

Think globally, settle locally? Multilateral platforms for cross-border payments based on distributed ledger technology

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ABSTRACT

Cross-border payments, especially between different currency areas, are still more expensive, slower and less transparent than domestic transactions. In addition to attempts to facilitate interoperability by harmonising message standards or legal frameworks, there is also the vision of using multilateral platforms to reduce existing inefficiencies. A particular focus here is on distributed ledger technology (DLT), which could create additional benefits beyond payment transactions, for example by facilitating broader economic activity by means of tokenised assets. Some private sector players, as well as international

organisations such as the International Monetary Fund and the Bank for International Settlements, have already developed concepts for DLT-based multilateral platforms. However, their realisation faces broader policy challenges that are unlikely to be solved per se with the help of new technologies. Although a global multilateral platform does indeed harbour great potential for efficiency gains, regional solutions are more likely to emerge that could be linked together to achieve efficiency gains at a global level.

Keywords: *cross-border payments, multilateral platforms, distributed ledger technology (DLT), digital money, central bank digital currency (CBDC), foreign exchange, central banks*

INTRODUCTION

From a consumer perspective, a cross-border payment is often seen as a 'black box'. The process itself lacks transparent information on the payment route, the intermediaries involved, the duration and the associated costs. Moreover, there are few mechanisms in place to trace the progress of the transfer. To exacerbate the situation, the service provider of the payer is just one component of a broader supply chain, adding complexity and making it challenging to intervene in the process.



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To address issues such as these and thereby improve cross-border payments, the payment sector has been exploring the development of multilateral platforms based on distributed ledger technology (DLT). DLT could eliminate the need for numerous intermediaries and, coupled with its ability to provide a single source of truth, may have the potential to revolutionise cross-border transactions. As such, this technology could serve as the cornerstone of more efficient, transparent and secure cross-border payments.

At the same time, however, greater potential efficiency appears to go hand in hand with greater challenges. This is due to specific challenges associated with operating multilateral platforms based on DLT. Additionally, the hurdles faced when processing a cross-border payment do not necessarily stem from the choice of technology, but rather from policy questions that affect all types of platforms.

This paper illustrates how multilateral platforms utilising DLT could contribute to a more efficient and conducive global payments landscape. The study also demonstrates that the primary causes of frictions in cross-border payments cannot be addressed simply by adopting a different technological foundation. For this purpose, concepts for multilateral platforms are evaluated against their potential efficiency gains and the challenges involved.

STATUS QUO IN CROSS-BORDER PAYMENTS

While the efficiency of domestic payments has improved significantly over the last few years — thanks in part to the introduction of faster payments in some jurisdictions — the efficiency of cross-border payments is still comparably low. This is due to frictions that affect all parts of the payment process.¹

Generally, the payment process can be divided into five major steps:

- (1) *Initiation*: Where the payer finds an intermediary to deliver the payment and secures funding.
- (2) *Validation*: Where data of the parties to the payment are gathered; compliance with regulatory standards, such as anti-money laundering (AML) measures and combating the financing of terrorism (CFT) provisions, is confirmed; and the format and content of the payment message are checked.
- (3) *Transmission*: Where the payment is transmitted along the payment chain, and payment data are converted to a different data standard, when necessary.
- (4) *Funding*: Where currency is exchanged (if necessary) and funds in the other currency are transmitted to the next participant in the chain.
- (5) *Reconciliation*: Where the payment is matched with the underlying payment transaction.

In cross-border payments, these steps are mostly processed by correspondent banks, although new, closed-loop solutions have arisen in the last few years, especially for remittances.

In its 2020 report, the Financial Stability Board identified seven main frictions affecting different parts of cross-border payment chains.² First of all, weak competition due to high barriers of market entry may limit choice and increase costs for the payer during the payment initiation stage. This may lead to long transaction chains, as incumbents may offer only a limited number of routing options and may only be able to serve some channels. This affects all stages of the payment process.

During the validation stage, fragmented and truncated data formats limit automated data processing and severely affect costs and the speed of transmission, due to the need for intervention that stands in the way of end-to-end straight-through processing. Furthermore, the complex processing of

compliance checks and differing regulation may prolong the payment process and increase costs for all participants.

During the transmission stage, legacy technology platforms with a main focus on domestic payments may hinder the uptake of new and more efficient ways to transmit payments, eg by relying on batch processing and lacking the capacity for real-time transaction monitoring (which in turns makes compliance checks more cumbersome). Furthermore, these platforms may have limited operating hours, which prolongs processing times when transmitting payments across multiple time zones. Although, limited operating hours are rather due to policy decisions instead of technical restrictions.

