentage points.⁹

There is a growing acknowledgement that remittance patterns are gendered,¹⁰ strongly influencing the channels, amounts and frequencies of remittances, as well as how and by whom the money is used.

For instance, studies indicate that when it comes to sending remittances women pay more in fees and appear to be more price sensitive, compared to men and that better digital payment system design creates the conditions for more women to use digital financial tools. You might wonder why there is an underlying gender bias in the choice between real-time transfers and T+1 settlements or between interoperable and closed-loop systems? While these highly technical choices seem far removed from women's daily lives, research indicates that better payment system design can create a financial system that is more open and accessible and, by doing so, creates the conditions for more women to use the system.¹¹

Driven by entrenched gender and social norms, the persistent gender gap in financial inclusion¹² also plays out for women migrants who account for half of all remittance senders globally, making remittances a gender equality issue.

Open digital payments systems, characterized by lower costs and interoperability, could be the key to building more gender-responsive remittance services that benefit everyone, especially women. These could lower the barriers to entry and experimentation and incentivize merchants to join the systems en masse. Open digital payment systems may also lead to more convenience and encourage innovation of more inclusive remittances products that meet women migrant's specific needs.

For a more in-depth understanding, see the UNCDF's technical paper on Designing Gender-Smart And Migrant-Centric Digital Remittances: The principles to designing digital remittances that migrants want and need at <https://bit.ly/gender-smart>.

⁹ Demirgüç-Kunt et al., 2018

¹⁰ Rahel Kunz and Julia Maisenbacher, "Gender and remittances", in *The Palgrave Handbook of Gender and Migration*, Claudia Mora and Nicola Piper, eds. (London, Palgrave Macmillan, 2021).

¹¹ Level One Project, "Payment System Design and the Financial Inclusion Gender Gap", Bill and Melinda Gates Foundation, Seattle, Washington, 2021 (https://www.leveloneproject.org/wp-content/uploads/2021/01/Payment_System_Design_and_the_Financial_Inclusion_Gender_Gap.pdf, accessed 14 December 2021).

¹² Better than Cash Alliance, *Advancing Women's Digital Financial Inclusion* (July 2020), https://btca-production-site.s3.amazonaws.com/documents/482/english_attachments/_Advancing_Womens_Digital_Financial_Inclusion_G20_GPFI.pdf?1606113263.

CHALLENGES WITH THE CURRENT LANDSCAPE

Today, sending a thousand dollars can be inexpensive but sending just fifty dollars can be 10 times more expensive. And we all know, fifty dollars goes a long way in a migrant's home country. But the cost of sending a thousand dollars depends very much on who the thousand dollars belong to as even when the amount is the same, the cost to send it is not. For example, affluent customers have access to premier banking status that gives them free transfers and preferential exchange rates. On the other hand, low-income migrants with limited access to banking services pay a lot more. Let's face it - it's expensive to be poor.

To make matters worse, the remittance industry is riddled with 'confusion pricing'. Zero fees and zero commissions advertisements are misleading as margins are baked into the FX rate. Even today, full fees are rarely disclosed up-front and often the amount received is different from what was initially expected. Transparency, so vital in this day and age, is still missing in the remittance industry.

When it comes to infrastructure, the litany of pain points—low speed, limited transparency and high cost—in the current payments systems stem from the lack of a fully connected, open regulated global payments inter-network, like the Internet. The fragmentation of existing networks has significant downstream impacts; primarily, it results in poor experiences for all parties involved in cross-border remittances. Without direct connectivity between transacting parties, factors such as costs, traceability and timing are a black box to sending and receiving remittances service providers (RSPs), and certainly to end users.

The high processing costs that are passed from one network to the next and down to the end users, limit RSPs addressable markets and impacts their servicing capabilities. The lack of standardisation across networks also impacts end users, who experience unexpected fees or delays in receiving their funds. This is especially true for corridors with lower volume.

In markets where financial technology (fintech) services are available, migrants are moving away from banks and money transfer agents towards fintech providers who can better meet their needs. However, this is only a small improvement and is limited to those with access to fintech providers, who are mostly active in major corridors.

Though interoperability itself doesn't solve all the challenges, it is crucial. For example, without seamlessly interoperable email platforms, users would need to work out which platform one recipient uses versus another. To take this example further, if each email sent had a different pricing structure depending on the recipient—and the poorer the recipient, the higher the cost—the system would be slow, inefficient and expensive. This reflects international remittances today.

The benefits of interoperable payment systems are widely known. It creates a network effect, which helps to increase usage and, in turn, boosts the economy. When electronic money becomes easy to remit, users automatically flock towards that network. Domestic examples, such as M-Pesa in Kenya, Swish in Sweden and Unified Payment Interface in India, have demonstrated this impact.

This paper does not seek to paint any of the current ecosystem players as bad actors. The private sector continues to innovate and regulators are demonstrating a clear intent to improve policies. The G20 Roadmap for enhancing cross-border payments was conceived to address many of the current challenges.

THE ROLE OF INTEROPERABILITY IN INTERNATIONAL REMITTANCES

Standardisation and interoperability are important catalysts in the quest to increase efficiency and realize economies of scale and network effects for international remittances.

Standardisation of both technical¹³ and regulatory requirements help bring harmonization within an industry and is fundamental to any interoperability efforts.

Interoperability implies business¹⁴ and semantic¹⁵ compatibility as pre-requisites for a more integral, less siloed international remittance system. It is a characteristic of a product or system, where the interfaces are completely understood and they work with other products or systems—now or in the future—in either implementation or access and without any restrictions.

Telephone and cellular networks are interoperable, allowing one individual to call another, anywhere in the world, using their phone number. Email is also interoperable. Interoperability for payments is prevalent, with card networks, such as Visa, Mastercard and ATMs, allowing their cards to be used in another provider's ATM and even in another country. However, like ATMs, mobile money systems were initially not designed to be interoperable for economic reasons (e.g. M-Pesa in Kenya). In the early days providers want to capture as much of the market as they can and so they aim to build a 'walled-garden system' that enables a 'winner takes all' model.¹⁶

The barriers to interoperability for international remittances are not the same as for domestic remittances. In fact, international remittances are largely interconnected¹⁷ (which is different to interoperable), traditionally through the corresponding banking network and more recently using the following models: single access point, bilateral link, hub and spoke (or multilateral link) and common platform.¹⁸

¹³ Technical - systems implement the same technical standards, such as message formats and data infrastructures, so that their hardware and software infrastructures can be connected directly. Source: BIS, Bulletin No. 49, 2021

¹⁴ Business - systems agree on rights and obligations, such as who can access the platform, when and how to clear and settle obligations among payment systems, and how to address risks of payment fail-ures. Source: BIS, Bulletin No. 49, 2021

¹⁵ Semantic - systems speak and understand the same language so that data and information are interpreted uniformly and consistently across systems. Source: BIS, Bulletin No. 49, 2021

¹⁶ A closed platform, walled garden, or closed ecosystem is a software system wherein the carrier or service provider has control over applications, content, and/or media, and restricts convenient access to non-approved applicants or content. Apple's iOS mobile operating software is a good example of a walled garden.

¹⁷ Interconnected: some payment systems are haphazardly connected, whereas interoperable systems are those that allow users on one network to seamlessly send funds to a user on another network. For example, email, phone calls and SMS messages are all globally interoperable.

¹⁸ Examples include Single access point model: euroSIC; Bilateral link: Directo a México; Hub and spoke: Regional Payment and Settlement System (REPSS) of the Common Market for Eastern and Southern Africa; Common platform: Southern African Development Community (SADC)-RTGS. Source: BIS Bulletin No. 49, 2021

Despite this, there are significant problems with formal international remittance transfers (Figure 1).

