

DZ Bank Fellowship Report



DLT FOR TRADE FINANCE

Transforming global operations through transparency and trust

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AN INTRODUCTION

In this report, we aim to demonstrate that distributed ledger technology (DLT) has significant potential to enhance the existing trade finance business model and to impact transatlantic as well as global trade interactions.

DLT's transformational potential has been heralded across all industries, with some particularly enthusiastic voices even comparing its emergence to that of the early internet itself. Over the past few years, we have witnessed several enterprises start their DLT journey with blockchain as the magic bullet for operational process efficiencies; however, companies have often jumped into early-stage proof of concept (POC) projects and implementations without clear ROI or other KPIs.

Facilitated and supported by the ACG, we conducted various expert interviews with traditional financial service firms, Fintech start-ups, DLT technology leaders, trade insurance and logistics providers, as well as government entities in both the United States and Europe with the goal of painting a comprehensive

picture of the current status of the DLT adoption journey with a focus on trade finance.

While the adoption maturity varies, both traditional companies like Wells Fargo and start-ups like Skuchain unequivocally recognize the truly disruptive potential that DLT technology can bring to the existing marketplace. The road to unlocking this potential, however, may still take a few years. Even established technology leaders like Consensus and R3 reckon that the true value realization enabled by blockchain technology will ensue only once all ecosystem stakeholders have made the plunge together.

This report aims to show how DLT technology could impact the trade finance industry profoundly and will try to demonstrate this through four real-life sample case studies.

THE EVOLVING DIGITAL PARADIGM

CURRENT MARKET OUTLOOK

In the 2017 Global Survey on Trade Finance by the International Chamber of Commerce (ICC), 61% of respondents – regional, national, and globally operating banks – reported a worldwide shortage of trade finance. The Asian Development Bank (ADB) quantified the global trade finance gap, estimating it at ~\$1.5 trillion of unmet demand in 2016. The fast-developing countries in Asia contributed 40% of the trade finance gap with \$585 billion in regional unmet demand, followed by Africa with its development

The primary focus of this white paper are the implications of blockchain technology application in the trade finance ecosystem. In an industry that is ripe for innovation, we argue that this intricate technology has the potential to disrupt supply chains and to streamline end-to-end processes, while at the same time preserving opportunities of value creation. Our perspective is being reinforced by four diverse case studies that demonstrate the feasibility of leveraging DLT at different stages of the technology adoption course, as well as with flexible use-cases.

The first case study will examine American Express and its approach for leveraging the Ripple technology to launch an innovative, first-of-its-kind cross-border

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bank estimating an average gap of \$110 billion – approximately 25% of total demand.¹

These are daunting numbers, especially considering that at least 36% of rejected trade finance transactions had been considered viable. Therein, however, lies the promise: reasons for rejection in those cases ranged from the need for additional client information or collateral (21%) to low profitability (15%).² This suggests that innovative FinTech solutions may resolve bureaucratic matters.

Global trade clearly faces a challenging period, but there are opportunities across the value chain to drive efficiency and to increase the overall market size. In order to capture this immense value, firms must be willing to fundamentally shift from laborious and predominantly paper-based processes that dominate and define the current global trade finance ecosystem. And increasingly, the message is being received: in the ICC's 2017 Global Survey, 50% of respondents expected most of trade flow processes to be digitized by 2027, with nearly 44% identifying digitalization and technology as a priority area of focus. A third of respondents also noted supply chain finance as a high priority.³

payments solution. In the second case study, we will review the first commercially viable trade finance transaction carried out by a platform created by HSBC and ING⁴. The third case study examines a project by BAML, HSBC, and the Infocomm Development Authority of Singapore, which used IBM's Hyperledger platform to deploy smart contracts. A fourth case study will involve a niche player in the Indian Private Sector, Kotak Mahindra Bank – primarily to demonstrate the feasibility of adopting blockchain technology with the proper collaboration and appropriate resources. This last case study also highlights the technology's potential to streamline the end-to-end trade finance process from an industry standard of 20-30 days, to a few hours, while meeting evolving customer demands.

Blockchain technology and its implementation are, of course, not without challenges. In order to enable the seamless and fully-integrated adoption of DLT within the broader trade finance ecosystem, the industry will be required to take concrete, global steps that facilitate and accelerate sustainable digitization. This paper presents key recommendations on how to best leverage the current infrastructure to digitize internal practices and processes via blockchain technology.

