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Blockchain Powered Smart Contracts for Global Payments: Reimagining Security, Compliance, and Speed in the Age of Digital Finance

JES Journal of Electrical Systems

Abstract: - After decades of effort, traditional economies have bound talented people in a rule-driven global network of vital finance and trade. Despite recent technological advances, the international payments industry remains incomplete. It's impeded by the need for trust to protect users against corrupted operations - especially since the global trend of financial digitization is ongoing. It is a well-known fact that monetary intermediaries usually have organized operations running via centralized mechanisms. In conventional money transmission, complex interbank systems guarantee settlement. But the structure leaves ample chance for single points of failure and addresses various dangers in total.Economic markets are also worried about the substantial amount of money deposited with intermediaries - usually their service providers. Security can be improved to some extent by regulatory norms and devices, but in some fields, such as operational risk, bank fraud and customers' information security incidents, holes are inevitable. International payments became a central challenge of the crypto-economic sector. With the appearance of Bitcoin, the first successful experimental digital cash, digital money became viable. Since the Bitcoin experiment is ongoing, with tens of millions of dollars of each currency exchanged daily, several currencies have emerged on its ledger. At lengths considered impossible, transactions persist, re-establishing the money's original property. After a brief period of time, they could be tamperproof. Orders, similar to physical cash, could be written for digital money. These posts, however, are global – they can be sent from any online site – unregulated and exciting – they may prove tricky for customers to trust.

Keywords: Distributed ledger fintech, blockchain payments, blockchain finance, payment network, blockchain regulation, regulatory technology, payment commerciality, commercial paper, shadow banking.

1. Introduction

The global payments market is complex, vast, and essential for world economy trade. Total global payment transaction value is expected to reach $9,410 billion USD in 2025. Besides its growth, it is also undergoing rapid technological transformation towards digital finance. The emergence of blockchain-powered smart contracts is re-imaging payment processes in terms of security, compliance, and speed. Off-chain blockchain elements, such as those involving centralized hubs, payment networks, or ledgers, are found susceptible to single point of failure attacks against digital oracles, authorized smart contracts, or data sources. Considering the advancement in Distributed Ledger Technology (DLT) with Byzantine fault-tolerance, it is technically feasible to set up a secure channel to enable end-to-end secure transactions and avoid exposing sensitive information or payment instructions to potential adversaries. An in-house data driven prototype is presented to provide a new architecture for secure channel establishment between two blockchain platforms in the transfer of sensitive transactional data. It can prevent adversaries from deducing or tampering valuable information. An in-house smart contract for KYC preparedness and compliance reporting is coded to potentially control and automate the execution process of compliance framework agreements, and to enable establishing a future-proof legal evidence of being compliant with a specific element of a broader compliance regime. Analyses of publications during the timeframe from 2021 to 2021 are carried out.

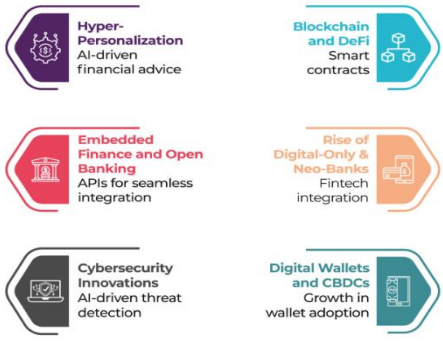

Fig 1: Digital Transformation for Financial Services

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1.1. Background and Significance Initially, finance was synonymous with economy and the instruments in use today, such as currency, were adjoined with the first civilizations, some 7000 years ago. Traditional finance involved the physical exchange of promissory notes, drafts, invoices, purchasing orders, confirmations of credit, clearance documentation, bills of lading, and a myriad of other documents transferring ownership in a complex set of consecutive steps, all of which had to be archived, and sometimes even notarized. In the contemporary era, the trade finance emotional roots remain close to the exchange of goods, where they belong forever. However, the backbone of these transactions is formed by the overall set of documentation, a pillar of concrete ideas and thoughts, including multiple copies of the same documents. These documented transactions were usually associated with people working in cross-time zones environments, sometimes in both Mandarin and Swahili. Indeed, to make sense of trade, the one who performs it must travel through them, understanding where shipping, net banking, and where culture met diplomacy. This seemed even more magical through a pre-1860s lens, involving the interplay of innovative technology: telegraph. Two decades prior, Henry Wells and William Fargo had figured that travelling through time zones could be expedited with a more physical model.