- Connectivity is not ubiquitous, and money cannot be sent from anywhere to anyone.
- Many providers rely on manual methods for customer due diligence (CDD). This is often due to a lack of access to Identity or eKYC systems.
- Apart from a few major corridors, transfers are not in real-time and can take anywhere between 1–3 days or longer.
- Exchange rates are not transparent.
- Transfers are expensive, with a global average of 6.09 percent to send \$200¹⁹ and well over 10 percent in smaller corridors.
- There are limited options to maintain digital liquidity.

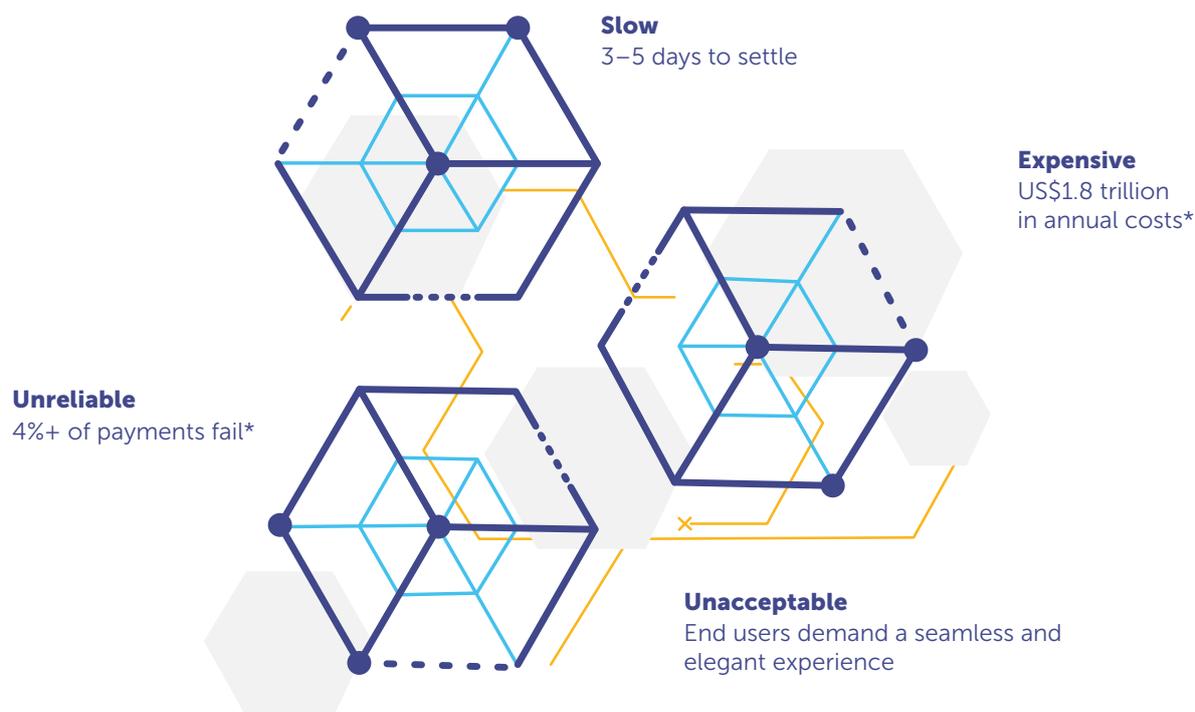


Figure 1. Problems with global payments.

*Source: Bansal et al., 2016²⁰

¹⁹ The World Bank: Remittances prices worldwide quarterly, March 2022 (https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q122_final.pdf, accessed 20 June 2022).

²⁰ Sukriti Bansal, Philip Bruno, Florent Istace and Marc Niederkorn. A mixed year for the global payments industry. McKinsey & Company, 1 September 2016 (<https://www.mckinsey.com/industries/financial-services/our-insights/a-mixed-year-for-the-global-payments-industry>, accessed 17 December 2021)

Moving money should be like making a phone call: an individual should be able to send money to anyone, anywhere, just as they could call anyone with a phone. Telephone calls were one of the first technologies to become interoperable, as people quickly realized it would be limiting to only call others within the same network.

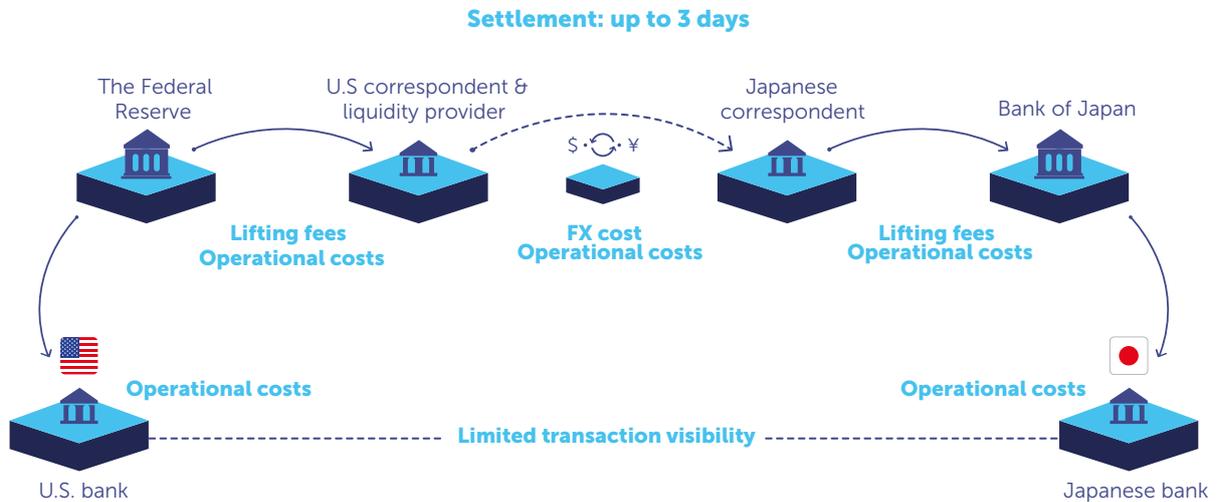


Figure 2. The way payments work today. Multiple separate layers that result in high operational cost, high settlement risk and liquidity management risk.²¹

FX = foreign exchange

While migrants seldom use banks to remit money, their RSPs primarily rely on banks to move money for them. Banks are part of payment networks and each payment network—either in the same country or across borders—has a central counterparty with its own unique or proprietary technology and compliance management, making interoperability between networks challenging. To access broad reach in payments, banks must join numerous networks, which each require integration costs, prefunded transaction accounts and ongoing maintenance (Figure 2). This is an expensive and resource-intensive model. Further many banks lack the size, resources or payment volume to justify direct integration in multiple networks, and so they must rely on correspondents to access other domestic or cross-border networks.

Relying on numerous intermediaries requires maintaining prefunded transaction accounts and introduces additional costs and counterparty risks. If these costs and risks are not feasible, a bank cannot access the network and in some cases access is denied if the risk is too high (known as de-risking). These conditions have created high barriers to entry, resulting in a fragmented system with reliance on intermediaries.

Over the last five years, a lot of progress has been made towards creating real-time payment

²¹ The Financial Stability Board's 'Enhancing Cross Border Remittances – Stage 1 Report to G20' defines the existing frictions in the market for international remittances. Among others, these frictions include fragmented data standards or lack of interoperability; complexities in meeting compliance requirements, including for anti-money laundering and countering the financing of terrorism and data protection purposes; different operating hours across different time zones; and outdated legacy technology platforms.

(RTP) systems on a domestic level, with 60 countries now live with real-time payments.²²

The next step is currently underway in the form of bi-lateral linkages. For example, domestic RTP systems in Southeast Asia have successfully launched linkages in several key corridors like Singapore and Thailand. The trend for bilateral and multilateral linkages of RTP systems continues, including Project Nexus developed by the Bank of International Settlement Innovation Hub.

However, even when this happens, inefficiencies will remain because RTP systems are one channel to make payments. Unless other networks can interconnect, such as the card networks, SWIFT, Ripple etc., we will not achieve full efficiency. Using the email analogy, the equivalent would be connecting email addresses issued by Internet Service Providers only and not other email providers.

