

# **Reshaping Trade Finance**

**Towards a “new” letter of credit.**

**Andrea Frosinini**

## 1. A bigger bang.

Often described as the fuel for global commerce, Trade finance provides delivery and payment assurance to Buyers and Sellers and helps filling the gap among these parties. The growth and sustenance of the international trade market depends on the easy availability and robustness of the financing mechanisms. Trade participants can be vulnerable to business risks and uncertainties stemming from several factors such as process inefficiencies, variance trade regulations, requirements across geographies and the logistical complexities that arise when a large number of entities interact. Obstacles can indeed increase both risks and costs, leading to unfavorable financing terms, especially for small businesses. As a new digital paradigm for securing transfer of value, blockchain technology holds the potential to forever change business processes by redefining value chain interactions, thus reducing operational complexity and transaction costs.

The cryptographic security underlying blockchain technology enables information immutability and credibility as trade transaction records stored on blockchain are made tamper-proof, reliable and verifiable by all parties at any time. Data confidentiality and privacy are ensured through permissioned access rights for trade participants. The distributed ledger architecture provides transaction transparency and traceability which enhances visibility into asset status for merchandise tracking, enables automated execution of contractual obligations through smart contracts, and ensures networks resilience to downtime and risks of manipulation.

In addition to this, the network consensus mechanism provides a single source of truth for enabling native issuance of financial assets, such as receivables and other payment obligations, and also eliminates the associated problems of double spend, fraud and the need for continuous reconciliation between trading and financing parties in the transfer of these digital assets.

Together, these features provide the foundation for building sound and synergistic ecosystems that substantially increase the efficiency of trade processes, eliminate fraud, improve asset liquidity and provide better visibility into the trade supply chain.

Three key areas in trade finance will benefit of the innovations led by blockchain. Blockchain will provide payment certainty to Sellers by automating payment methods. Letters of credit provide an effective way to mitigate business risks through bank facilitation of the trade flow and settlement process. Their value can be seriously limited by high costs, contractual delays and process complexities. Compliance is evaluated based on documents and not the actual delivery or quality of goods. Furthermore, ambiguities in the semantics of the legal clauses in the LC contract need a bank to apply discretionary determination when interpreting them. As a result, errors in terminology and interpretation of requirements are quite common, leading to disputes between parties, with goods sitting unclaimed at the delivery location.

Payments can also be delayed by data mismatches between the wording and the underlying documents, which either require a waiver or acceptance by the Buyer/Applicant. Other delays can stem from corrections in the documents or amendments in the LC itself within a short time window before the expiry date.

To mitigate the risk of delayed or denied payments, the LC can be modeled as a self-executing contract on blockchain that automate compliance verification with contract terms and ensure faster payment to Sellers by preventing disputes from arising due to ambiguities in the contract. Such automation also expedites payments through early discovery of discrepancies and increases the efficiency of the amendment process.

Providing delivery assurance to Buyers through trade asset tokenization also means granting for visibility into the status of in-transit shipment. It is essential for Buyers to obtain timely indications of potential delays and damages that can impact fulfillment of downstream obligations. Buyers often lack this insight into en-route delays or shipment damage due to bad weather, port congestion, customs hold-ups and other reasons until the actual delivery of the shipment.

Documents also move separately from the goods flow, which often leads to situations where goods cannot be claimed until the title or other physical documents have been received by the Buyer/Applicant. The risk of documentary fraud for trading parties arises as documents can be easily forged, or manipulated, due to vulnerabilities in the transport chain, fragmented interactions between stakeholders, variations in country-specific regulations and trade procedures, and an overall lack of security and common standards.

Blockchain allows trade assets to be digitized through crypto-tokens denoting custody or ownership of the bearer and linking its transfer between trade transaction participants on blockchain with the movement of the physical asset, establishing a clear chain of provenance. Documents can also be directly issued and verified on the blockchain by the relevant parties. Asset tokenization will provide delivery assurance and better risk management for Buyers by enabling real-time shipment status tracking and visibility into transport conditions. Managing the flow and transfer of documents, such as bills of lading, on blockchain helps reducing hold-ups in the release of cargo to the Buyer/Applicant due to delayed receipt of documents and also prevents losses due to document manipulation and errors.

