CAPCO

How ESG-Conform are DLT-based payments?

a **wipro** company

Introduction

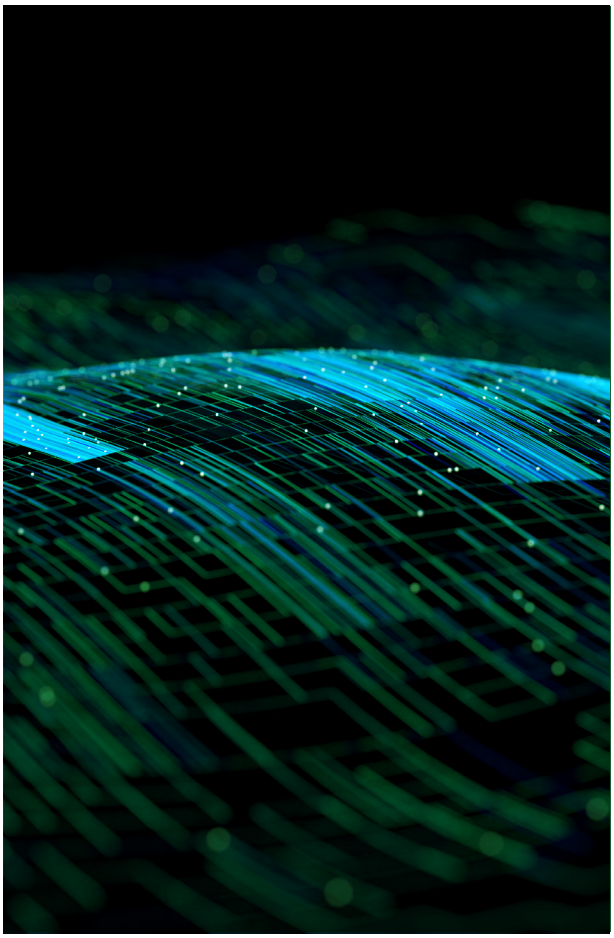
Payments are the backbone of economic activity, facilitating the exchange of goods and services, and their optimization accordingly remains a key priority for payment service providers (PSPs) – including banks and financial technology companies – as they look to improve efficiency, reduce costs and enhance customer satisfaction in an increasingly competitive market.

This optimization involves both product and service innovations spurred by customer demand and competitive pressures, as well as in response to related regulatory imperatives. Examples of regulatory measures include the European Union's Payment Services Directive (PSD2), which aims to increase pan-European competition and participation in the payments industry from non-banks, and the General Data Protection Regulation (GDPR), which governs the handling of payment data.

These regulatory changes not only shape the competitive and operational environment for PSPs but also intersect with broader societal expectations, bringing sustainability considerations increasingly into focus. In this context, environmental, social, and governance (ESG) criteria have become a lens through which the long-term viability and responsibility of new developments are assessed.

One development influenced by both regulatory dynamics and ESG considerations is the adoption of Distributed Ledger Technology (DLT)-based payments. While PSD2 does not promote DLT directly, the regulation's focus on innovation, competition, and openness in the payments ecosystem creates an environment in which DLT-based solutions may more readily emerge. At the same time, DLT is often explored due to its potential to enhance transparency, reduce intermediaries and lower energy consumption in certain implementation scenarios that resonate with ESG goals.

This white paper builds upon our publication ESG & DLT: Why Banks Need to Consider These as a Combination.[1] It examines the advantages attributed to DLT-based payments over traditional payment systems by analysing two use cases: DLT-based cross-border payments and Central Bank Digital Currencies (CBDCs).