A new standard, ISO 20022, has emerged as a common messaging standard. Whilst the remittance industry is fast adopting this standard, it is only one part of the payment stack and not a complete solution.

New technologies such as the Blockchain have a lot of great advantages, but sometimes those advantages can be misused in ways that often have not been thought about, resulting in unintended consequences.

An open regulated global payments inter-network might eventually make it easier to discriminate against migrants, especially those who are undocumented. It might also make it easier for countries to tax remittances. Eventually, such risks associated with an open regulated global payment inter-network are expected to be outweighed by the benefits; but each risk will need to be considered as different components of a global payment inter-network develop.

Project Nexus: a blueprint for instant cross-border payments

Nexus is a model for connecting multiple national payment systems into a cross-border platform that could enable international payments to happen as quickly as sending a text message.

More than 60 countries already have instant (or “fast”) payment systems that allow people to send money to each other within seconds. However, sending money abroad is often still slow and expensive. Connecting these national systems internationally, through Nexus, could improve the speed, cost and transparency of cross-border payments.

The BIS Innovation Hub has developed this blueprint through 30 workshops with instant payment system operators, central banks, and large banks who are active in foreign exchange markets and cross-border payments.

²² FIS Global, “Flavors of Fast 2020”, report on the global real-time payment trends transforming money movement.

PAYMENT LAYERS

There are currently six payment layers that are integral to any payment system (Figure 3):

1. **Application interface:** digital (mobile app, payment card, internet banking) or over the counter.
2. **Regulated payment service provider:** banks/remittance service providers (RSPs), etc.
3. **Compliance:** all providers check the transaction against their compliance requirements (e.g. know your customer (KYC), anti-money laundering (AML), Combating the Financing of Terrorism, and anti-bribery corruption (ABC) and sanction checks), often using external providers.
4. **Messaging:** a transfer of information in an agreed upon (unified) format (e.g. ISO 20022).
5. **Clearing:** the process of updating the accounts of the trading parties, accounting for taxes, fees and exchange rate adjustments.
6. **Settlement:** the actual exchange of money between the service providers serving senders and recipients.



Figure 3. The six payment layers that are integral to payment systems

The following section describes how these six payment layers currently work for international remittances.

1. Application interface: digital (mobile app, internet banking) or over the counter

There are two ways to send money. The first is assisted sending, which is done in-person over a counter (at a bank or money transfer agent), and the second is self-served sending,²³ which is carried out digitally (via a mobile app or website provided by a bank or remittance service provider (RSP), including fintechs).

²³ Digital transactions can be informally assisted, such as by a family member or friend.

There are several problems with the application interface.

- User interface (UI) and user experience (UX) vary widely and are often onerous and cumbersome. Swish (Sweden) is a good example of a UI/UX that applies to multiple banks, rather than each bank having their own UI/UX, as is the case with Paym (UK) and in many other countries where digital uptake has been poor.
- Applications with good UI/UX have different approaches, meaning they are not completely intuitive when switching from one to another.
- UI/UX complexities require further education of the end user. To move millions of people to digital transfers, simplicity is required. An example of simplicity is the green and red phone buttons on a mobile device, which are universally recognized as green to answer a call and red to end it.

Most interfaces that have achieved scale are either provided by one provider (e.g. Microsoft Windows) or by multiple providers who converge (e.g. internet browsers) by following similar standards. Instant messaging apps all look very similar even though they are not standards-based. But by copying each other, the major messaging apps have converged. This is not the case with payments. Banks offer too many products to make remittances the focus on their apps. As a result, a new layer has emerged, the Payments Initiation Service Provider (e.g. Google Pay or GPay), which sits between the user and the user's bank. Whilst this additional layer has proved successful in some markets, banks want to control the UX for commercial reasons.

2. Regulated payment service provider

Application layers are provided by regulated payment service providers (banks, RSPs, MTOs, mobile money providers, fintechs, etc.). In international remittances, there are several providers involved in a transaction. The send-side provider on-boards and services the migrant, while the receive-side provider terminates the transfer to the beneficiary in the receive country. In rare cases, the send-side and receive-side providers are the same. Often, there are intermediaries between the send-side and receive-side providers, introducing complexity to the payment process.

Due to the nature of regulation, it is extremely difficult for one provider to be present in all send and receive markets. As such, regulation benefits large players with the capacity to adapt to multiple regulatory environments. However, even if a provider achieves this kind of scale, monopolistic problems arise. Interoperability is therefore essential; the ultimate goal is for a provider to enable their customers to send funds to anyone, anywhere in the world. To return to the email example, to send an email, one person only needs to sign up with one email provider to be able to send an email to anyone with an email address anywhere in the world, rather than signing up to multiple email providers depending on which country the recipient lives in, which is still the case for money transfer.

Once a regulated payment service provider has captured the request from their customer via the application interface, the money must be delivered to the recipient. The next four steps describe how this happens.

3. Compliance

Compliance is defined as conformity in fulfilling official requirements.²⁴ Compliance in payment transactions is particularly complex for international remittances, as providers must comply with the requirements of at least two sovereign nations.

In the aftermath of the 2001 9/11 terrorist attacks, financial compliance became a serious matter for regulators and other concerned parties, which led to the introduction of stringent measures and penalties for non-compliance.

KYC is a standard practice for allowing providers to identify the customer they are working with and ensure that the customer is who they say they are. A major benefit of KYC is the reduction of fraud.

Money laundering is the act of illegally passing obtained funds through a complex system to make the funds appear legitimate and legal. AML refers to the laws, regulations and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income. Providers enforce AML mandates by analysing financial transaction reports, identifying suspicious transaction reports, ensuring compliance of reporting entities, and researching trends and patterns in money laundering.

While AML actions are intended to prevent and combat cleaning gains and money from illegal activities, combating the financing of terrorism (CFT) aims to investigate, analyse, deter and prevent sources of funding for activities aimed at achieving political, religious or ideological goals. AML and CFT target different sources of funding: money laundering always involves the proceeds of illicit activity, whereas terrorist financing implies using funds for illegal political purposes, but the money is not necessarily generated in an illicit manner. Broadly, AML actions help to reduce crime, whereas CFT actions help to limit the funding of terrorism activities.

Bribery and corruption are an unfortunate and growing reality that has resulted in anti-bribery and corruption (ABC) and sanctions checks, which include politically exposed persons (PEP). Currently, regulations require each provider and financial intermediary to perform checks and meet compliance requirements. This means that for one transfer, the same checks are performed multiple times, thereby increasing the cost of the transfer. In addition, differences in national legislation on compliance requirements increase the complexity for cross-border payments. Because every actor in the chain must carry out CDD checks, complexity and costs increase with every additional intermediary in the chain. As such, the complexities in cross-border payments are being addressed by multiple building blocks in the G20 roadmap for enhancing cross-border payments.

²⁴ Merriam-Webster dictionary.

4. Messaging: transfer of information in an agreed format

Messaging standards specify the technical aspects of sending messages so that one software programme can exchange information with another and have that information ‘understood’ by the receiving machine.

For decades, the formats supporting high-value and cross-border payments have been fractured. A lack of interoperability due to different standards and formats has resulted in significant delays and inefficiencies in processing payments. Now, the world is moving towards one common global and open standard for payments messaging: ISO 20022. Global adoption of this standard is accelerating, with a number of payment market infrastructures already live and more planned to go live by 2023.

The lack of common business terminology has been a key challenge across payment types, which ISO 20022 is addressing through a globally accepted standard. It offers significant enhancements over the proprietary legacy clearing standards that have dominated until now.

The G20 cross-border payments roadmap advocates for the adoption of common message formats, with emphasis on the harmonized version of ISO 20022, which can play an important role in the interlinking of payment systems and, more generally, addressing data quality and quantity restrictions in cross-border payments.²⁵ More importantly, the new standard allows banks and payment participants to include significantly more contextually relevant data on a payment. Among other benefits, this provides rich structured party data and extended remittance information and allows for special characters and expanded character sets.