Trade receivables and other payment instruments such as promissory notes, checks, drafts or bills of exchange act as negotiable instruments that can be transferred to third parties, like banks and other financial institutions.



It possible for suppliers to get funding that meet their working capital needs by sale or transfer of these payment instruments through discounting, factoring or forfeiting. Banks are facing big challenges in detecting deviations and ensuring compliance because of process inefficiencies, such as limited availability of dedicated information, reliance on documentary proofs of trade, and the high cost of the required manual screening, making them vulnerable to business risk.

One more big point is the unavailability of sufficient and timely credit for SMEs, that generally receive deferred payment terms from corporate Buyers but need liquidity in order to meet their working capital needs. The overhead involved in issuing, storing, transferring and redeeming receivable instruments in paper form also result in an operationally inefficient, costly and time consuming process.

“Payment instruments” are essentially “credit instruments” created by the trade transaction that can be directly issued on a blockchain network as native assets. Payment tools like bills of exchange or promissory notes can be digitally created as financial contracts between the issuing and redeeming parties. Being directly issued on blockchain prevents fraudulent invoicing practices, improves SME financing options through increased liquidity of receivables and enables process efficiencies in managing receivables.

In the coming years, blockchain will also play a pivotal role in improving the peripheral business processes impacting trade finance:

Identity and reputation management stand as the cornerstone of any trade interaction. Banks do need to facilitate trade transactions to cover the risk of payment or delivery default by the trade counterparty.

Blockchain ecosystems will facilitate credible and effective trade party credentialing based on immutable and comprehensive payment and trade transaction history records that can be effectively deployed for assessing the creditworthiness and financial health of the corporate and initiating financing, as well as for ongoing monitoring for funds release and disbursement.

Document and contract management will also benefit of this technology. Documents related to financial, regulatory, commercial and insurance can be effectively managed on blockchain. Hashing ensures all parties are accessing and making changes to the most recent version of the document. Similarly, trade-related contracts can also be created, updated and amended directly on blockchain through a multi-signatory mechanism and carried forward and easily referenced with the rest of the transaction activities. Blockchain increases the auditability of the trade process and ensures that documents or contract information cannot be tampered with by any single party. Also, it makes dispute resolution easier as immutable contract information is preserved and made accessible to all parties.

Blockchains are also instrumental in optimizing business processes by reducing redundancies and implementation inefficiencies and the longer-term implications of this technology in trade finance will be deeper and will allegedly lead to a complete redesign of the current processes.

Although, critical challenges are related to ensuring adoption and collaboration to reach critical mass to drive network efficiencies, and in managing the operational complexity and associated change management processes in setting up industry-wide blockchain networks.

Blockchain is only one part of the overall solution, and distributed ledger applications require careful strategic evaluations and design decisions before production deployment. In addition to this, we have to reckon for a few complexities regarding the legal acceptance and regulatory applicability of such networks and the challenges of platform applicability, scalability and interoperability. The adoption of blockchain will need more concerted efforts to accelerate implementation.

## 2. The two pillars: strict compliance and independence.

The letter of credit continues to serve as an important trade finance tool, particularly when transactions involving parties that do not trust each other.

UCP 600 represents the most common body of law applied to commercial letters of credit, promulgated by a business entity, which allows parties to adopt it explicitly. It has gradually begun to allow certain portions of the letters of credit to “turn electronic” for it acknowledges digital signatures and documents in electronic format. The principle of independence and strict compliance prevent banks from looking to the nature of the goods in the underlying sales contract. As a result of this, the obligation to pay depends solely on papers, rather than the actual goods being shipped.

The “core” step in the LC process involves “presentation” and “documentary compliance”. The “presenter,” which is often the Beneficiary, must present all of the documents required under the letter of credit to the Issuer at some point before the expiration of the LC. The Issuer in turn evaluates whether, “on its face,” the documents are in compliance with the LC terms: this is what the UCC defines the “strict compliance” standard.

Under the UCC and UCP, the Issuer has the discretion to determine whether the documents comply with the terms of the letter of credit based on the standard practice defined by international financial institutions.