The trade in trade loans refers to a large cafeteria area, dedicated to the citizens of the city who required specific banking services. The cafetorium' services included the processing of payments, the notarization of trusts and last wills, and the archiving of valuable commodities. In this last regard, these services were located within the Silo district, right by the Western dock depot; the only industrial area of the city present inland, in the air of Anor. This geographic composition was not by chance, resembling a crystal key, embodying the motto of the city in its top ridge: bonds below, sovereign above.

Equ 1: Transaction Speed in Blockchain (T)

$$T = \frac{B}{S}$$

where:

- T = Transaction speed (transactions per second),
- B = Block size (in terms of data or transactions),
- S = Time taken for block verification (block generation time).

2. Overview of Blockchain Technology

Amid the COVID-19 pandemic, the world witnessed an unprecedented rise in cybersecurity threats even though the global economy became more dependent on digital technology during lockdown. Financial institutions were common targets with recent global economic stagnation contributing to higher cybercrime activities. While traditional financial institutions are considered to have inefficient, error-prone IT infrastructure with frequent latency issues in connecting global networks, the pandemic amplified these shortcomings. Although the transition from paper money to credit cards and bank-guaranteed digital payment networks has helped, cross-border payments still take 3 to 5 business days with a high percentage of delayed payments. Moreover, global payments still involve multiple intermediaries for just one cross-border transaction.

In this context, there are forces leading a tectonic shift to blockchain-powered smart contracts for a new era of global payments. Blockchain technology is a distributed ledger system powered by a chain of encrypted blocks to secure a transaction record. In blockchain-powered smart contracts, if a particular condition in the shared ledger is met, the contract's self-execution is triggered. The combination of blockchain with smart contracts can reimagine security, compliance, and speed in finance. There are contrasting perceptions of financial technology's disruptive power. Some financiers and IT experts favour it, whereas others believe the banking industry's huge sunk cost will prevent any rapid industry displacement. The domination of financial institutions in global payments traditionally adheres to the second view. Nevertheless, the above mentioned shortcomings are pushing even IT laggards to collaboratively join forces to explore fintech based on blockchain-powered smart contracts.

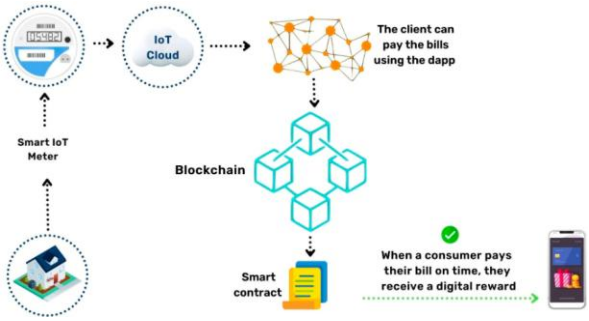

Fig 2: Blockchain Technologies

2.1. Definition and Characteristics Smart contracts are a way to convert a contract into an automatable code. This code is executed automatically whenever certain conditions, expressed in logic terms, are met. The appeal of this annulment lies in algorithmic enforcement of contracts. Smart contracts automatically perform an appropriate incentive mechanism or punishment in one way of a pre-established agreement, making it not only quick but also relatively cheap. However, the algorithmic automaton execution does not easily modify the agreement without the intervention of an administrative actor, or revoke it without the consent of the regulators. A classic vending machine is a good example of how automated enforcement is not particularly reliable; whenever a soft drink bottle momentarily blocks the output channel, too expensive to dispense, the customer's self-awareness and rationality acquire the drink by destabilizing the machine. Automated contracts are capable of random and unforeseeable events, so they are riddled with deficiencies that traditional contracts do not have. Moreover, an event that the contract is not able to register reliably (such as the foreclosure of a house validly concluded just before the expiration of the term of delivery of the premium) can generate an infinite number of alternative legal discussions. On the other hand, of course, a contract written according to an ambiguous natural language makes it difficult to decide its uncertain terms. Because of this flaw, a computer is unable to interpret the contract, which reduces the contract's intelligence. Smart contracts are a kind of technological contract that guarantees enforcement through computer scripts. The digital code, embodied in an electronic document, is inserted in a platform which further uses cryptographic algorithms to implement the contract. Once operated by this platform, the code is able to interact with the data cryptographically stored and time stamped in a blockchain. Considered by their zealots as a major technological breakthrough, smart contracts constitute a technology currently employed in many domains of human activity, from trade to intellectual property. Undoubtedly, the smart contract is welcomed by the bureaucracies of the courts and public notaries with reluctance, fear, or even open resistance. While the use of proposal and artificial intelligence to accelerate drafting activities can be studied in the field, the new role of lawyers in smart contracts will remain a neglected aspect in the literature of legal theory.