ISO 20022 is quickly becoming the global language for financial messaging. However, it is not the only standard, especially when considering low-value payments. The GSMA Mobile Money Application Programming Interface (API)²⁶ (an initiative developed through collaboration between the mobile money industry and the GSMA) was launched in 2016 primarily because each platform provider had their own bespoke way of communicating. ISO 20022 and UK Open Banking²⁷ (PSD2)²⁸ were reviewed and deemed unsuitable for mobile money, as they came at a price of increasing complexity and client implementation cost; thus, a simpler standard was developed to meet the needs of, and reflect different use cases for, mobile money providers and has already been adopted by a range of mobile money providers across Africa, Asia and Latin America.

²⁵ Bank for International Settlements, “Enhancing cross-border payments: building blocks of a global roadmap”, Committee on Payment and Market Infrastructures, Stage 2 Report to the G20, July 2020 (<https://www.bis.org/cpmi/publ/d193.pdf>, accessed 14 December 2021).

²⁶ Viji Pathy, Bart-Jan Pors and Gareth Pateman, “Why is there a need for GSMA Mobile Money API Specification? A comparison with other industry standards”, GSM Association, London, United Kingdom, 2020 (www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/07/Why-is-there-a-need-for-GSMA-Mobile-Money-API-Specification.-A-comparison-with-other-industry-standards.pdf, accessed 14 December 2021).

²⁷ Open Banking Limited, “The Future of Financial Services (www.openbanking.org.uk, accessed 14 December 2021).

²⁸ Payments Service Directive 2 (PSD2) is a European regulation for electronic payment services.

Some providers have built their platforms to cater to both ISO 20022 and the GSMA standards. This bodes well, as it allows them to easily integrate with other providers who use either standard.

Account addressing

Messaging standards are 'behind the scenes'; they are not visible to customers. However, customers need to supply basic data to help providers identify the customer's intended recipient of the funds. This is known as account addressing. Currently every payment system has its own unique way of identifying the payee and the payer. Some use national identification (ID) numbers while others use mobile numbers or aliases, which leads to the need for complex conversion and translation of payment data. More importantly, these payment systems are not interconnected. In the past, there have been several attempts to standardize account addressing, with the IBAN making the most progress.

In 2011, India attempted to develop a mobile-number-based account addressing mechanism by creating a Mobile Money Identifier (MMID): a seven-digit code issued by a participating bank to their mobile banking customers for using the country's Immediate Payment Service. A customer could have different MMIDs for different accounts, all linked to a single registered mobile number. Therefore, to send funds to a beneficiary, the customer needed their mobile number and the MMID for the beneficiary's account. Unlike the sort codes used in Europe or American Bankers Association (ABA) numbers used in the United States, the MMID was generated by the participating bank unique to each customer and was not a common identifier for the bank. This proved too complex for customers and its uptake was very low.

In 2016, India made another attempt to standardize account addressing with the launch of their Unified Payment Interface (UPI), by introducing a virtual payment address (VPA): a unique identifier that helps UPI track a beneficiary's account. The VPA acted as an ID independent of the beneficiary's bank account number and other details. A VPA could be used to make and request payments through UPI-enabled apps. Customers did not need to enter the beneficiary's bank account details repeatedly when making multiple payments.

A typical VPA takes the form of 'abc@bankname'. Generally, a primary default VPA will be set by the UPI app. The 'abc' part of the above example can be anything, such as a name (like a Twitter handle) or a registered mobile number (the default). The 'bankname' in the example is the name of the beneficiary's bank, the name of the bank the app is associated with, or just the word 'upi'. For example, 'george@hdfcbank', 'anjali@upi' and '123456789@ybl', would be typical VPAs.

On the surface, VPA seemed well designed; however, it proved too complex for customers and the uptake was low. This should not be confused with the uptake of UPI, which has been a huge success, mostly because 96.2 percent of the transactions were done with one of three major providers,²⁹ out of over 66 providers. In fact, major providers tend to benefit from hiding the customer's VPA so that they transact on-net (within their platform) versus sending funds to a user on another UPI app, even though full interoperability exists within UPI.

29 Source: [PhonePe Maintains Lead In UPI With 49% Market Share In Jan 2022, WhatsApp At 0.02%](#)

While the sender likely knows the mobile number of the beneficiary, they cannot easily discover the second part of the VPA that comes after the @ symbol. Asking the beneficiary for the name of the bank does not solve the problem; for example, if the beneficiary banks with the State Bank of India, the sender needs to know that they should add '@sbi' after the mobile number, which is not obvious. To add further complexity, if the beneficiary who banks with the State Bank of India is using a third-party UPI app, they will need to provide the @bank_name of the third-party provider, not their own bank.³⁰ Even people familiar with this type of financial transaction may find this system challenging.

Other faster payment systems around the world allow customers to choose an alias. This could be a mobile number, email address or a username. However, considering that too many options can cause confusion, perhaps a standardized alias could be helpful.

5. Clearing: the process of updating the accounts of the trading parties

Once a regulated RSP has received instructions from a migrant to send funds and is in receipt of those funds, clearing is the next step. The transfer has been through the compliance requirements and messaging standards described above, and the RSP has sent a message to its financial intermediary that is then sent on the beneficiary's bank.

The Committee on Payments and Market Infrastructures (CPMI) glossary defines clearing as "the process of transmitting, reconciling and, in some cases, confirming transactions prior to settlement, potentially including the netting of transactions and the establishment of final positions for settlement". There are two types of clearing: (i) bilateral clearing and (ii) central clearing. In bilateral clearing, the parties to the transaction undergo the steps legally necessary to clear the transaction. Central clearing uses a third-party—usually a clearinghouse—to clear transactions.

Simply put, when a transaction has been cleared, money does not change hands (that is the next stage: settlement), but the records of the two parties have been updated. For example, a bank in one country ('Mars Bank', say) is sending \$1,000 to a bank in another country ('Venus Bank', say). Venus Bank updates its records to show that Mars Bank owes it \$1,000, and Mars Bank updates its records to show that it owes Venus Bank \$1,000. As such transactions keep happening, the records are constantly updated.

6. Settlement: the exchange of money

Funds are settled using three methods:

1. deferred settlement (involves counterparty credit risk)
2. prefunded transaction accounts (known as 'nostro' accounts)
3. real-time settlement (typically settled by central banks).

³⁰ NPCI, "UPI 3rd Party Apps" (www.npci.org.in/what-we-do/upi/3rd-party-apps, accessed 14 December 2021).

Using the examples of Mars and Venus banks (from the clearing section above), normally at the end of a defined period, the two banks will settle up by making one payment to cover the net amount owed. This is called a 'deferred settlement' and it involves counterparty credit risk (i.e. if Mars Bank is insolvent, it cannot make the payment to the Venus Bank).

To avoid counterparty credit risk, a prefunded transaction method was devised. In this method, Mars Bank would make a large advance payment to Venus Bank. However, there is counterparty risk here too, because Venus Bank could become insolvent and be unable to make the pay-outs requested by Mars Bank. To reduce this risk, transaction accounts are often held at a third bank ('Jupiter Bank', say), which is typically a large reputable bank in a developed country. When it is time for Mars and Venus banks to settle, Mars Bank asks Jupiter Bank to transfer the funds to Venus Bank's account held at Jupiter Bank – these accounts are known as 'nostro' accounts (counterparty risk remains as Jupiter Bank could become insolvent, but is largely reduced).

For international remittances, the prefunding model is widely used. This means that globally there is somewhere between \$5–15 trillion in transaction accounts. Current RSPs have a number of local currency transaction accounts around the world ready to make domestic payments and then rebalance their float. This model is expensive and risky due to exposure to foreign exchange losses, and it is one of the biggest drivers of cost, along with compliance, especially for smaller corridors.