Finally, during the funding stage, the necessity to pre-fund multiple currencies along the long transaction chains outlined above may lead to high funding costs that are mainly borne by the payer.

In view of these shortcomings, the G20 launched an initiative in October 2020 to improve cross-border payment systems. In addition to building blocks that aim, for example, to achieve regulatory harmonisation and increase the service level of existing platforms, multilateral platforms were identified as a potential solution to reduce frictions in cross-border payments.³ A multilateral platform is a cross-border payment system that spans multiple jurisdictions, aimed at improving cross-border payments.⁴

OPPORTUNITIES AND CHALLENGES

Multilateral platforms, in general, have various potential avenues for enhancing cross-border payments. When combined with DLT, these platforms offer additional opportunities, especially with regard to alleviating the challenges inherent in cross-border transactions through the use of distributed ledgers, smart contracts, digital money and atomic settlement. However,

operating multilateral platforms based on this technology comes with its own set of challenges. Moreover, the development of such platforms typically encounters significant obstacles that may not solely stem from the technological choices made.

Friction reduction through multilateral platforms in general

New multilateral platforms could start with a clean slate. As such, they could use modern, harmonised payment messaging standards, addressing the friction associated with fragmented and truncated data standards. Furthermore, multilateral platforms could allow participants to pool liquidity on the platform. This might be more efficient than holding funds in individual currency pots at correspondent banks or participating in various domestic payment systems. Moreover, by facilitating direct access for a broader range of participants, multilateral platforms may have the potential to streamline long transaction chains by enabling direct payments between participants. This could lead to faster and more cost-effective payments as a result of delays and the additional funding required when payments rely on a chain of correspondent banks being eliminated. This might also enhance competition by enabling payment service providers (PSPs) to establish direct connections for cross-border services. A multilateral platform, with its capacity to monitor more transactions than individual participants, is well-positioned to detect anomalies, thereby aiding participants in complying with national AML/CFT regulations.⁵ Additionally, multilateral platforms could integrate know your customer (KYC) management systems that could help to transmit relevant data to the relevant parties. These could then check the data in accordance with their respective national regulation, without the checks taking place at platform level.⁶ Thus, AML/CFT as well as KYC requirements would still be based

on national legislation and not be harmonised by multilateral platforms.

Transparency and reduction in complexity through distributed ledgers

Cross-border settlement could become more transparent and streamlined through the implementation of DLT. Transaction data are recorded and stored via a distributed ledger, enabling the transfer of digital or digitally represented assets without intermediaries. This applies in particular to transactions involving many independent parties. In this context, ‘digital’ refers to the fact that data, assets and money are represented in the form of tokens. Depending on the design, possession and transfers of the tokens are visible to the parties involved, enhancing the transparency of the settlement process.⁷

Standardisation and automation through smart contracts

Smart contracts can standardise and automate various steps in the settlement process of a cross-border transaction. Smart contracts are programmed algorithms that technically implement the fulfilment of claims through verification and the subsequent independent execution of transactions.⁸ The usage of smart contracts reduces costs, saves time and enhances security by enabling the automation of business processes. They can also be used to automatically adapt the proprietary data formats of individual countries, or to establish new standards that can be utilised by all participants in the form of templates.⁹ In addition, they might facilitate more efficient processing of foreign exchange transactions.¹⁰

Seamless integration of digital money

One of the key innovations of DLT is that it enables the integration and instantaneous settlement of different values, including various forms of money. This eliminates the necessity for cross-system communication.

In this context, central bank money in digital form (hereinafter referred to as central bank digital currency, or CBDC for short) could play a major role. Central bank money is the settlement asset with the highest quality in terms of credit and liquidity risk and, as such, the preferred means for settlement in systemically important payment systems.¹¹ Given this fact, final cross-border settlement in secure central bank money could be integrated directly into the platform. The greatest efficiency gains for cross-border payments would be expected if central banks provided unrestricted access to central bank money for use on DLT-based platforms.¹² Nevertheless, this could have implications for the monetary policy of the participating countries, especially if there are significant fluctuations in or high demand for the domestic currency from abroad.¹³ This might lead central banks to refrain from providing central bank money on such a platform or to restrict access to a limited group of holders. As a result, participants might have to resort to private digital forms of money like stablecoins. However, this would significantly reduce the attractiveness of such a platform, as cross-border transactions and foreign currency exposures would still be associated with credit and liquidity risks with respect to the issuer of the stablecoin. The risks in this context could likely be significantly reduced by collateralising the stablecoin with central bank money. However, this would depend on the central bank’s willingness to provide the issuer of the stablecoin with a corresponding reserve account; an option that the Eurosystem currently excludes.¹⁴ In addition, stablecoin arrangements face a number of further challenges. These include the stablecoin arrangement’s network scale, any inconsistencies in its access to on-ramps and off-ramps, and a lack of regulatory consistency across jurisdictions. Many of these challenges may undermine trust in the stablecoin arrangement as a form of private money. Excessive use of stablecoins could