2.2. Types of Blockchain There are multiple types of blockchain based on comparing different aspects such as public and private, proof of work and proof of stake, and another category consists of naming it as the first, second, third, fourth, and the fifth generation. In public blockchains, network nodes make any transaction done by a sender, some of the transactions are grouped together to create a block or container, and this block is added to the blockchain network, where it has to be confirmed by the process of mining. As a result of mining, the block is permanently closed, and it cannot change again. Process called consensus is used to confirm the block. Blockchain network has to work in a democratic manner which means, each member has to vote to approve some changes in blockchain network. There are multiple consensus methods that can be used to achieve this target. Once the vote is completed and the result is 'yes', the necessary change in the blockchain network is done. In permissioned blockchains, not just anybody can take part in the blockchain validation process; you have to be invited to participate, because the validating nodes are all or mostly known. In PoW, miners run the hashing algorithm and find a block to fill the container, then the completed block is broadcasted to the blockchain network. Each node of the network publishes the block to its peers, and competition starts to find the valid hash. In PoS, there are no miners, and no competition among the nodes and the block is created periodically by selected validers. Broadcasted block is assigned a sequential number called slot, and each slot has a designated set of validers. Token holders lock up part of their stake for a period to be able to become a valider. Each valider signs their support by putting down a bond which represents a portion of their stake. Then, the block is committed and broadcasted to network members which can choose whether to accept it or not. Each block has a validity range based on the common reference string. Block with a valid hash and committed in the valid slot is recognized as such by the network. Block is not fully committed to the network unless a substantial percentage of the network accepts it. Error-tolerant methods are implemented so that potential errors are mitigated. In that way, the network of decentralized deterministic databases can be designed. Blockchain is not a new technological discovery, the tech is here for about 5 years, but it is not known wide and not adopted wide, Blockchain has a great potential, crypto is just a small part of it, there are hundreds of different use cases for blockchain, and thousands if not tens of thousands of new applications will be created per year; most of blockchains incorporate smart contracts that automatically enforce contract terms. This can greatly simplify and streamline business operations, data storage in blockchain is handled by all nodes on the network working together, ensuring data security and reliability, etc.

3. Understanding Smart Contracts

During the last couple of years there has been a lot of excitement surrounding Blockchain technology. There are a number of reasons for this. First off, Blockchain could be used to conduct transactions quickly and inexpensively. Blockchain can also be used to create a distributed ledger that is permanent and tamper-resistant. The buzz has also been fueled by the promise of smart contracts. Blockchains are systems allowing digital data to be stored in an unalterable, verifiable manner, while being distributed across a network of multiple, interlinked machines. Smart contracts are scripts that run on a blockchain, and that can encode the terms of agreements between individuals or content creators. They can, if designed appropriately, run autonomously, and prevent any of the contract's participants from altering the agreement after it has been signed . Advertising is a complex industry with a diverse set of arrangements that are not easily codified. This makes it impractical to encode advertising deals in such a way that a script might emulate traditional legal norms. Moreover, volatility associated with potential changes in the market make this industry prone to

errors or even attacks, rendering smart contracts potentially dangerous. However, some of the most damaging doubts regarding the viability of smart contracts in this sector have been based on the unpredictability generated by the relation of the underlying contract to the real world. These will be later explored together with potential solutions.