Further, if funds in a particular prefunded account run out, transactions cannot be cleared. These transactions fail and are returned due to insufficient funds, like when a person writes a cheque to someone without the necessary funds in their account to cover the cheque.

Real-time gross settlement or RTGS is a settlement mechanism that allows for the instantaneous transfer of money and/or securities. Settlement in "real time" means a payment transaction is not subjected to any waiting period, with transactions being settled as soon as they are processed. "Gross settlement" means the transaction is settled on a one-to-one basis, without bundling or netting with any other transaction. Once completed, real-time gross settlement payments are final and irrevocable. In most countries, the systems are managed and run by their central banks as it is seen as critical infrastructure for a country's economy. RTGS systems are typically available to large national banks, while smaller banks and non-bank payment services providers access RTGS via an agent bank. In 2017, the Bank of England opened direct access to a new generation of non-bank Payment Service Providers, by allowing them to apply for a settlement account in the Bank's RTGS system.

Case study: Pan-African Payment & Settlement System (PAPSS)

Pan-African Payment & Settlement System (PAPSS) is a new payment system designed to supercharge cross-border trade in Africa. It was conceptually launched by Afreximbank in July 2019 at an African Union summit in Niger and went live in January 2022.

The commissioning of PAPSS follows a successful pilot phase in the six countries part of the West African Monetary Zone (WAMZ). Since then, 22 commercial banks – many with a pan-African reach – and six payment switches have signed up to the system.

Transactions are processed in near-real-time (within 120 seconds), with compliance, legal and sanctions checks performed instantly within the system. PAPSS uses a unique settlement model, where participants pre-fund only in their local currency. PAPSS then ensures prompt settlement within 24 hours via net settlement across all participating central banks using their RTGS systems, which occurs at the same time – 11.00 UTC – each day.

By settling transactions in African currencies, the goal of this platform is to reduce Africa's dependency on hard currencies like the dollar and euro. Previously, over 80 percent of African cross-border payment transactions originating from African banks had to be routed offshore for clearing and settlement using international banking relationships, which is costly, inefficient (taking two to 14 days to complete) and acts as a barrier to intra-regional trade.

The benefit to participating financial institutions is two-fold, one liquidity efficiency as they maintain one pre-funded account rather than several and two, reduced currency exposure of maintaining several pre-funded Nostro accounts.

PAPSS is now engaged in advanced discussions with other national and regional institutions to rapidly expand continent-wide connectivity. Afreximbank provides settlement guarantees on the payment system and overdraft facilities to all settlement agents. To accelerate expansion and ensure settlement finality, Afreximbank has approved US\$500 million to support the clearing and settlement in West African Monetary Zone (WAMZ) countries. A further US\$3 billion will be made available to support the system's continent-wide implementation.

The development of a pan-African payments infrastructure has been made possible by some of the continent's leading institutions. The platform has been developed by Afreximbank, which also acts as the main Settlement Agent in partnership with participating African Central banks. The implementation of the infrastructure is taking place in collaboration with the African Continental Free Trade Area (AfCFTA) Secretariat with the endorsement of the African Union (AU).

THE PATH TOWARDS GLOBAL INTEROPERABILITY

Achieving interoperability with existing and new payment infrastructures requires coordination and collaboration between both the public and private sectors. The G20 roadmap for enhancing cross-border payments has 19 building blocks which are arranged into five focus areas, four of which (focus areas A to D) seek to enhance the existing payments ecosystem, while focus area E is more exploratory and covers emerging payment infrastructures and arrangements. More than half of the 19 building blocks relate to harmonizing, standardizing and applying common features to payment systems, and is critical to achieving interoperability. Building blocks 8 and 16, from focus areas B and D respectively are future-looking and are the focus of this paper. To that end, the following section proposes ideas for three components that will enable an open regulated global payment inter-network.

The three components are, Account addressing, Tokenized compliance and Instant clearing and settlement (Figure 4):

		G20 Building Blocks	
Phase 1	Account addressing	Primary building blocks	Secondary building blocks
	<ul style="list-style-type: none"> A global distributed directory that will resolve identifiers for RSPs by informing an RSP who the MSISDN is pointing to, for example, +2547004422 points to KCB Bank in Kenya, and will return the Legal Entity Identifier and the IP address for KCB Bank. 	<p>Building block 16: Establish unique identifiers with proxy registries</p>	<p>Building block 6: Reviewing the interaction between data frameworks and cross-border payments</p> <p>Building block 13: Pursue interlinking payment systems</p> <p>Building block 17: Consider the feasibility of new multilateral platforms and arrangements for cross-border payments</p>
	<ul style="list-style-type: none"> Compliance checks are performed at country-level and a signed token issued by one of several trusted compliance providers is shared internationally and accompanies the transaction, providing the status of compliance. 	<p>Building block 8: Foster KYC and identity information sharing</p>	
	<ul style="list-style-type: none"> Digital signed transactions allow RSPs to verify the authenticity of the transaction. RSPs will therefore be able to trust requests received over the open network. Real-time or near real-time settlement of funds using distributed ledger technology or CBDCs will reduce the cost of low-value transfers, by removing the need for prefunded transaction accounts. 	<p>Building block 19: Factor international dimension into CBDC designs</p>	

Figure 4. The three components or phases that will enable an open regulated global payment inter-network

CBDC = Central Bank Digital Currency; KCB = Kenya Commercial Bank; KYC = Know Your Customer; MSISDN = Mobile Station International Subscriber Directory Number; RSP = remittance service provider.

1. Account addressing

Account addressing, is the identifier that allows an RSP to resolve who they need to send the money to – vastly simplifying the UX.

CPMI building block 16 advocates for establishing unique identifiers with proxy registries. Global structures that generate digital unique identifiers for individuals and legal entities, and decentralized proxy registries that link unique identifiers with both payer and payee account information (in a standard format), would reduce processing errors and the need for complex conversion and translation of payment data. The Global Legal Entity Identifier (LEI) System (GLEIS) is one example of a unique identifier that enables third-party stakeholders to accurately connect their own unique identifiers to the LEI, providing interoperability across parallel identity platforms, which could be leveraged as a global unique identifier. Providing a globally standardized approach that supports national schemes (e.g. Singapore’s PayNow system uses an individual’s national digital ID and a company’s legal identifier as proxy for payments) for identification could expand beyond payments to end users and the wider economy if mass adoption is achieved throughout society. This would need to be balanced with due consideration of potential drawbacks and delivered in a way that avoids reinforcing existing inequities.³¹

Work on this building block is still at an early stage because of resource constraints, and the completion date for the initial action—an exploration of the scope for and obstacles to develop a global digital unique identifier for cross-border payments and potentially other financial transactions—has been extended from December 2021 to October 2022.

The Financial Stability Board (FSB) Financial Innovation Network has been conducting a wider analysis of developments in the use of digital IDs in the financial sector. A series of early bilateral outreach calls took stock of the scope and obstacles for a global digital unique identifier, including the LEI for legal entities. This work will inform the detailed analysis to be conducted by the workstream.

The next step for this work is to complete the exploration of the scope for a unique identifier by the new date of October 2022, to provide the basis for the subsequent stage of the building block, whose deadlines are being correspondingly extended.³²

UNCDF propose to use mobile numbers (Mobile Station International Subscriber Directory Number, MSISDNs) as the only primary account identifier to start with. While some people have multiple accounts, one account (bank, mobile money or monetary financial institutions) will default to one mobile number. The beneficiary will have the ability to change which account their mobile number defaults to (similar to an internet browser, where one is assigned

³¹ Bank for International Settlements, “Enhancing cross-border payments: building blocks of a global roadmap”.

³² Financial Stability Board, “G20 Roadmap for Enhancing Cross-border Payments: First consolidated progress report”, 2021 (<https://www.fsb.org/wp-content/uploads/P131021-1.pdf>, accessed 14 December 2021).

as the default). Additionally, if required, people can have multiple mobile numbers, one for each of their accounts to connect their multiple accounts to the network, which is the case in countries where mobile money is not interoperable.