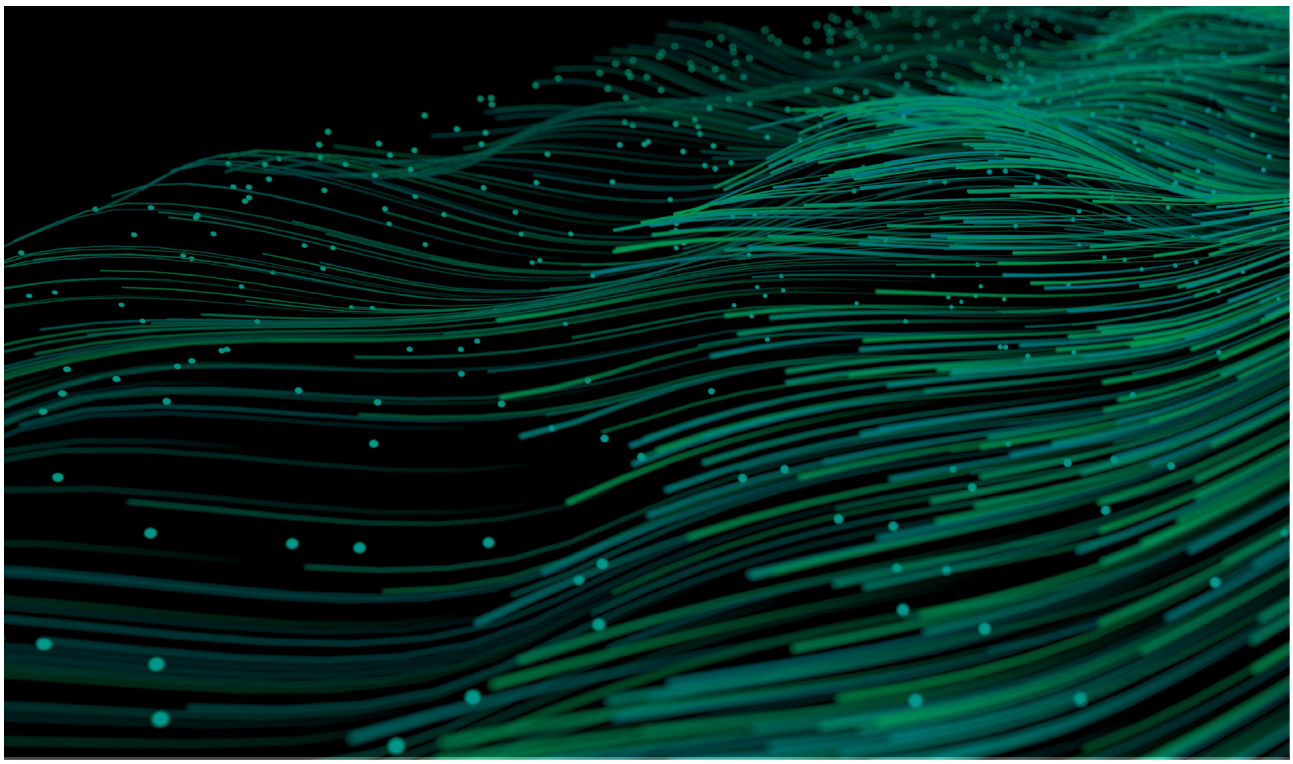


The choice of DLT-based cross-border payments as a use case stems from their high costs, slow transaction speeds and lack of transparency – issues that DLT can potentially mitigate. In the case of CBDCs, we explore their growing relevance in reshaping monetary policy and enhancing financial inclusivity, making them critical in the context of modern financial infrastructure reforms. These scenarios demonstrate the transformative potential of DLT in streamlining and securing financial transactions. We then evaluate these

developments in light of growing regulatory attention to ESG-related aspects, interrogating the degree to which DLT-based payments are ESG-compliant. This analysis considers not only the regulatory perspective but also societal and market expectations, as ESG criteria increasingly influence corporate strategy, investment decisions, and stakeholder communication.

DLT, and especially Bitcoin as a prominent blockchain-based offering, is often criticized for its high energy consumption and environmental impact. However, this addresses only part of the environmental picture. There are certainly means to curb the negative environmental impacts of DLT – and there may even be positive impacts to consider.

Furthermore, this paper extends its scope to include the social and governance aspects, offering a holistic response to the previously mentioned query. For example, DLT-based payments most likely have the potential to facilitate financial inclusion and therefore enhance the social dimension. In addition, the inherent auditability and immutability of DLT-based payments may enhance transparency and accountability in financial systems, thereby supporting governance objectives – particularly in areas such as compliance and fraud prevention, while requiring careful consideration of data protection for retail users.



How can DLT enhance payments?

DLT payments exhibit three primary characteristics that categorize them as a significant technological advancement: they are publicly transparent, allow for improved auditability, and are permanently stored within the network. However, this increased auditability – especially for public blockchains – needs to be balanced against privacy concerns, particularly in retail payment contexts.

The Deutsche Bundesbank sees DLT as an opportunity to enable cross-company integration of payment and settlement processes. Digital assets, representing currencies or other valuables on DLT, facilitate this integration by allowing transactions to be managed and verified through smart contracts.

This automation ensures that transactions are not only secure and efficient but also directly tied to specific contractual agreements, making them ideal for complex, multi-party financial interactions. Such integration streamlines processes and reduces the potential for errors and fraud, thereby enhancing the efficiency and security of payment systems.

In this chapter, we examine two use cases: cross border payments and Central Bank Digital Currencies (CBDCs).