The Issuer may not apply nondocumentary standards; thus, any attempt to examine the quality of the goods or other measures of performance that do not appear on the face of the documents is prohibited.

Defining "strict compliance" is often unclear and indeed leads to granting the Issuer with more discretionary power when determining documentary compliance. After receiving the required documents from the Beneficiary, the Issuer has a reasonably limited time to determine compliance or noncompliance and notify the presenter, which is not to exceed five (5) business days under the UCP. The Issuer either "honors" the presentation of complying documents or informs the presenter of any discrepancies between the documents presented and the letter of credit requirements. If the documents are not in compliance, the Issuer may allow the Applicant to waive the discrepancies. Either way, the Beneficiary will attempt to solve the problem in order to be paid. Theoretically, the strict compliance principle stands and the Beneficiary is entitled to be paid once the Issuer determines there is documentary compliance. Regardless of when the Beneficiary is paid, all methods parties might agree upon share the concept that payment is conditioned upon documentary compliance.

In time drafts or deferred payment obligations, the Applicant is able to inspect the goods before the issuer pays the Beneficiary. Though, the Applicant's judgment of the goods has no effect on whether the Beneficiary gets paid. If he refuses to pay, the Issuer still has the obligation to pay the Beneficiary.

Detailed terms are meant to outline the requirements the Beneficiary must meet and in particular the Applicant must list documentary conditions with which the Beneficiary must strictly comply in order to get paid. Thus, the strict compliance principle, focusing on the prescribed roles of the Issuer and Beneficiary, stands as the first primary mechanism underlying every letter of credit.

The independence principle expands upon the strict compliance and encompasses other existing contractual relationships in a LC transaction. According to such principle, a letter-of-credit transaction comprises three separate undertakings: the contract between the Applicant and Beneficiary, the contract between the Issuer and Applicant and the contract between the Issuer and Beneficiary.

According to the independence principle, the sales contract between the Applicant and the Beneficiary is separate from the letter of credit. When the Issuer reviews documents, it cannot look to the nature and quality of the goods shipped. Indeed, the Applicant should require an inspection certificate to safeguard against the chance of the Beneficiary shipping fraudulent-quality goods. Depending on the Incoterms specified, the Applicant will likely not bear the risk of any loss that occurred while the shipment was in transit.

Allowing the Applicant to inspect goods might violate the independence principle: while the Applicant and Beneficiary are likely to know the product being shipped, the Issuer only has knowledge about reviewing documentation and issuing payment. Consequently, he should not look to whether the Beneficiary performed according to the underlying sales contract.

The separation of the Applicant and Beneficiary from the Issuer circles back to the strict compliance principle for the Issuer can only evaluate compliance based on the face of the documents. The "reimbursement contract" between the Applicant and the Issuer is the second undertaking in a letter of credit: the Applicant agrees to reimburse the Issuer for the amount "distributed" to the Beneficiary under the credit, this principle being explicit in the UCP.

Before issuing an LC, the Issuer makes sure the Applicant has sufficient funds to settle for reimbursement. At least, he will confirm that the Applicant has sufficient credit or might even take a step forward by holding a collateral. Because the Issuer takes a security interest in the goods, should the Buyer default, he is generally still obligated to pay the amount under the letter of credit. If, for instance, the Applicant files for bankruptcy after the Issuer grants him a letter of credit, the Issuer would still be obligated to pay the Beneficiary, as long as under the LC requirements are satisfied, as the Beneficiary is relying on the solvency of the Issuer.

The final undertaking is the letter of credit itself for it requires the Issuer to pay the Beneficiary the amount provided for as long as he provides complying documentation. While in a typical sales contract, the Buyer usually has the obligation to pay the Seller, conditioned upon tender of conforming goods, in a sale against a commercial letter of credit, the Issuer bears the responsibility to pay, conditioned upon the Beneficiary submitting documents complying with the terms of the letter of credit. The simple fact of giving the Issuer this responsibility of payment is what underlies the basis for a letter of credit: the mitigation of the risk between the Applicant and the Beneficiary.

Despite three separate agreements, the fraud exception is the one and only case that does not trigger the independence principle. The party most likely to allege fraud is the Applicant that wishes to stop payment until issues regarding the underlying contract are fixed. Because it is not always easy to detect fraud, the Issuer may still honor the draft in good faith.