Those with multiple bank accounts are currently served by IBANs and the Society for Worldwide Interbank Financial Telecommunications (SWIFT) network, and this will continue. These customers are not the target users of this system, although by using their mobile number they would also be able to participate in this global network by nominating one of their accounts.

Using the mobile number as an account identifier is very powerful: see WhatsApp versus Microsoft Network (MSN) messenger, for example. MSN messenger which was based on users' email addresses disappeared when it was not able to make the shift from desktop to mobile, while WhatsApp now has over two billion users. Further, using just numbers has major advantages, such as inclusion for those who are only numerate but not literate and for countries where English or the Roman script is not in use (e.g. Thailand).

The use of Mobile Station International Subscriber Directory Numbers (MSISDNs) as account identifiers for mobile money accounts

There are over 1.2 billion registered mobile money accounts across the globe.³³ The memorability of mobile numbers was a key enabler to helping mobile money gain traction. The convenience of being able to send funds to a contact, simply by inputting their mobile phone number, fuelled increased growth in adoption and usage.

Mobile money accounts are mapped 1:1 with the users' mobile phone numbers (MSISDN).

In total, there are 5.3 billion MSISDNs in circulation. As they include the country code, the number helps identify the country, and as most MSISDNs have an additional ten digits after the country code, up to 100 billion MSISDNs per country are allowed.

How it could work

Governed by a neutral body, an open regulated global payments inter-network will host a global distributed directory that will resolve identifiers for RSPs. RSPs will be given permission to add and update fields in the global directory, similar to the way the Internet Corporation for Assigned Names and Numbers' Domain Name System registry works for the internet.

³³ GSMA, Simon K. Andersson-Manjang and Nika Naghavi, "State of the Industry Report on Mobile Money 2021" (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report-on-Mobile-Money-2021_Full-report.pdf, accessed 14 December 2021).

The global directory will inform an RSP which bank the MSISDN is pointing to; for example, +2547004422 points to Kenya Commercial Bank (KCB Bank) and returns the LEI and internet protocol (IP) address for KCB Bank. The RSP will then let KCB Bank know that a payment to +2547004422 needs to be made for Ksh 100,000. KCB Bank will know that +2547004422 belongs to Mary Otieno and credit her account. If the number is ported to another provider—for example, the Commercial Bank of Africa (CBA)—the global directory is updated (by both KCB Bank and CBA).

The global directory will allow APIs to:

- register: link a user's MSISDN with an RSP
- lookup: query using a user's MSISDN and return the linked RSP's IP address
- deactivate: remove a user's MSISDN from the global directory
- port: change the RSP linked to an MSISDN.

Considerations

Whilst there could be serious ramifications for sending an email to the wrong person (depending on the confidentiality of the information), in most cases it is harmless. When it comes to payments, however, sending money to the wrong person can be an expensive mistake. Therefore, further checks will be needed to ensure funds are going to the correct person.

Separately, RSPs can share additional details to help ensure the funds reach the correct person, such as a name matching or confirmation of payee, which some countries have already implemented.³⁴ This is currently not envisioned in the account addressing layer, and more thought needs to be given to mitigate against user error, as this challenge currently exists for domestic and international networks, big and small.

Considerations need to be given to data protection, data privacy and data localization. In line with G20 cross-border payments building block 6: reviewing the interaction between data frameworks and cross-border payments, the FSB and their partners are currently conducting a stocktake of existing national and regional data frameworks relevant to the functioning, regulation and supervision of cross-border payment arrangements, and identifying issues relating to cross-border use of those data by national authorities and by the private sector. They will publish their findings in 2022.

For most migrants who send remittances, the receiver's mobile number is already known to them, but there could be a few edge cases where a receiver may not want to disclose their mobile number.

Lastly, cybersecurity implications must also be considered.

³⁴ Pay.UK launched [confirmation of payee](#) in 2020

Global Legal Entity Identifier Foundation (GLEIF)

Established by the Financial Stability Board in June 2014, the GLEIF is tasked to support the implementation and use of the Legal Entity Identifier (LEI). The foundation is backed and overseen by the Regulatory Oversight Committee, which represents public authorities from around the globe that have come together to jointly drive forward transparency within the global financial markets. GLEIF is a supra-national not-for-profit organization headquartered in Basel, Switzerland.

GLEIF makes available the Global LEI Index: the only global online source that provides open, standardized and high quality legal entity reference data. By doing so, GLEIF enables people and businesses to make smarter, less costly and more reliable decisions about who to do business with.

GLEIF is, by its statutes, agnostic to any particular commercial or political interests. As a result, GLEIF is uniquely positioned in the entity identification market.

GLEIF services ensure the operational integrity of the Global LEI System. GLEIF continuously increases both the information available within, and the quality of, the LEI data pool and makes public access to the information easier.

Thanks to the services provided by GLEIF, the LEI remains the industry standard's best suited identifier for providing open and reliable data for unique legal entity identification management.

GLEIF has endorsed the International Open Data Charter, which aims to foster greater coherence and collaboration to promote increased adoption and implementation of shared open data principles, standards and good practice across sectors around the world.

Case study: Visa Direct Overview

Visa Direct is a global network payment capability that enables payments to over 170 countries, with real-time push to card payments available. With a key set of capabilities, Visa Direct provides flexibility to connect to over 5bn cards and accounts around the world. The network provides optionality in facilitating money movement with true global reach for many use cases including remittances, domestically and cross-border.

While cross-border remittances have become much more digital, reaching new markets and opening up opportunities through cards and mobile payments, collecting and storing recipient card details has fast become a concern for remittance businesses. Visa Direct utilizes robust risk controls, and also offers value added services such as card tokenization and Alias Directory. These can have a huge positive impact on the remittance business as well as the sender, providing some peace of mind regarding the risk of card data fraud.

Understanding the needs of this diverse global client base has meant acknowledging the shift in interest towards 'alias' based transfers via a global directory of cards and bank accounts connected to alias data, such as a mobile number or an email address. Visa alias directory solution can match an alias to recipient payment credentials. Alias directory service can remove the complexities of finding and entering recipient payment details, and storing of financial data, instead only using a well-known 'alias' to perform the transfer. Visa can do the background work to connect the dots between the 'alias' and financial data from global banks.

However, these end points and value added services do still require both sender and recipient to be banked. To fill the gap and provide the unbanked/hard to reach population with the same set of capabilities, Visa Direct is working on creating a solution to send money to digital wallets globally. This solution, planned for launch in 2022, aims to provide access to an additional 3bn individuals across markets that were previously complicated to reach.

2. Shared tokenized compliance

CPMI building block 8 advocates for fostering know your customer (KYC) and identity information-sharing. In several jurisdictions, financial institutions have established, or are considering establishing, shared facilities for customer identification in the context of domestic or cross-border payments. These initiatives are likely to be implemented at a regional rather than a global level and require changes to legal and regulatory frameworks.

The implementation of this building block could be of particular interest to those groups of countries where (i) remittance flows between the participating countries are economically important, (ii) there is some compatibility in national data protection and privacy laws, and (iii) KYC/AML risks are similar. Such initiatives can help overcome the difficulties arising from identity and verification systems that are often not interoperable within or across jurisdictions.³⁵

The South Pacific central banks are investigating a possible regional KYC facility, which is targeted at low risk, retail remittances. Governors in the South Pacific region agreed in November 2020 to continue this work, but no commitment has yet been made to implement a regional KYC facility. The central banks of Australia, New Zealand, Tonga, Samoa, Solomon Islands, Vanuatu, Papua New Guinea, Timor and Fiji plus several multinational agencies are helping to support this work.