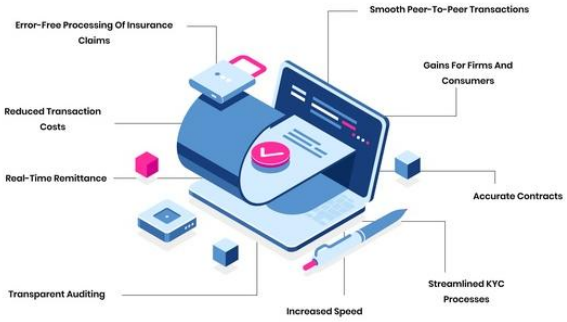

Fig 3: Smart contracts

3.1. Definition and Functionality Smart contracts, a concept with its origins in the 1990's, represent a novel approach to executing contractual (both legally binding and non-binding) agreements automatically utilizing computer code. Often hailed as the latest technological innovation poised to disrupt the global economy. Advances in Blockchain technology have facilitated the role of smart contracts in modern business and enabled their surge in popularity across global payment application sectors, for example, in the finance sector, investment in maintenance of expected products and services regardless or in spite of geo-political and macroeconomic risks. The automated approach these contracts provide between their bi-lateral partners and possibly many more parties, is expected to remove significant inefficiencies attributed to regulatory burdens and operational intricacies. Smart contracts are now increasingly percolating into policy and public discourse; as for the average onlooker, the interpretation and implementation of terms and obligations contained within them is rarely straightforward.

A smart contract is a self-executing contract or agreement where the processes of implementation or execution are automated and performed by a computer program, commonly running on a Blockchain network. The automated execution of smart contracts rely on customer-provided input and stores data on, but not limited to, the Blockchain. The interrelation by interacting with smart contracts can then pre-determine events, times and conditions which will automatically generate transactions to effect pre-agreed settlements or actions. Although this process has its attraction, for example the avoidance of chargebacks, litigation during disputes, and potential benefits in terms of efficiency and cost, smart contracts may contain coded problems or errors in their mechanism that will affect their outcome, making them void or invalid. In principle, Blockchain technology allows a smart contract code to be operating as intended. Engagements between business parties will generate the industry vocabulary standard previously referenced and described elsewhere in this fraternity agreement. Commonly referred to as “oracles,” 3rd parties would in effect nurture a connection to website or application programming interfaces outside of the Blockchain layer and would be writing onto the ledger at the smart contract’s command. Whether public or private, such inputs are in potential monopoly situations or may simply just be subject of exploitation. But is the reliance of a smart contract on such inputs procuring or negating the decentralized and trustless nature across industries of its supporters?

3.2. Advantages of Smart Contracts When a set of default contract terms is established, the smart contract will carry them out. When the terms of the agreement are met, the parties to the contract implement the operational and executive action plan outlined in the smart contract. If a payment is not received for the goods or services provided, the smart contract will initiate the process of recovering the items or stopping the delivery of the services.

Some benefits of blockchain-powered digital automation and arbitration are unequivocal. There are several aspects and functions of security and compliance which are automated via cryptocurrency’s blockchain patterns. Furthermore, there are functions of digital smart contract arbitration and transaction verification that may be of interest to other jurisdictions and financial professionals. These advantages, strategies, and tools will revolutionize the transaction and document handling benefits of the financial and legal sectors. The combination of digital arbitrations and standardized patterns of security and compliance allow cryptocurrency transactions to be secured, enforced, and verified that are much faster and cheaper than traditional manual processes. Extra-judicial documents may be automatically filed and secured through blockchain encryption for the purpose of canceling and executing smart contracts. Blockchain security features are implemented via encryption technology, making illegal access and modification impossible. The unique blockchain patterns are designed to cooperate with the cryptographic machine code of smart contracts, to automate transaction protecting and forensic evidence advantages. Therefore, unnecessary intervention by the law may be avoided with the use of private and domestic resolution of disputes, using blockchain and cryptocurrency tools to automate the enforcement of FIRTA and NDAs.

Equ 2: Transaction Cost in Blockchain (C)

$$C = F + P \times (T + R)$$

where:

- F = Fixed cost (platform fees or miner fees),
- P = Payment volume (amount of money transacted),
- T = Transaction time (processing time for smart contracts),
- R = Regulatory compliance cost (costs associated with ensuring

4. Global Payment Systems: Current Landscape

The ability to move money across borders using a global payment system (GPS) is a critical pillar of the new digital economy. Rapid and predictable flows of money lubricate the engine of e-commerce giant Amazon and empower more than 12 million platform workers on UpWork. Without means to move funds seamlessly between them, a driver in New Delhi could not accept a fare paid using the ride-sharing app Lyft, nor could a freelancer in Kampala accept payment for a job executed on the digital workspace Freelancer.