Cross border payments

Cross-border payments are more complex than national or SEPA payments because they involve more parties, primarily due to the correspondent banking system. In contrast, SEPA payments can utilize multilateral clearing. Hence, they bear a bigger optimization potential and are therefore naturally one of the first payments use cases to be examined for improvements.

The G20 recognizes this potential, having decided to prioritize the enhancement of cross-border payments.Increasing international trade, globalization of production, cross-border e-commerce, as well as a rise in international travel and migration, further underscore the relevance of cross-border payments.

The Financial Stability Board (FSB) has identified four challenges for cross-border payments: **cost, speed, access and transparency**.

The correspondent banking system is one of the major causes for these challenges. **Figure 1** illustrates a classical cross-border payment within a correspondent banking model, with the red arrow marking the start of the process. Individual B sends an invoice to individual A; individual A then instructs his/her domestic bank A to send money to indivudual B, who holds an account at domestic bank B.

As these two banks do not have a direct relationship, correspondent banks come into play, leveraging their international relationships to carry out the payment transaction.

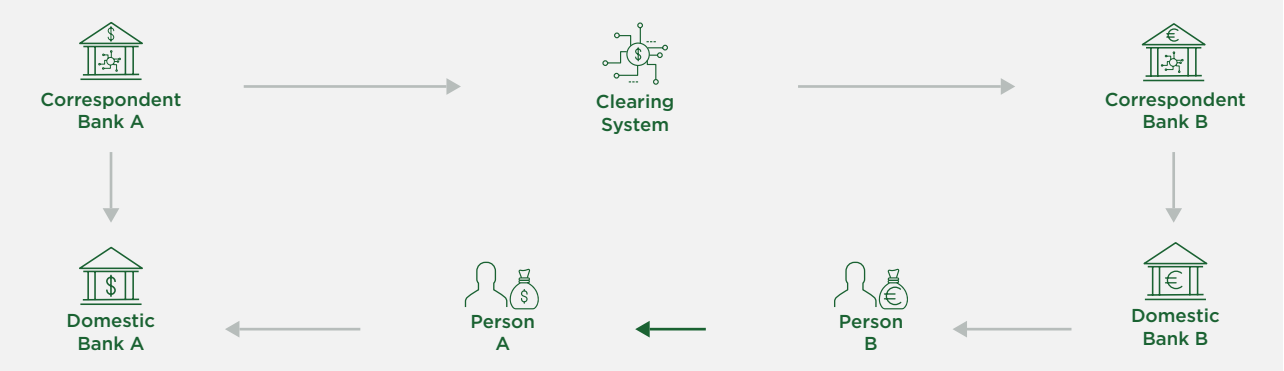


Figure 1: Cross-border payment in correspondent banking model

Employing DLT for payments – moving from centralized ledgers in traditional clearing structures to distributed ledgers on a blockchain – can significantly help address the challenges identified by the FSB:

- DLT is likely to reduce transaction costs by circumventing correspondent banks
- This also leads to reduced processing times for clearing and settlement.
- DLT-based payments allow more people to participate in payments transactions given the lower cost and the removal of the requirement to hold a traditional bank account.

These three key characteristics of DLT mean increased transparency in payment processes, as transactions are recorded immutably and can be accessed and verified by authorized participants in real time.

In addition, DLT ensures transparency and reduces inefficiencies in cross-border transactions, which can support ESG-related objectives such as improving operational efficiency, reducing intermediaries, and enabling more accountable financial processes, as promoted by institutions like the G20 and the Financial Stability Board.

Central bank digital currencies (CBDCs)

Cross-border payments are more complex than national or SEPA payments because they involve more parties, primarily due to the correspondent banking system. In contrast, SEPA payments can utilize multilateral clearing. Hence, they bear a bigger optimization potential and are therefore naturally one of the first payments use cases to be examined for improvements.

CBDCs are expected to revolutionize the financial ecosystem, driven by initiatives from central banks and fintech companies. By leveraging DLT, CBDCs can enhance transparency by making the flow of funds between actors visible to authorized parties and improve traceability by ensuring that every transaction is permanently recorded and auditable, subject to privacy-preserving mechanisms.

The adoption of DLT ensures immutable records of transactions and significantly reduces the risk of fraud. This technological foundation allows for more precise and efficient monetary policies and resource allocations. Central banks, using CBDCs, can more effectively manage monetary systems and adapt to the digital economy's evolving demands.