During 2021, the South Pacific central banks consulted with key banks and money transfer organizations in Australia, New Zealand and the Pacific about the design requirements and general viability of the KYC facility. The South Pacific central banks also consulted with government organizations in the Pacific as well as with the World Bank (WB), the International Monetary Fund (IMF) and other international organizations that are working on digital ID databases in the region.³⁶

³⁵ Bank for International Settlements, "Enhancing cross-border payments: building blocks of a global roadmap".

³⁶ Financial Stability Board, "G20 Roadmap for Enhancing Cross-border Payments: First consolidated progress report".

On 20 June 2022, the South Pacific Central Bank Governors reviewed work done by central banks and international agencies on the challenges and opportunities for remittances, and the potential to develop a regional electronic 'Know Your Customer' (eKYC) facility for the South Pacific region.

Governors decided to prioritize countries developing strategies for delivering their own eKYC capability. This work is part of their respective national digitalization, digital identity, and AML/CFT compliance work programs. The development of a regional eKYC facility may be considered as a possible extension of the national eKYC capabilities in the future.³⁷

Another concept to gain efficiency has been put forward by Deutsche Bundesbank's Amplus initiative, which includes KYC, AML/CFT, ABC, sanctions and PEP checks. It proposes to allow compliance to be completed at the country level (this also complies with data localization regulations, which mandate that personal identifiable data must be stored locally and not leave the country) and to be shared with all the parties in a transaction using a signed token, issued by trusted compliance providers, who record the compliance status that accompanies the transaction.

3. Instant clearing and settlement

Instant clearing

Today, clearing of transactions is instant. However, it happens in a trusted environment versus an open environment, and to create this trusted environment as it stands today, bespoke and bilateral integrations are required in most cases. One exception is SWIFT global payments innovation; however, whilst this serves 80 percent of the market it does not serve the long tail of low-value remittances.

Payment fraud more complex than spam email

Email has evolved over the years to fight bad actors, especially impersonators – also known as forged spam. As a result, when a person receives an email from john.doe@bank.com, they can have confidence that this email was sent from the said person from the bank.

A digital signature attached to an email message offers another layer of security by providing assurance to the recipient that the genuine sender—not an imposter—signed the contents of the email message. A person or organization's digital signature, which includes a certificate and public key, originates from their digital ID. That digital ID serves as a unique digital mark and signals to the recipient that the content has not been altered in transit. For additional privacy, the content of email messages can be encrypted.

Similarly, each RSP can be provided with a digital signature, which other RSPs can use to verify the authenticity of the transaction. RSPs will therefore be able to trust the request they receive over the open network. This is integral to the clearing process.

³⁷ Reserve Bank of Australia, Joint Media Release June 2022, (Available at <https://www.rba.gov.au/media-releases/2022/mr-22-18.html>)

Instant settlement: real-time or near real-time

In the future, the same money sent by the sender will be the money received by the receiver. This means MTOs will not have to prefund accounts, as the funds they receive from the sender will be the funds they transfer to the receiver. This will require settlement to happen in real-time or near real-time, something that is already common with, but not unique to, blockchain networks. As a result, MTOs will experience savings from not needing to provide extra liquidity (prefunded accounts).

Blockchain networks have two advantages over existing payment networks: (i) blockchains are transparent – by using distributed ledgers, everyone has a copy of the transactions; and (ii) blockchains are intentionally designed to be practically immutable, i.e. nobody (in theory, at least) can modify the blockchain's 'distributed ledger' of all committed blocks. It is important to note that blockchain is not the only solution to real-time or near real-time settlement of funds.

The Society for Worldwide Interbank Financial Telecommunication (SWIFT)

SWIFT is a global, member-owned cooperative and the world's leading provider of secure financial messaging services. It provides its community with a platform for messaging and standards for communicating and offers products and services to facilitate access and integration, identification, analysis and regulatory compliance.

SWIFT provides critical infrastructure that supports the global economy, connecting 4 billion accounts and more than 11,000 financial institutions across 200 countries and territories. SWIFT prioritizes security, reliability, and resiliency.

While SWIFT does not hold funds or manage accounts on behalf of customers, it enables its global community of users to communicate securely, exchanging standardized financial messages in a reliable way, thereby supporting global and local financial flows, as well as trade and commerce all around the world. SWIFT members then determine who they do business with based on their own parameters and requirements.

In 2017, SWIFT launched Global Payments Innovation (gpi), a new initiative to improve the experience of making a payment via the SWIFT network for both customers and banks. SWIFT gpi combines the traditional SWIFT messaging and banking system with a new set of rules. While SWIFT gpi is still a correspondent led service, it enables financial institutions to send and receive funds quickly and securely to over 4,283 financial institutions with full transparency over where a payment is at any given moment. SWIFT gpi processes payments of over \$577 billion per day which are made in over 152 currencies across more than 3,072 country corridors.

SWIFT Go is for financial institutions to enable their SME and retail customers to send fast, highly secure, and competitively priced low-value cross-border payments directly from their bank accounts. Live since July 2021 in pilot mode, it has 13 live banks with over 200 banks around the world signed up.

What is blockchain/distributed ledger technology (DLT)?

DLT is a novel and fast-evolving approach to recording and sharing data across multiple data stores (or ledgers). This technology allows transactions and data to be recorded, shared and synchronized across a distributed network of different participants.

A 'blockchain' is a particular type of data structure used in some distributed ledgers that stores and transmits data in packages called 'blocks' that are connected to each other in a digital 'chain'. Blockchains employ cryptographic and algorithmic methods to record and synchronize data across a network in an immutable manner.

For example, a new digital currency transaction would be recorded and transmitted to a network in a data block, which is first validated by network members and then linked to an existing chain of blocks in an append-only manner, thus producing a blockchain. As the linear chain grows when new blocks are added, earlier blocks cannot retrospectively be altered by any network member. Note that not all distributed ledgers necessarily employ blockchain technology, and conversely, blockchain technology could be employed in different contexts.

For a more in-depth understanding, see the World Bank's DLT and blockchain report at <http://bit.ly/wb-dlt>.

Various blockchain solutions are emerging, such as from Ripple, Stellar, Celo, Roxel, Deim and Waves. Whilst the most blockchain networks are open and decentralized, the native coins that run each network are held by a minority. Moreover, it is critical that these different chains find a way to interoperate, and work on this front is underway. When it comes to money and payments, there are good reasons why associations such as SWIFT have played a key role.

Case study: East-African based Leaf Global

Leaf Global has developed a simple digital wallet for refugees that helps them securely store and use their money on the Stellar blockchain without the need to use a smartphone. Refugees and migrants from Uganda and Rwanda living in Kenya can send funds across borders using a basic mobile phone.

Leaf Global works with all major mobile money providers in the countries where they have launched. That means that users can send and receive money across borders using just a mobile number.

Case study: cLabs launches Valora built on the Celo network

Valora was inspired by the idea that everyone should have full control of their money—without being beholden to intermediaries—and that sending money should be as easy as sending a text message.

Launched in February 2021, Valora reliably sends and receives value from anywhere in the world, easily and instantly, for as little as \$0.01 per transaction, making international money transfers cost effective and accessible to anyone with a mobile phone. And because transactions run on the Celo blockchain platform, transferring funds globally is fast and secure.

Whilst Valora uses mobile numbers to send funds from one Valora account to another, all users need to be onboarded on to Valora, which is a closed loop. Valora runs on cUSD, a US dollar stablecoin. However, getting your funds in to cUSD and out to another currency comes with additional costs.

What is a stablecoin?

Stablecoin is a class of cryptocurrencies that attempt to offer price stability and are backed by a reserve asset. Stablecoins have gained traction as they attempt to offer the best of both worlds: the instant processing and security or privacy of payments of cryptocurrencies, and the volatility-free stable valuations of fiat currencies.

While the technology exists (and not just blockchain/distributed ledger), the modality, the governance, and the neutrality (a trusted global body) need to be addressed (Figure 5).