THE OPPORTUNITY

Despite ever-present inefficiencies, global trade is growing significantly – outpacing growth in nominal world GDP.⁵ In 2018 alone, the WTO forecasts trade growth between 2.1% and 4%. The ADB notes particularly strong growth in emerging markets, with an emphasis on APAC regions. It projects that a 40% share of total exports will be attributed to this region by 2030, up from ~25% in 2013.

From a balance sheet perspective, trade finance is still the bread and butter of lucrative business. Revenues have increased overall, with BCG predicting revenue growth of roughly 4.7% a year for trade finance.⁶ This sort of revenue is in a firm’s best interest, as it is recurrent and independent of interest rates – providing a steady stream of income. Additionally, default rates are enticing for businesses, often 10x lower than default rates for traditional corporate lending. Trade finance provides corporations with complete and integrated transaction banking offerings, presenting an invaluable cross-selling potential. A 2014 East & Partners Trade Finance Report projects that \$1 in trade finance fees can bring \$1.70 in FX and cross-border payment fees, and \$2.25 in other revenue.⁷

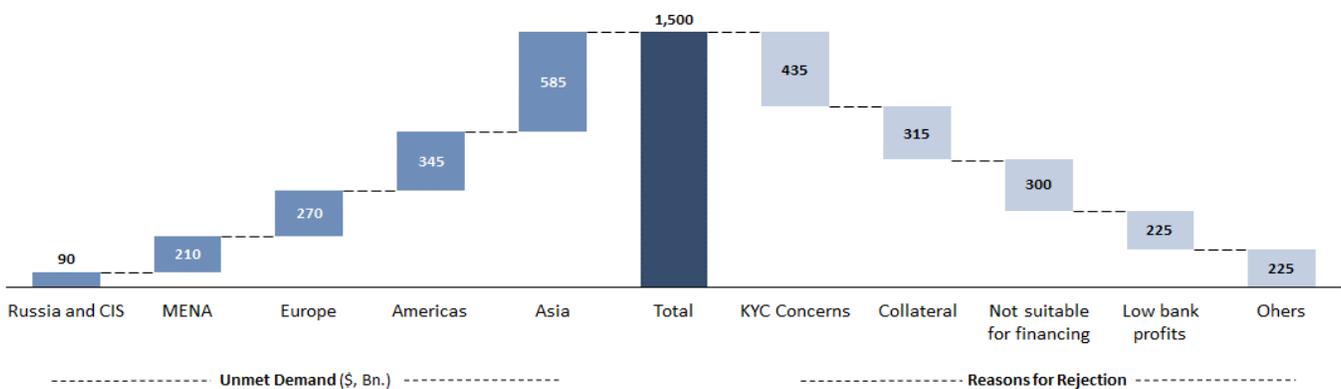
Trade finance demonstrates unparalleled growth opportunities, despite its current disconnected model and ensuing challenges. The future is digital, and firms must be up to the challenge to unlock the potential of these long-term benefits.

Blockchain technology has the potential to revolutionize the trade finance process by reducing operational complexity and transaction costs, while also redefining value chain interactions. At its core, blockchain is a decentralized software platform that enables a distribution ledger system (DLT). It allows authorized participants to track and record transactions and assets in the absence of a single central trust authority, such as a bank. Blockchain networks have the capacity to create proof of ownership across the end-to-end trade finance process by using digital signatures that rely on both public and private encryption keys only known to authorized members – thus curtailing fraud.

In addition, these networks also enable peer-to-peer exchange of data, assets and currencies through rules-based *smart contracts* - a set of promises, agreed between parties and encoded in software, which are performed automatically when criteria are met. As a result, payment flows become more efficient, transparent and cost-effective - while also providing temper-proof record keeping.⁹

In a 2017 survey by Cognizant, 91% of respondents said blockchain will be critical to their firm’s future, while nearly half said it will fundamentally transform the industry.⁸ The application of blockchain technology to trade finance has already started to gain momentum in the industry, with key players successfully completing proof-of-concepts and looking forward to production (see the case studies in the subsequent section for more details).