also be undesirable from the central bank's perspective. For example, central banks may need to consider how the widespread adoption of a stablecoin that is not denominated in the domestic currency might affect the central bank's ability to implement monetary policy. This could also entail risks to financial stability.¹⁵

Risk reduction through atomic settlement

Irrespective of the forms of money in use, the utilisation of multilateral DLT platforms has the potential to contribute to eliminating a primary risk in cross-border payments and associated currency exchanges: settlement risk. The risk here is that the counterparty in foreign exchange spot and forward transactions may not be able or willing to fulfil obligations, even though the counter transaction has already been performed. By using programmable functionalities, DLT can ensure atomic settlement, meaning that the two currency legs of a trade are settled on an all-or-nothing basis, thereby eliminating settlement risk.¹⁶

Settlement risks are typically mitigated through real-time gross settlement via specific payment versus payment (PvP) arrangements. In 2022, settlement risk was eliminated in approximately 50 per cent of all foreign exchange transactions, with Continuous Linked Settlement (CLS) contributing the most significant share. While these data are based on survey results, substantial settlement risks are still likely to persist in foreign exchange transactions.¹⁷ Reasons cited include unfavourable cost-benefit considerations, the absence of PvP mechanisms in certain currencies, or a lack of access to such mechanisms. All three points particularly affect participants from less developed countries. CLS, for example, only settles in 18 different currencies.¹⁸ As such, potentials for the utilisation of multilateral platforms, including mechanisms to reduce settlement risks, could emerge if:

(1) access is open to as many participants as possible and trading occurs in a wide range of currencies, especially those from developing countries or time zones that currently lack suitable settlement windows; and (2) the system is as efficient as possible, meaning that the benefits from an institutional perspective outweigh the costs.

In addition to potential benefits in the field of foreign exchange, multilateral platforms could also present an opportunity for settling cross-border assets transactions risk-free according to the principle of delivery versus payment (DvP). This possibility would arise if both cash tokens and tokenised assets were available on the platform, even though this might significantly increase the operational complexity of such a platform.

Limited participation and inclusion

Not all opportunities and challenges of multilateral platforms relate to the underlying technology. Instead, a lot of challenges are a result of general business considerations and participant behaviour, which in turn is strongly influenced by the respective economic conditions and regulatory environments. Of course, introducing additional functionalities could lead to increased complexity and costs, potentially requiring regulatory adjustments in participating countries. Additionally, technical requirements should be implemented in a way that allows also less advanced participants to access such a platform. Furthermore, technical limitations might be encountered with regard to the scalability of such holistic platforms, depending on their design.¹⁹

In addition to technological challenges, numerous political and risk-related hurdles must be overcome. For example, CLS imposes a set of requirements on currencies to be settled through its platform. These requirements ensure that participants and CLS itself are not exposed to uncontrolled risks. The requirements include adequate legal foundations and regulations, especially

regarding the prevention of money laundering, convertibility and transferability of currencies, stability-oriented monetary policy, low country risk, and an appropriate level of commitment on the part of participating banks.²⁰ This highlights a fundamental problem in cross-border payments: a new multilateral platform presumably holds the greatest potential for currency areas that have not yet been connected to multi-currency platforms or have only been connected to a limited extent, but connecting these areas would be associated with potentially higher risks. In addition to potentially authorised currencies, participants wanting direct access to a multilateral DLT platform may also face certain minimum requirements. For instance, requirements for direct participation in CLS include adequate supervision, appropriate resources, and compliance with anti-money laundering guidelines.²¹ Multilateral DLT platforms are likely to have similar requirements.

As a result, the constrained access of certain currency areas and financial market participants to efficient international payment transactions, along with the associated frictions, cannot simply be remedied by changing the technological basis.