Figure 5. The current and future environment for settlement of funds real-time or near-real time

CMPI building block 19 explores factoring an international dimension into the Central Bank Digital Currency (CBDC) design. To date, no major jurisdiction has launched a CBDC, and many design and policy decisions are still unresolved. Nonetheless, central banks recognize that the implications of CBDCs go well beyond national borders, highlighting the need for multilateral collaboration on macro financial questions and the importance of interoperability between CBDCs.

As an initial action, the CPMI, in collaboration with the BIS Innovation Hub, IMF and WB, conducted a stock take of provisional domestic CBDC designs and central bank experimentation to determine the extent to which they could be used for cross-border payments. Central banks have started collaborating on several projects and studies to consider internationally coordinated CBDC arrangements to enhance cross-border payments. The report goes beyond a simple stock take and sets out conceptual models of how CBDC could operate beyond borders. In addition, IMF, in cooperation with other relevant stakeholders, analysed international macro financial implications of cross-border CBDC use.

The analysis also concluded that enhancements in, for example, regulatory, supervisory and oversight frameworks for cross-border payments; AML/CFT consistency; payments versus payments adoption; and access to payment systems will be critical for CBDCs to reach their cross-border potential. The resulting report was delivered to the G20 ahead of the Finance Ministers and Central Bank Governors meeting on 10 July 2021.

As a next step, the CPMI, in collaboration with the Bank for International Settlements (BIS) Innovation Hub, IMF and WB, will identify and analyse options for access to and interlinking of CBDCs that could improve cross-border payments.³⁸

Interledger: open and inclusive payments

The Interledger Protocol provides for routing payments across different digital asset ledgers while isolating senders and receivers from the risk of intermediary failures. Secure multi-hop payments and automatic routing enables a global network of networks for different types of value that can connect any sender with any receiver.

However, the Interledger Protocol is intentionally limited in scope to provide the functions necessary to deliver a payment from a source to a destination over an interconnected system of ledgers. It includes minimal requirements for underlying ledgers, and it does not include public key infrastructure, identity, liquidity management, or other services commonly found in payment protocols.

The Interledger Protocol is managed by the Interledger Foundation, a non-profit

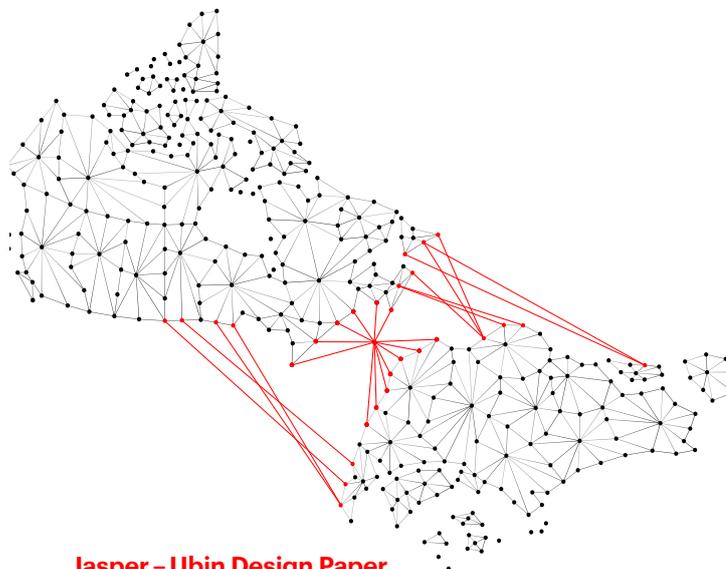
³⁸ Financial Stability Board, "G20 Roadmap for Enhancing Cross-border Payments: First consolidated progress report"

advocate for the web that promotes innovation, creativity, and inclusion by advancing open payment standards and technologies that seamlessly connect our global society. It is currently funded by Coil and Ripple, two private sector companies whose executives sit on the board of the foundation.

Case study: enabling cross-border high value transfer using Distributed Ledger Technologies (DLTs)

In 2016, two central banks, Bank of Canada and Monetary Authority of Singapore, embarked on Project Jasper and Project Ubin, respectively, to explore the use of DLTs for the clearing and settlement of payments and securities. They published a report that describes how the Jasper and Ubin prototype networks, developed on different blockchain platforms, were able to interoperate, allowing for cross-border payments to be settled on central bank digital currencies, which in turn enabled greater efficiencies and reduced risks.

The collaboration between the two central banks has successfully proven the ability for settlement of tokenized digital currencies across different blockchain platforms. The projects (Jasper and Ubin) focus on the use of blockchain technology for high-value cross-border payments.



Jasper – Ubin Design Paper

Enabling Cross-Border High Value Transfer Using Distributed Ledger Technologies

Powered by: **accenture**  **J.P.Morgan**

CONCLUSION

Today, unlike email, remittances are not interoperable. It is not possible to send money from one network to another, such as from Western Union to MoneyGram. Currently, RSPs receive money in the origin country and then pay it out from a prefunded bank account in the destination country (as described above). To do this, RSPs send a message to the bank in the destination country, either via SWIFT (this is getting faster) or through direct API connectivity with the destination bank. However, each integration is time consuming and expensive.

An open regulated global payments inter-network, leveraging and cultivating existing infrastructure and governed by a trusted neutral entity will allow any RSP to send money to anyone, anywhere on the network. It will significantly speed up total interoperability, reduce the cost of transactions and provide users with an easy way to transfer money digitally. This global inter-network would be open to all regulated RSP transacting domestically or internationally.

Now, imagine you wanted to become a new email provider and you had to build your network, connecting to Gmail, Microsoft Exchange, AOL and the thousands of email providers. This is the state of play when it comes to cross-border remittances.

An open regulated global payments inter-network in reality is a highly interoperable network of networks that works seamlessly and without prejudice just like the Internet, allowing an RSP to be connected to everyone on the inter-network. Several private sector companies have built their own networks, and getting these networks to interoperate is a key success factor. Some are more open to the idea, others less so. Ultimately it boils down to trust.

In summary, this paper highlights the need for:

- a trusted neutral entity to govern interoperable infrastructure
- use of phone numbers as account identifiers (proxy aliases)
- an increased efficiency in the way compliance is managed
- a reduction in the number of intermediaries involved in a transaction
- faster and more transparent settlement.

For various reasons, it is difficult for the private sector alone to come together themselves and connect all of their respective networks, some efforts are underway but it remains a piecemeal approach. UNCDF aims to convene the remittance and broader financial services industries to help the FSB and CPMI build on the G20 roadmap for enhancing cross-border payments.



Unlocking Public and Private
Finance for the Poor

LEAVING NO ONE BEHIND IN THE DIGITAL ERA

The UNCDF Strategy 'Leaving no one behind in the digital era' is based on over a decade of experience in digital finance in Africa, Asia, and the Pacific. UNCDF recognizes that reaching the full potential of digital financial inclusion in support of the Sustainable Development Goals (SDGs) aligns with the vision of promoting digital economies that leave no one behind. The vision of UNCDF is to empower millions of people by 2024 to use services daily that leverage innovation and technology and contribute to the SDGs. UNCDF will apply a market development approach and continuously seek to address underlying market dysfunctions.

THE UNITED NATIONS CAPITAL DEVELOPMENT FUND

The United Nations Capital Development Fund makes public and private finance work for the poor in the world's 46 least developed countries (LDCs).

UNCDF offers "last mile" finance models that unlock public and private resources, especially at the domestic level, to reduce poverty and support local economic development.

UNCDF's financing models work through three channels: (1) inclusive digital economies, which connects individuals, households, and small businesses with financial eco-systems that catalyze participation in the local economy, and provide tools to climb out of poverty and manage financial lives; (2) local development finance, which capacitates localities through fiscal decentralization, innovative municipal finance, and structured project finance to drive local economic expansion and sustainable development; and (3) investment finance, which provides catalytic financial structuring, de-risking, and capital deployment to drive SDG impact and domestic resource mobilization.

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