Figure 1: Unmet Trade Finance Demand & Reasons for Lack of Financing



A LOOK AT THE BENEFITS

ENHANCING TRANSPARENCY

The risk resulting from the lack of visibility in the conventional trade finance model is the primary catalyst for the increasing cost of capital. Using a technology like blockchain is expected to minimize risk and reduce the cost of capital to shareholders. Essentially, blockchain stands to significantly improve the value chain by integrating the movement of goods, transaction processing, and payments. The technology bridges the chasm between buyer and seller in two ways:

- (1) Reducing the prevalence of manual processes, as well as automating and digitizing paper documentation
- (2) Unifying the wide array of disparate parties involved in the supply chain by establishing shared standards

In addition, both efforts serve to enhance security and transparency in an overly saturated business model by significantly accelerating the authentication stages in the flow of goods. Firms can be both confident and secure in providing financing and/or participation in the process, as demonstrated in the HSBC - ING case study.

STREAMLINING DATA

In the current end-to-end trade finance process, a single transaction may exact up to 5,000 data field to document interactions. As data flows through this process, a decreasing share of these fields (~1%) create value-adding data with roughly 85-90% registered as 'ignore/transmit to the next party'.¹⁰

Realistically, there are only about 60-80 unique relevant data fields, such as reference numbers, dates, suppliers, and amounts. In the current model, these unique data fields are reused some 8-10 times.

This complicates the transaction process, increases the risk of discrepancies and expands the extent of redundant activities. Ultimately, this threatens to significantly delay an already lengthy process and to increase fraud and error exposure.

BCG estimates that blockchain technology can streamline this end-to-end trade finance process, while enhancing transparency and reducing overlap/error, by simplifying, or potentially eliminating altogether, more than 90% of data field interactions.¹¹

INCREASING DATA ACCURACY

In addition to its intricate nature, the process behind trade finance transaction also creates a long paper trail and it may take between five and ten days to exchange all relevant documentation.

Because a blockchain entries are updated quickly by each participant on the network to reflect the most recent transaction, it removes the need for multiple physical copies of the same document information, as this is stored on numerous ledgers across various entities. All necessary information can be stored in a single blockchain, which saves time and improves data transparency and accuracy.

BUSINESS IMPLICATIONS

A key challenge, in our experience, is that firms are more likely to just re-work interfaces, rather than create entirely new business processes, systems and data flows, which, of course, is far more complex and potentially fraught with risk.

In our estimation, however, the real risk lies in relying on established industry standards in a fast-developing environment. As the dependence on redundant manual processes and paper declines, blockchain trade finance can cut costs by between \$2.5 billion and \$6 billion (35%) over 3-5 years¹⁵, driven primarily through:

- (1) Collaborative digitization
- (2) Intelligent automation
- (3) Smart contract usage

A few select case studies on the next page will outline real-world examples of how blockchain has already been deployed, and what business processes were augmented as a result.

CASE STUDY #1: AMERICAN EXPRESS

Late in 2017, American Express announced its partnership with FinTech start-up *Ripple*. The company began rolling out a cross-border payments system based on Ripple's xCurrent platform for B2B transactions between the US and the UK. The deal represented one of the first major uses of blockchain.

Ripple's blockchain solution enables actors on either side of a transaction to instantly settle cross-border payments with end-to-end tracking. Clients can easily message each other in real-time to confirm payment details prior to initiating the transaction, and confirm delivery once it settles, cutting out intermediaries.

Amex' service is especially geared towards small- to medium-sized enterprises (SMEs), which suffer most from cross-border payment inefficiencies. According to a 2016 McKinsey study, 60% of business-to-business cross border payments require a manual intervention that takes 20 minutes or more, greatly slowing down the process and introducing a margin of error. With Ripple's blockchain infrastructure in place, Amex customers can now move small amounts with speed, facility and certainty. This approach is showing tangible results: according to Colin O'Flaherty, American Express's VP & General Manager of global commercial services UK and Russia, Amex customers in the US are seeing quicker payments and the firm has seen a decline in customer queries about the status of payments.

CASE STUDY #2: HSBC / ING

In May 2018, HSBC and ING performed the world's first commercially viable trade finance transaction using a single blockchain platform. HSBC and ING completed the deal for US food and agriculture firm Cargill when a bulk shipment of soybeans was transported from Argentina to Malaysia. The bank issued a letter of credit that backed the shipment.