Uncertainty regarding efficient governance

Additionally, the greatest challenge may be determining how the governance of a multilateral platform should look. In principle, governance should be both clear and transparent, promote the safety and efficiency of the platform, support the stability of the broader financial system, and be accepted as fair among all countries and participants.²² DLT could offer opportunities to respond to those requirements, but raises also new challenges.

Distributed ledgers share a basic premise which shapes their daily operation and governance. They provide a decentralised infrastructure aimed at preserving the single

version of truth, documenting all changes made. Their distributed operation is achieved without the necessity of a central authority, as every node in the peer-to-peer network shares an identical copy of the database. The copy that is to be distributed among the members of the network is decided via consensus mechanisms. This is what makes participants trust the system and ensures the integrity of transactions. Consequently, there is no need for an administrator to maintain a master version. The practical implications for the governance of DLT infrastructures are that they do not need an official organisation or physical and legal entity in charge that operates the network and is responsible for its performance and failures. Accordingly, the conceivable options for the organisation of governance of a distributed ledger offer a range of variants. On the one hand, DLT does not exclude central, potentially supra-national governance, but also allows for a more decentralised setup in which decision-making processes regarding development and operations could be made collectively, eg by eligible stakeholders. Such structures can reduce the risk of abuse or one-sided control; a major intention behind using this technology in the first place.²³ This, however, leads to the risk that crucial decisions, such as those regarding the implementation of financial sanctions, may not be made or may be implemented only very reluctantly. In addition, platforms that are exclusively operated and governed privately could face insurmountable obstacles, as central banks might not want to outsource central bank money using such infrastructures. Instead, operators and members of the governance body are likely to be international institutions, a consortium of central banks or a public-private partnership of central banks and the private sector. Public cooperation across borders, however, always involves an increase in dependencies, which carries political implications.^{24,25} Overall, addressing these governance challenges across many

countries, let alone on a global scale, appears difficult in the current geopolitical context.

SELECTION OF MULTILATERAL PLATFORM CONCEPTS

The establishment of a multilateral platform is likely to require the coordination of multiple public and private sector actors across different jurisdictions. Therefore, it is crucial to clarify how the platform is to be designed, managed, operated and monitored. The concepts of multilateral DLT platforms presented below provide a brief overview of selected solutions. The aim is to represent the spectrum of different multilateral platform concepts that can be used in a cross-border context utilising DLT. The text contains only a brief description of the main features of the chosen sample. More detailed information can be found in the respective concept papers or the report entitled ‘Exploring multilateral platforms for cross-border payments’ by the Bank for International Settlement (BIS), the Committee on Payments and Market Infrastructures (CPMI), the International Monetary Fund (IMF) and the World Bank.²⁶ Subsequently, the concepts are evaluated in a two-dimensional matrix (Figure 1) against their associated potential efficiency gains and complexity.

The IMF envisages the use of a multilateral platform based on DLT with its multilateral Exchange and Contracting Platform (XC) concept.^{27,28} This is intended to improve the settlement of cross-border payments and related foreign exchange transactions. For this purpose, the objective of the new system is not only to centralise the holding of liquidity and the execution of transactions in central bank money, but also to act as a foreign exchange market. The aim is to provide users with comprehensive programming functionalities and for business processes to be automated. By doing so, the hedging of foreign exchange exposures

via derivatives could be integrated into the platform in both technical and legal terms, for example.

The BIS is proposing a new type of financial market infrastructure with the concept of a unified ledger, which allows various forms of digital money as well as tokenised assets (from the real and financial sectors) to circulate on a common platform.^{29,30} The idea behind a unified ledger is to bundle the advantages of tokenisation on a common programmable platform and to enable the seamless exchange of tokenised values without the need for cross-system communication.^{31,32}

On a unified ledger as well as on the XC platform, the various components needed to execute a transaction are incorporated into a common platform. In contrast to the IMF, however, the holistic approach of the BIS does not focus solely on improving cross-border payments; accordingly, in addition to money, tokenised assets could also be transferred securely without the need for involving external processing or messaging systems.

The BIS Innovation Hubs are also putting forward related concepts mainly focusing on improving cross-border payments. For example, the projects Dunbar,³³ mBridge³⁴ and Mariana promote cross-border payments by using multi-currency platforms and wholesale CBDC. Dunbar and mBridge are very similar from a technical point of view. Both comprise a smart-contract-enabled private network in which central banks issue CBDC to commercial banks. These two projects do not envision foreign exchange trading as a function integrated into the platform. Project Mariana also uses a transnational network to transfer CBDC across borders. In contrast to the aforementioned projects, it additionally offers an integrated automated market maker (AMM).³⁵ The concept of an AMM, which is a genuine element of decentralised finance, describes an exchange using a pre-funded liquidity

pool based on smart contracts that acts as a counterpart for foreign exchange trades. By contrast, project Icebreaker does not involve a platform with its own account management, but rather a central hub for linking national CBDC systems.³⁶ In principle, therefore, only messages are exchanged and not assets. The system is essentially based on foreign exchange providers, which are used to establish the connection between separate CBDC networks.