The UCP is silent on the fraud exception and the argument against applying the fraud exception to the UCP is that this is designed in order to reflect banking practices, not legal ones.

In the future, the key will be to strive for the proper balance between ensuring efficiency while preserving the commercial viability of the instrument. Striking the proper balance requires a firm understanding of key financial technologies, also known as FinTech, mainly blockchain, smart contracts, and IOT.



### 3. Accepting the challenge.

Because LCs are evaluated on the basis of trade documents and not the actual delivery or quality of goods, errors in terminology and interpretation of the compliance requirements often lead to disputes between trading parties. As a result, goods can sit unclaimed at a delivery location as the parties negotiate a way forward. To understand why these differences occur, we need to take a deeper look at how an LC contract is structured. As a payment commitment made by the issuing bank, or Buyer's bank, to the Seller, the LC is preceded by two other trade contracts: the sales contract between the buyer and the seller, outlining the terms of trade, and the "promise" by the Buyer to reimburse the issuing bank for duly honoring a "compliant" LC submitted by the Seller. The latter also obligates the bank to ensure that the documents presented by the Seller completely adhere to the LC terms and conditions, so the bank cannot unilaterally overlook or waive even the smallest discrepancy. At the same time, the LC independence principle renders the bank's obligation to the Seller independent of the Seller's obligation to the Buyer. Therefore, even if the sales contract terms have been breached, the bank is required to pay the Seller as long as the LC terms and conditions have been met. Thus, the issuing bank must carefully evaluate whether the documents submitted by the seller comply with the LC. For numerous reasons, this can lead to process inefficiencies for all participants, as well as delayed or denied payments for the Seller.

Interpreting semantic ambiguities of the legal clauses in the LC contract usually necessitates discretionary determination by the bank. If the bank checks only for substantial or reasonable compliance with LC terms, then it risks waiving a material deviation and, in doing so, fails to honor its contractual obligation to the Buyer. To avoid this, banks more often adopt the strict compliance standard, which mandates compliance with the LC both in spirit and in letter. However, this can lead to payment disputes or denial even on the basis of trivial ambiguities despite the seller's fulfillment of performance requirements under the sales contract.

Consider a hypothetical international trade transaction involving the transport of goods by sea. If the LC specifies that the shipment is to be effected "in the beginning of the month of September," different parties could translate this timeframe in many different ways. Similarly, conditions calling for "competent" or "well-known" issuers of the document, or actions that need to be taken "as soon as possible" or "promptly," all require discretion, as well. Although the UCP 600 has attempted to increase the flexibility of strict compliance rules and provide some guidelines for interpreting the compliance conditions, instances of misunderstandings and varied interpretation still abound.

In addition to ambiguities, LC contracts can also contain data mismatches or related discrepancies. Given the possibilities for terminology-related and typographical mistakes and oversights by various parties, mismatches can easily occur in LC and trade documents. Most of the documents presented for LC evaluation are rejected on the first presentation due to such discrepancies arising from mistakes or ambiguities in presentation and grammar, including spelling and punctuation.

Ambiguities and discrepancies that cannot be waived, e.g. those involving change in the Seller's address, require amendments in the LC contract, the sales contract or even both. Such waivers and amendments also need to be completed within a short window before the LC expiration date. A majority of LCs today are issued through SWIFT as MT700 messages rather than as paper contracts. An average LC easily costs several hundred euros and requires several days after documents are submitted for processing and payout. Any changes, waivers or amendments add increase costs and delays, making this method unprofitable for small transactions or those involving time-sensitive or perishable goods.

Though several efforts have been made to digitize LCs, most have not been successful at mitigating these pain points due to data matching and authentication challenges, as well as a lack of integration with the overall trade process, or failure to bring all stakeholders onto a common centralized platform.

Although, in conjunction with the UCP, parties may also expressly adopt the Supplement to the Uniform Customs and Practice for Documentary Credits for Electronic Presentation (eUCP), which is relatively new and still has quite a low rate of adoption as most letters of credit have yet to be digitized.