DLT also plays a key role beyond CBDCs in advancing the overall payment infrastructure. Their transaction volumes are steadily increasing, highlighting their growing importance in both retail and business environments. Instant payments offer tangible benefits such as faster fund availability and improved cash flow management.

When combined with DLT, these payments can become even more efficient, secure, and transparent. The integration of instant settlement mechanisms with decentralized infrastructure opens new possibilities for innovative financial services and further streamlines payment process. These technologies offer the following benefits:

- Reduction of exclusion: Increasing accessibility through smartphones to integrate underbanked individuals into the financial system.

Enhancement of transparency: Improving visibility of fund flows and transaction monitoring, thereby closing tax loopholes and reducing financial fraud. Transparency in cash flows: Enabling unbanked individuals to gain access to digital accounts and e-payment services through traceable money movements.

How ESG-compliant are DLT-based payments?

Having assessed how DLT can enhance payments, we will now explore how it conforms with key ESG criteria. In the following sections we evaluate each dimension – Environmental, Social and Governance – in turn, using the criteria shown in **Figure 2**.

Figure 2: Overview of criteria to evaluate ESG conformity

Environmental

The most relevant criteria for assessing the environmental impact of DLT-based payments are energy consumption (E3) and its related greenhouse gas (GHG) emissions (E2). As previously mentioned, DLT is often criticized for high energy consumption, primarily due to the consensus mechanisms used to validate transactions. Depending on the consensus mechanism chosen, the energy consumption can be relatively high.

A more nuanced view requires distinguishing between different consensus mechanisms. Looking at the two most popular consensus mechanisms – Proof of Work (PoW) and Proof of Stake (PoS), one can observe significant differences in energy efficiency. PoS clearly offers a more cost- and energy-efficient way to validate blockchain transactions. These advantages extend to applications such as DLT-based cross-border payments and CBDCs.

Another important consideration is the reduction of energy consumption through processing improvements, which marks the second criterion in this section. Given that energy used may come from non-renewable sources, streamlining payment processes through DLT could lower consumption. This especially holds true for cross-border payments. Usually, correspondent banks handle the bilateral relationships between banks in a cross-border transaction, which involves multiple steps before a payment is completed.

DLT can eliminate intermediaries like correspondent banks, enabling faster multilateral clearing. In doing so, clearing and settlement can

either occur in fiat or cryptocurrency. Eliminating traditional steps can lead to lower energy usage and thus a positive environmental impact.

Moreover, as a still young and evolving technology, DLT inherently drives innovation and offers the potential to foster environmentally friendly products and services. This is particularly relevant in the payment context, where blockchain can reduce transaction costs while also enabling transparent and traceable payments with environmental purposes.

A prominent example is the use of blockchain to track and verify carbon offsetting payments tied to digital transactions such as flight bookings or parcel delivery. This allows for automation and trust in offset mechanisms, thereby linking the financial transaction directly to a verified environmental impact. Such applications contribute to reducing GHG emissions (E2) by enabling carbon offsetting for various products and services through digital transactions.

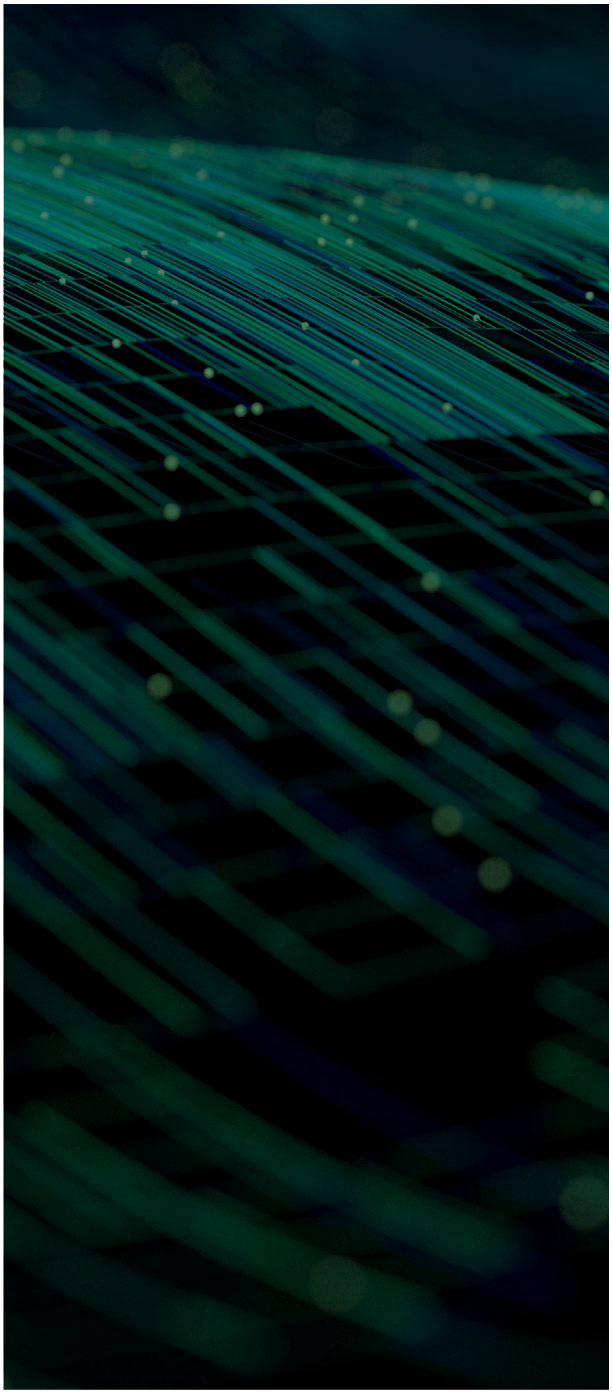
One example is Lufthansa's partnership with Norwegian start-up Chooose, which allows passengers to seamlessly offset flight emissions via blockchain during the payment process.