A concept proposed by institutions from the private sector, for example, is the regulated liability network (RLN). The RLN is very similar to the BIS' unified ledger.^{37,38} However, it has a private-sector motivation and therefore places less emphasis on the macroeconomic benefits. The aim is to create a new financial market infrastructure to improve national and international payments on the basis of DLT. For this purpose, central bank money, commercial bank money and e-money are stored in the RLN on a common DLT platform, ie they are tokenised. The network should be globally interoperable and regulated by national authorities. Similar to the unified ledger, the technical implementation of the RLN could harmonise various use cases on one platform. Both concepts lay the foundation for a holistic (digital) ecosystem, with a much broader range of participants and almost unlimited possibilities of tokenisation. On this basis, both could also be used to improve cross-border payments.

Besides all these more or less theoretical concepts, private multilateral DLT-based platforms that can be used in a cross-border context already exist. Fnality, for example, is a consortium of several global financial institutions that aims to deliver a regulated payment system for a network of decentralised financial market infrastructures. In contrast to the RLN and the unified ledger, Fnality is a pure payment system interconnected with third-party DLT-based businesses. The settlement assets are backed by funds held

in central bank reserve accounts. Partior and Onyx represent platforms that, at least so far, do not entail (synthetic) CBDC. Instead, transactions are settled using commercial bank money. Partior by J.P. Morgan, DBS Bank and Temasek is a multi-currency payment platform dedicated to facilitating the settlement of cross-border payments.³⁹ In contrast, J.P. Morgan's Onyx payment platform covers a more holistic approach, enabling also the exchange of digital assets.⁴⁰

All of the aforementioned concepts are based on DLT and, therefore, share similar technical functionalities at their core. In essence, this implies that multilateral platforms based on DLT have the capacity to leverage the potential efficiency gains associated with this technology. However, the ultimate value added of such a platform is subject to a trade-off between potential efficiency gains depending on the platform's functionalities and the challenges arising from the complexity involved, as illustrated in Figure 1.

From an economic perspective, platforms that do not concentrate solely on payments but also integrate other digital assets hold the potential for greater efficiency gains compared with those without digital asset integration. This is also the genuine vision of DLT: having multiple forms of money and assets on a single platform, enabling seamless and unmediated settlement. At the same time, this also increases the challenges associated with implementing and operating such a platform as levels of complexity surge. Platforms that comprise settlement in private forms of money are still exposed to counterparty risks. The usage of central bank money would eliminate these risks as central bank money is the safest and most liquid settlement asset. However, providing central bank money on privately operated platforms comes with several implications. Where central bank money is not directly integrated into the platform, interoperability mechanisms might be used, if available.⁴¹