The exchange of this letter of credit was performed in 24 hours, compared to the five-to-10 days it normally takes to complete such exchanges through a paper-based system. The transaction was executed on the R3 blockchain consortium platform *Corda*.

CASE STUDY #3: BAML & HSBC

Bank of America Merrill Lynch, HSBC and the Infocomm Development Authority of Singapore¹⁷ jointly developed a prototype solution built on the Linux Foundation open-source Hyperledger Project Blockchain Fabric, whose development was supported by IBM Research and IBM Global Business Services, that mirrors all relevant data fields from the letter of credit on a distributed ledger.

This then enables users to execute a trade deal automatically through a series of digital smart contracts, thereby reducing the timeline as well as risk, providing assurance by streamlining the manual processing of import/export documentation and improving security by reducing errors. Overall, DLT is expected to make the companies' working capital flows significantly more predictable.

CASE STUDY #4: KOTAK MAHINDRA BANK

Kotak Mahindra Bank (KMB), one of the largest Indian private sector banks, has enabled transparent, end-to-end trade financing for its clients using blockchain technology. The premise of the proof-of-concept was to reduce the time taken to issue a letter of credit and perform a real-life banking transaction.

As part of the POC, KMB and JP Morgan Singapore successfully conducted cross-border LC transactions using a proprietary platform. Kotak Mahindra Bank was able to reduce the time taken for issuing an LC from a lengthy 20 to 30-day period (industry norm) to a few hours. Additionally, this blockchain trade finance model provided unprecedented visibility to all involved stakeholders.¹⁴ The proven success has resulted in the bank expanding the model to all its transaction banking customers.

The examples above present just a few out of many possible uses of blockchain technology in the trade finance context.

A LOOK AT THE ECOSYSTEM

EMERGENCE OF CONSORTIUMS

A key challenge to the success of blockchain technology in trade finance is the threat of market fragmentation; there must be a unified series of players consolidated under one seamless technology initiative so that clients may use it. Naturally, given the strong element of network effects in financial services, this has championed a strong focus on the establishment of banking consortiums around the development and adoption of blockchain-based solutions for trade finance and supply chain management. Table 2 below presents the most notable differences between the key players in the world of distributed ledger technologies: Ethereum, IBM's Hyperledger Fabric and R3 Corda.¹⁹

While significant progress has been made in this space, blockchain technology is still in its infancy; a true set of standards has not been defined yet. As the momentum progresses, key players will face significant challenges before reaching a seamless

and revolutionary integration of blockchain. However, if made aware of such challenges, and with the appropriate knowledge and guidance, firms will undoubtedly be able to take rewarding strides towards integrating blockchain to their current trade finance process.

FINTECH COMPETITORS

There are already various FinTech players in the trade finance space who have been quick to realize the revolutionary implications of blockchain technology for the industry - namely the massive cost reduction and radical simplification potential. The perhaps most advanced solution today is TradelX; the company offers a robust and secure permission-based distributed ledger technology platform. It boasts the capacity for simple and secure integration into existing systems of banks, trade credit insurers and corporations. The product also allows partnering firms to have real-time visibility to manage customer terms and credit risk while also presenting access to capital. This enables clients to improve their payment terms with their suppliers and customers alike.

Table 1: Comparison of Ethereum, Hyperledger Fabric, and R3 Corda

	Ethereum	Hyperledger Fabric	R3 Corda
Description of Platform	- Generic Blockchain platform	- Modular Blockchain platform	- Specialized distributed ledger platform for financial industry
Governance	- Ethereum developers	- Linux foundation	- R3
Mode of Operation	- Permissionless	- Permissioned - Private	- Permissioned - Private
Consensus	- Mining based on proof-of-work (PoW) - Ledger level	- Broad understanding of consensus, multiple approaches - Transaction level	- Specific understanding of consensus (i.e., notary nodes) - Transaction level
Smart Contracts	- Smart contract code (e.g., Solidity)	- Smart contract code (e.g. Go, Java)	- Smart contract code (e.g., Kotlin, Java) - Smart legal contracts (legal prose)
Currency	- Ether - Tokens via Smart Contract	- None - Currency and tokens	- None

Other innovators in the space have targeted prominent pain points in the current end-to-end trade finance model, from delayed timeline and payments, to manual contact creation to invoice factoring. Their solutions have created a new frontier of possibilities, allowing for multi-bank, multi-lender trade asset market places, transparent factoring, real-time review and reduced counterparty risk.