By using blockchain, LCs can be modeled as smart contracts between the financier and the supplier in order to guarantee payment to the latter, if the goods are delivered to the Buyer in accordance with all specified condition codified by abstracting and expressing conditional clauses, regarding time, place and manner of shipment and delivery, description and quantity of the goods shipped and the documentary evidence required for verification as separate, independent or interdependent functions providing "pass/fail outputs" based on the "input information".

Evaluation and verification of the documents submitted by the Exporter under the LC can be automated through program logic with the to indicate case by case compliance or noncompliance.

The network consensus ensures there is only one single final version of the LC draft at any given time that all parties are able to view and work on this version based on their access rights. The LC is issued on a distributed ledger technology (DLT) network consisting of a Buyer, a Seller, a few banks, including the issuing, advising,





confirming, nominating, reimbursing and correspondent, and other entities acting as participating nodes. The LC terms and conditions can be drawn by the Importer and stored immutably on the blockchain network as a draft. This draft is first made visible to the issuing bank, which, after reviewing and underwriting the LC application, can digitally sign it to confirm its approval. Similarly, it can be sequentially reviewed and approved by other participating banks, including the advising bank, before being forwarded to the Exporter.

After revision and acceptance by the Exporter, the LC is finalized as a contract between the issuing bank and the Exporter. Amendments or updates to the LC can be managed through a similar multi-signatory mechanism, providing approval and viewing permissions to the Buyer, the Seller and all of the banks involved.

This automation thus grants for a faster assured payment method and prevents any dispute arising from contract ambiguities, reduces payment delays by detecting discrepancies and decreases the expense and difficulty of making amendments due to discrepancies at an early stage.

Specifying LC requirements as “logical” and “verifiable” conditions in a smart contract-based template compels exactness and precision regarding time, place, value and manner of shipment while drafting the LC.

By modeling the preceding sales contract between the Buyer and the Seller as a smart contract, as well as the agreement between the Buyer and the issuing bank, data discrepancies can be further prevented in the LC contract, because key elements, such as the description of the goods or the names of the parties can be “picked up” directly from the underlying contract ensuring uniformity in description all the transaction related documents. Similarly, the Importer would be referred to in a uniform way throughout the trade lifecycle, reducing data errors.

Any required amendments or corrections can also be conducted earlier in the process rather than after presentment to the issuing bank. If, for instance, shipment is delayed by a couple of weeks, the implications can be dealt with in real-time as the Buyer can either allow the bank to waive this discrepancy in the shipping date, and its consequent impact on the delivery and payment dates, or, along with the Seller, he can agree to modify other terms of trade and create an LC amendment. All these discussions can be initiated and decisions can be made ahead of presentment instead of after the discrepant documents are rejected by the issuing bank, reducing the time taken for bank evaluation and speeding up delivery, freeing funds for the Seller’s working capital needs. If the LC specifies a number of conditions that need to be fulfilled, at any given time, all parties can see which ones have been successfully completed, rejected or are pending, leading to timely risk management and better internal forecasting, saving time and eliminating additional costs for disputes.

In many cases, this approach might also be the only way to prevent non-payment: while “internal documents” can be adjusted at a later stage for compliance with the LC, this might not always be possible when dealing with a third-party document, such as a bill of lading, because a post-shipment change to bill of lading is considered as a fraud attempt in some countries.

On a blockchain all trading and facilitating parties have visibility into the LC issuance process and clear oversight into the current status of the pending actions. Thus, potential discrepancies can be more quickly identified. Another advantage brought by new technologies is that they substantially reduce the time and cost for LC issuance, as well as for any Buyer waivers or amendments made due to discrepancies. Through the multi-signatory mechanism, any changes required can be instantly approved or countered by the relevant parties, and the updates are visible to all stakeholders in real-time.

In contrast with the paper-based or SWIFT LCs, that are primarily meant to be “bilateral” inter-bank communication mechanisms, this approach substantially reduces the time taken to issue and update an LC. Proofs of concept (PoC) for LC automation via smart contracts have reduced execution times from weeks and days to a few hours. If the Importer’s address has changed, an amendment can be proposed by the Importer, reviewed and approved by the Exporter and issuing bank, incorporated in the LC and shared with all other stakeholders. All other documents, including the sales contract, that use this data input field would automatically also be flagged for update and modified similarly in order to avoid discrepancies.