Social

Looking at DLT-based payments from the social dimension, one key aspect stands out: decentralization and the removal of intermediaries. These reduce transaction costs and improve financial inclusion by bypassing traditional players like currency exchanges and payment providers.

Lower costs reduce barriers to accessing financial services, especially for underserved populations, thus supporting the social criterion of financial inclusion (S3). This expands access to financial systems and can help alleviate poverty, as DLT makes micropayments economically viable – currently rare due to costs for SEPA and cross-border payments.

As pay-per-use models gain traction, micropayments are expected to become more important. Furthermore, DLT enhances data security and privacy through encryption, reducing risks of breaches and unauthorized access. Smart contracts can manage data consent, empowering individuals and supporting ethical data handling, aligning with social and governance ESG dimensions (S4).



Conclusion

As payments continue to evolve in response to customer demands and regulatory measures, DLT emerges as a pivotal force reshaping the financial sector.

The exploration of two primary use cases – cross-border payments and CBDCs – sheds light on the positive aspects of DLT-based payments. DLT's transparency, traceability and permanence in network storage contribute to a paradigm shift in the financial landscape.

In cross-border payments, DLT offers significant advantages, reducing transaction costs, enhancing efficiency and fostering financial inclusion by eliminating intermediaries. The social dimension sees DLT empowering individuals through reduced transaction costs, micropayments and enhanced data privacy. From a governance standpoint, the immutability of DLT transactions strengthens transparency, traceability and anti-corruption efforts.

While recognizing the positive impacts, it is crucial to recognize the challenges associated with DLT-based payments. Environmental concerns, particularly energy consumption, remain a focal point of criticism. Our paper acknowledges the environmental impact of consensus mechanisms, emphasizing the need for more energy-efficient alternatives.

Moreover, some consensus mechanisms – particularly those relying on a limited number of validators or nodes – may lead to centralization of power within the network. This concentration can undermine the social objective of promoting equal access and participation, thereby potentially reinforcing existing financial or technological inequalities.

Furthermore, the effectiveness against fraudulent activities is contingent on the specific blockchain application, requiring careful consideration of public and permissioned blockchains.

How Capco can help

Capco plays a strategic role in guiding financial institutions through the adoption of DLT-based payments. We leverage our expertise to help clients navigate the positive aspects, addressing challenges and aligning their strategies with ESG considerations.

Our role extends to advising on environmental sustainability by exploring energy-efficient consensus mechanisms and fostering innovation in financial services. In addressing social challenges, Capco facilitates strategies to maximize financial inclusion, minimize transaction costs, and enhance data privacy. On the governance front, we aid in establishing robust anti-corruption measures, ensuring transparency and optimizing accounting practices through DLT.

Through our comprehensive approach, we act as a catalyst for financial institutions to embrace the transformative potential of DLT-based payments, aligning with the broader goals of sustainability and innovation.

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Capco, a Wipro company, is a global management and technology consultancy specializing in driving transformation in the financial services and energy industries. Capco operates at the intersection of business and technology by combining innovative thinking with unrivalled industry knowledge to fast-track digital initiatives for banking and payments, capital markets, wealth and asset management, insurance, and the energy sector. Capco's cutting-edge ingenuity is brought to life through its award-winning Be Yourself At Work culture and diverse talent.

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