In parallel to this trend, banks have also begun to anticipate the impact of FinTech disruption in the industry and have sought lucrative partnerships with such innovative firms to stay ahead of the curve (see Table 1 for additional details).

CHALLENGES

STANDARDIZATION

Without coherency and unification crossing the two different supply chains (buyers, sellers), the market is vulnerable to fragmentation – a circumstance under which the promised omnichannel consistency of blockchain technology will fail. Hence, the implementation and adoption of a data standard and protocol is imperative for any blockchain based trade finance service. There has been some progress in this regard in the form of the Bank Payment Obligation (BPO) initiative. Additionally, UCP 600, the latest version of the rules that govern letters of credit transactions worldwide, solves this for letters of credit. DLT-enabled smart contracts need an equivalent set of standards and procedures.

INTEGRATION

The challenges of integrating the disparate sources of data necessary to grant buyers, sellers, and any required intermediaries interface to the network has hindered previous initiatives from successfully automating the global trade finance industry. Without having to entirely overthrow legacy systems and introducing a disconnected technology infrastructure, the parties involved in the trade finance process will need flexible tools to map the process documents and payments. The big question is therefore: how can companies best integrate this technology with their existing operating model?

While there are genuine promises of the long-term benefits of blockchain technology, it is expensive to implement as it must often be developed for the specific firm in question. Additionally, skill sets, and human capital are required to maintain the technology efficiently; hence, firms must train or find qualified personnel.

MOVING FORWARD

IMMEDIATE NEXT STEPS

DLT has the potential to significantly change the trade finance aspect of supply chain management as it is a natural fit. Blockchain technology will help drive efficiencies through the ecosystem to improve the end-to-end process for all players while significantly lowering its cost.

In the short term, firms are encouraged to champion immediate initiatives to reduce risk, improve service, and reduce the cost-to-serve in documentary trade. As the marginal cost and effort required to serve clients continues to drop, firms should look to small and medium-sized enterprises (SMEs) to build scale. Lower trade finance costs are simultaneously expected to increase demand.¹⁸

Realizing the benefits of DLT technology, requires the successful aggregation of the following initiatives:

- Facilitating the flow of trade receivables
- Enabling transparency of trade asset movement
- Reducing disputes and fraud to provide delivery and payment certainty.

Understanding the underlying information fabric – i.e., data points that support transactions – of a players' supply chain will help with more accurate risk pricing – and ultimately the creation of new products and services. Data flows must have a unique purpose and path in their logistic interaction with other entities involved to avoid redundancies and duplications.

Additionally, firms must shift to digitizing documents in order to navigate the ever-evolving landscape of trade finance. Achieving scale and a lower unit cost will be imperative as trade becomes more

commoditized and the customer increasingly focused on cost. Currently, it is estimated that the cost of processing physical trade paperwork is \$420 billion; this compliance cost is 5-10% of transaction value.²⁰ Under the right circumstance, digitizing the paper-dominated industry and implementing blockchain technology has the capacity to substantially reduce and eliminate this cost altogether.

In this line of thought, smart contracts are expected to streamline the trade financing process by hardwiring the various elements of an agreement between parties into automatically executing code. For example, imported goods may be scanned immediately upon arrival at the destination, prompting an automatic signal to the smart contract which would then authorize the release of funds to the exporter. In the case where parties require further assurance of delivery, the goods could also be geo-tagged so that the smart contracts would only trigger the release of the funds upon receipt of two confirmations: (a) the scan of the goods upon arrival, and (b) the GPS-based signal confirming that its delivery location is correct.²⁰

The adoption of blockchain technology in trade finance does not necessarily entail a complete overhaul of legacy systems. Banks, for example, should focus on creating a digital ring-fence with internal systems digitized and built around the flow of data. As paper use declines, banks could re-work the interfaces, rather than creating entire new business processes, systems, and data flows from scratch. Banks should see start-up technology firms and FinTechs as potential partners rather than as threats.

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FIGURES

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