In the short term, blockchain technology reduces process inefficiencies by digitizing the documentary evaluation of LC. In the long term, the maturity and ubiquity of its processes and ecosystems completely obviate the need for documents-based evaluation and financing, instead enabling LC evaluation and financing to be based on asset movement and other contractual milestones. Rather than an inspection report, the LC condition for a perishable shipment could be based on the shipping temperature not exceeding the recommended range throughout transportation.



#### 4. A broader concept of documentary compliance.

Importers and Exporters often lack mutual trust, especially when it comes to payment. FinTech is propelling the financial industry with the goal to modernize trade finance, by focusing in particular on the tools that help ensuring transparency throughout the transaction. Businesses regularly apply IoT to business logistics and supply chain or to aid in shipping perishable goods or to detect equipment failure.

Blockchain and smart contracts are hot topics in the financial industry as these two technologies can modernize trade finance, with important tasks like documentary management and payment: they are prime candidates for modernizing letters of credit as well.

Blockchain is a comprehensive, chronological database of transactions, grouped into individual “blocks,” which are time stamped and then connected to the previous block. Generally, they fall into two broad categories: “open blockchains”, allowing public access, or “permissioned blockchains”, allowing access only to specified individuals. Both types can be tailored by parties according to the needs they cover.

There are many fundamental components to this technology, one of the core features being “decentralization”, meaning that neither a single person, or entity can control the blockchain. Instead, each “node” is connected to the same peer-to-peer network that runs under the same “protocol.” When a participant updates the ledger, each node checks the transaction via “consensus” before the change is written into the blockchain.

These changes can be thought of as additions, as previous versions of the blockchain remain unaltered: this is why blockchain is often considered to be “immutable.” The system automatically updates on each node so that every participant access the latest information. Thanks to the high degree of transparency, blockchain is often described as “trustless.”: therefore, it helps parties in documentary management for documents are stored and verified through consensus.

More recently, blockchain has also been used to generate documents like bills of lading in letter-of-credit transactions. Though, because international transactions involve many documents, potentially with multiple phases of correspondence, this technology is an easy way to store, organize, and verify documents and can also be used in tandem with smart contracts to further automate international transactions.

Smart contracts can be defined as a written set of mathematical rules that, once triggered, automate certain promises between parties. While a smart contract may actually be a legally binding contract, more often this term means that the “smart” code is verified and stored on the blockchain.

Smart contracts are commonly used to facilitate payment in international transactions for parties use them in order to automate payment when a certain condition is met, such as delivery, for instance. They can execute the parties’ agreement securely and quickly, with no need for a middleman or an invoice.

If smart contracts and blockchain can disrupt the way letters of credit traditionally function, IOT represents the key technology that could transform the financial industry for it has already changed the way people seek information and interact with others. While it is most commonly associated with consumer goods, businesses have also begun to take advantage of technologies like IOT, radio-frequency identification (RFID) and complementary technologies like sensors, actuators, and oracles in order to transform the “Internet of Things” into the “Internet of Everything” (IOE).

IOT is often described in terms of devices that connect to the Internet and in more general terms as physical objects using technology in order to connect in real-time with the surrounding environment, devices, and external information systems. IOT should not be restricted to a certain label or definition as this restriction might hurdle growth.

IOE, expands upon IOT and four things work together to form it: people, processes, data, and things. It is more than just connecting items to the Internet: it is about how people, processes, data and things can work together with the goal of creating value.

At its most basic level, RFID is a tagging system that provides the means to track physical goods and deliver the information to an electronic database through a wireless system that tracks the location of tagged objects via a GPS device, which can in turn be tagged by items or by pallets. Each tag has a unique Electronic Product Code (EPC), similar to a bar code, though able to hold more information . It can be rewritten and can function even if the tag is not easily visible. An active tag has more capabilities than a passive one, thanks to a battery , that enables the data stored on the tag to reach the RFID reader over a greater distance than a passive tag.

Passive tags have a wider use though, because they are less expensive. Regardless of the type of tag used, these small powerhouses can transmit valuable information for companies throughout the supply chain.