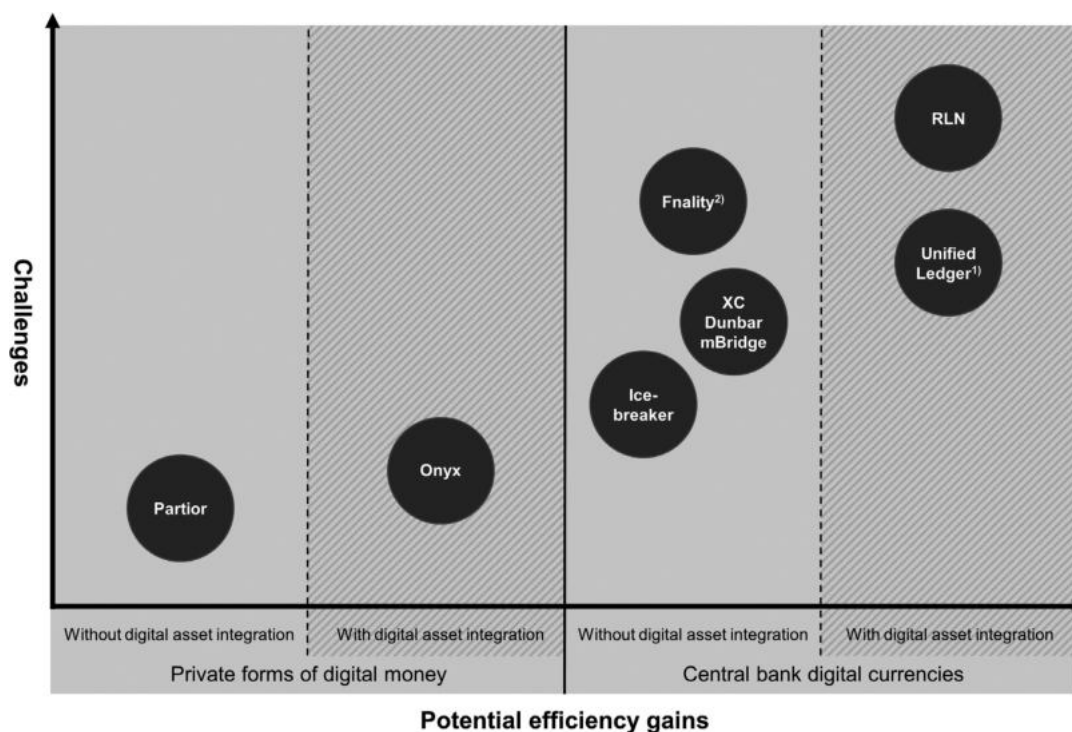


Figure 1: Multilateral platforms for cross-border payments in a trade-off between potential efficiency gains and challenges

Notes: 1) Classification under the assumption that the platform is operated by the public sector, 2) Classification considers Finality tokens as a synthetic form of central bank digital currency. This classification implies a significant reduction in counterparty risks, albeit without complete elimination.

This could involve technical bridges between a DLT platform and conventional central bank payment systems allowing for an off-chain payment settlement of an on-chain asset transaction.⁴²

CONCLUSION

The concepts proposed so far for multilateral DLT platforms are quite similar. However, while the projects that are only in the conceptual stage remain vague in their design proposals, making it difficult to assess their practicality and actual potential, the solutions in operation have yet to prove their scalability on a global level. It seems that when it comes to designing a multilateral platform for cross-border use, an economically sensible balance needs to be struck

between potential efficiency gains and the associated challenges.

The greatest potential is likely to arise for those currency areas that have not been or have only been partially connected to multi-currency systems like CLS. However, these currency areas may also be associated with higher legal and financial risks. It remains unclear how multilateral platforms will find a reasonable balance between potential efficiency gains and the challenges associated with integrating these currency areas. Unfortunately, most concepts do not provide recommendations on the governance of the platforms, nor do they outline requirements concerning the currencies to be traded or direct participation. Therefore, it appears that the biggest challenges for enhancing cross-border payments in a significant way

lie in the areas not yet explicitly covered in the concept papers. As such, in addition to technological innovation, a comprehensive strategy as well as political commitment and determination are necessary to overcome the fundamental challenges in cross-border payments.⁴³

To attract participants that are already well integrated into the international payment landscape, the concepts would need to provide significant added value compared with existing infrastructures. This could be achieved through the provision of innovative functionalities that go beyond cross-border payments. Integrated processing of digital assets is conceivable, creating a global digital ecosystem with innovative business cases. Ultimately, however, as with all payment systems, various design considerations must be weighed up against each other. There is no one-size-fits-all solution that would be equally suitable for all situations and participants.

Building a multilateral platform based on new technologies would undoubtedly constitute a significant step towards global connectivity. However, the implementation of a multilateral platform requires a coordinated effort by a large number of players from different countries, which is likely to be complicated by national interests and geopolitical tensions. Even if an agreement is reached, there is a risk that a compromise solution will be created without any real added value. Against this background, the realisation of a global platform is likely to be rather unrealistic.

In view of these considerations, it seems more sensible to initially develop customised solutions that deliver technological added value and specifically address the issues mentioned in this paper. To achieve the greatest possible efficiency gains for cross-border payments, adjustments should be made above all in those currency areas that have so far been relatively poorly integrated into the international payments landscape. In practice, this could lead to the development of

regional solutions, which are more likely to find a reasonable balance between potential efficiency gains and the challenges involved. Instead of promoting the vision of one multilateral platform, a more straightforward strategy could be to facilitate the interlinking of such regional solutions, leading to the idea of a highly interoperable network of functional solutions.⁴⁴ By developing regional solutions and promoting interoperability at the same time, a solid foundation can be laid for future efficiency gains on a global scale.

AUTHORS' NOTE

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