RFID is commonly used in shipping container as it allows companies to track the location and quantity of goods while they are in transit and in general throughout the entire supply chain in order to gain valuable information that would otherwise be unknown or not discovered until the goods reach their final destination.

RFID and IOT capabilities are enhanced by sensors and actuators as they collect information and data that can be accompanied by actuators capable of implementing decisions as they react to things like weight, temperature, and moisture. A sensor can detect if the temperature goes out of range, and then the actuator can



send a signal to cool the temperature back down. As a result, IOT can sense, process, and respond to data without the need for human intervention.

Thanks to this “continuous knowledge” and “situational awareness”, one can compare the current state of the physical environment with its predicted future state. Oracles are specifically designed to work with RFID sensors and smart contracts, while blockchain is limited to the data in its own network.-A letter of credit might specify that the temperature of the container cannot exceed twenty degrees Celsius and also include the Incoterms that governs the transaction, as this dictates who bears the risk of loss of goods that are tracked by IOT along the transaction. The Applicant will have the primary control and responsibility of drafting the LC, as he is more knowledgeable than the Issuer about the terms that need to be included, based on the underlying sales contract. After drafting the LC, the Applicant uploads the document on the blockchain for the Issuer to approve, deny, or suggest changes.

Moreover, international transactions involve third parties such as ports and customs. Therefore, the Issuer still plays an important role in ensuring the credit accounts for these third parties and any related documents. Once the letter of credit is finalized, the Issuer adds the respective parties to the permissioned blockchain. The bank can also include third parties that are not directly related to transaction. The Issuer is able to control and limit the information available to third parties.

Blockchain is particularly useful for transactions involving multiple parties and communications, such letters of credit and eliminates the need for “physical presentment”.

Before the Beneficiary ships perishable goods to the Applicant, each pallet, or item, can be equipped with an active RFID tag, a sensor and a GPS device. Once the goods are loaded onto the container, a smart contract generates a bill of lading based on the RFID data. Parties should opt for documents generated by the blockchain because blockchain data are tamper-proof, thus ensure the information reflects the reality; thus they mitigate the risk fraudulent documents. When blockchain cannot pre-generate a document due to the limitations of IoT, the third party would need to manually upload the document onto the blockchain. Regardless of whether a document is automatically generated or manually uploaded, the system reduces the role of the Issuer in determining documentary compliance because he gets involved only in case something goes wrong.

Through consensus, the blockchain first verifies the information of the document with the terms of the letter of credit, then, if no discrepancies are detected, it notes that it is compliant and a smart contract authorizes goods to go on to the following step in the transaction without any interruption or involvement by the Issuer. If there is a discrepancy that is not related to the temperature of the goods, for instance, the blockchain notifies the Issuer, who has the final say on whether the documents are in compliance, based on standard banking practices. Should he determine the documents are not in compliance, he has the discretion of allowing the Applicant to waive the discrepancies.

Generally, the Issuer favors having limited involvement, as a bank often expresses concerns about exercising any degree of discretion when checking for documentary compliance. Similarly, the Applicant is able to see the updated ledger, so the Issuer no longer has to inform the Beneficiary of whether the documents are in compliance. How long does the issuer have to make a decision on whether it will allow the Applicant to waive the discrepancy? The Issuer will be reviewing only one document at a time and will have fewer documents to review compared to a traditional, paper-based letter-of credit transaction as an aggregate amongst all of its customers. As a result, he does not need seven five days to determine whether the Applicant will be able to waive the discrepancy.

Incorporating conditions like temperature or weight violates the traditional independence principle though, because when the Issuer is able to review a document, either because IoT does not detect a problem or when a third party contract is involved. As long as the documents reflect the letter-of-credit terms, it would be irrelevant whether the goods are at the correct temperature or whether the Seller shipped nonconforming goods. The Issuer must honor the letter of credit, and the Applicant would need to seek its own judicial remedy. As with traditional paper-based letter-of-credit transactions, the Issuer is not making any investigation or inspection as to the quality of the goods. IoT solves the concern that banks should not be compelled to investigate and verify facts outside their normal business. In this new model, IoT is the source of knowledge and requires no expertise from a bank at all.

The strict compliance principle also still applies as the data from the blockchain are reflected in the documents, so the bank is still adhering to the rule of dealing only with documentary conditions. In addition, the basis for the such a principle is that the Issuer should not impose its own subjective opinions on the underlying contract. The documents being produced through the blockchain and IoT are “objective facts”. In fact, these technologies help the Issuer in adhering to the strict compliance principle because computers are more objective than humans. Furthermore, they help parties in detecting potential documentary discrepancies: when there is one, they should follow the traditional waiver process whenever possible.

Many discrepancies go beyond violating the letter-of-credit terms as they also violate the underlying sales contract. IoT can detect a discrepancy in the temperature of goods at any point along the supply chain, every





time it goes out of range. Without IoT, the Applicant cannot waive the discrepancy because goods being shipped would spoil. With IOT, the focus shifts from “waiving” to “fixing” the discrepancy. It is therefore crucial that, once IoT detects a discrepancy, the Beneficiary is able to take immediate action. To take full advantage of smart contracts and IOT technology, the blockchain should immediately notify the Issuer and the Beneficiary in case the temperature goes out of range.

Assuming the Beneficiary still bears the risk of loss at that point in the shipment, he would have two options: wait for the Issuer to decide whether to allow the Applicant to waive the discrepancy or attempt to cure the defect before the Applicant decides whether to waive or not.

Although the latter option is untraditional, allowing the Beneficiary to “cure” a defect is one of the goals in a letter of credit, particularly in the UCP. Alternatively, in combination with sensors, parties could use actuators to implement decisions. Instead of just sending a signal for someone to check on the goods if they go out of the specified temperature range, actuators can automatically change the internal temperature so that it is in compliance. Theoretically, this compliance should substantially reduce, or even eliminate, any discrepancies within the letter of credit. When IoT detects a problem, the Beneficiary can overstep the Issuer in the attempt to cure it: again, this arguably violates the independence principle. The Applicant and Beneficiary purposely entered into a letter of credit, so that the issuer would act as a simple intermediary. If there is a problem with the goods, the Applicant should sue the Beneficiary through a contract claim. Physical information, such as the temperature of the goods goes to the underlying sales contract, not the letter of credit. If, for instance, the Issuer had the right to ask the Applicant whether he wants to waive the discrepancy, this would violate the independence principle as well, as the Issuer is not allowed to consider the quality of the goods. Similarly, allowing the Issuer to be involved would also violate the strict compliance principle, because the sales contract is separate from the documents the Beneficiary must provide in accordance with the letter-of-credit terms and stipulations. IoT simply grants the Applicant and the Beneficiary with more power to control what they contracted for in the underlying sales contract.

In the end, the synergy between blockchain, smart contracts, and IOT will facilitate the final step in a letter of credit transaction: payment

It is crucial for the “commercial actors” to consider how FinTech may modernize letters of credit and trade finance in general.

Before recent innovations, the independence principle was rightfully steadfast, as the Issuer could not inspect the goods. Applicants and Beneficiaries were helpless as the system heavily relied on the Applicant waiving discrepancies. Nowadays, the underlying sales contract can coexist alongside the letter of credit for technologies facilitate the documentary compliance step in the letter-of-credit process by linking “compliance” with “performance”.

In addition, they allow the Applicant and the Beneficiary to make informed decisions about the goods throughout the shipping process. If we look further, they are mostly able to replace the Issuer’s main responsibility in a letter of credit to act as an intermediary between the parties in effectuating payment.

Payment is indeed linked with performance and the risk between the Applicant and Beneficiary is neutralized: Beneficiary has the incentive to fix any problem with the goods, rather than waiting anxiously to see if the Applicant waives the defect. Similarly, the Applicant no longer has to waive defects and pay the Beneficiary in full, although he knows the goods do not comply with the underlying sales contract.

As the main reason parties agree on a letter of credit is a lack of trust, industry should move toward a truly “trustless” system with the least human involvement possible. Letters of credit will then remain a viable commercial credit mechanism for many decades to come.

The poor fit between discrepancies and default suggests a problem with the current system for there is a disconnect between the Seller’s performance of the underlying sales contract and the Seller’s right to be paid under the letter of credit.