The goal of creating a widely-accessible GPS to aggregate payment rails across the world has so far proven elusive. Indeed, the current landscape is highly fragmented and comprises mostly closed-loop networks of correspondent banks, known as correspondent banking networks (CBs). The shape of the network affects inefficiencies – every bank must establish lines of credit with multiple other banks, which then must maintain relationships with multiple corresponding banks. As a result, the majority of the world's payment rails are routed through a small number of major financial centers with extensive networks, such as New York and London.

Final transaction settlement across the payment rail occurs through the bank accounts held by correspondent banks. It is this final settlement and other requirements related to correspondent banking that has put the ability to move money at the top of the stack of challenges faced by those engaging in online platform work, driving shared, and financing small transactions across borders. Consequently, credit is often drawn to finance the delay in final settlement. With billions of bank accounts and a globally scoped internet, the number of transactional relationships required to enable a free movement of funds across the world is infeasible absent a fundamental change in the underlying architecture of the system. This helps constrict transactions to a limited number of major financial centers.

Against this backdrop of walled financial gardens carved out by banks and states, money transmitters and indirect clearing systems have managed to insert themselves into the system and access its rails. With no right to settle across the payment rail, however, they too are eventually forced to rely on correspondent banks to reconcile and clear their final transactions. The result is an indirect relationship to the payment rail over which they have no control, and over which they cannot guarantee transaction finality if the corresponding banks refuse to act.

Fig 4: Global Payments Trends

4.1. Traditional Payment Systems The digital revolution has sparked swift transformation in the way global finance payments are made. Blockchain technology is known to be a frictionless, trustless platform that increasingly powers the financial technology field in the finance sector. It secures the transfer of value by encoding hashed time-stamped batches of transactions that form blocks and connecting them to a permissionless highly distributed chain of blocks, called blockchain. A transaction could be programmed to execute under certain specific conditions. Blockchain has enabled the development of smart financial contracts that embed business logic in computer code deployed on the blockchain.

The next evolution in this process consists of creating decentralized applications by building a user interface, plugging it into smart financial contracts and running it via a node. Smart payment platforms restore power to the payee. They incorporate exchange rate feeds and can be pegged to any asset or income. An external user can anchor their local currency to an asset and program the smart contract to invest in the selected interest-generating asset class. In the era of digital finance, smart contracts enable personal or commercial transacting to be conducted without the need to trust a counterparty or intermediaries. Regulatory authorities must investigate how to adapt their specific compliance requirements to this new technology of decentralized trustless contract performance and secure financial transfers.

4.2. Challenges in Global Payments Over the last decade, digital finance has transformed the way consumers and businesses handle their financial transactions. The proliferation of smartphones has made fast fintech solutions accessible to billions of people worldwide. A result, a variety of traditionally inconvenient transactions can now be performed in a matter of seconds with the tap of a touchscreen. In this new digital age, the reliance on cash for payments is rapidly decreasing. Advanced cashless electronic solutions such as NFC featuring seamless credit card payments or consumer-to-consumer apps are now dominating over a number of traditional payment methods. Alongside, blockchain technology might be the ultimate disruptor. The ledger technology backing up cryptocurrencies and the concept of smart contracts is promising to upend the industry of e-payments once again. Indeed, blockchain-based money transfer solutions are now being developed for securely exchanging digital currencies, which might as well be tokenized versions of fiat money. The so-called "stablecoins" aim at alleviating exchange rate volatilities against actual cryptocurrencies or new suggested private monies. During these transactions, the programs are executed by code without credentials of any party involved. Blockchains are mutable to smartphone applications, featuring decentralized token public ledgers which can be accessed through APIs by anyone on the globe. New blockchain-based protocols can provide more time and cost efficient alternatives to the existing fiat rails operated by banks. There are no account numbers or routing, just QR codes and/or alphanumeric chains identifying the token public ledger's account.

One of the most employed and efficient blockchain-based protocols for global token remittances is the Bitcoin blockchain. It was arguably the very first publicly accessible ledger of its kind, and it is still by far the most used. Bitcoin as a protocol behind the leading cryptocurrency was designed as an electronic peer-to-peer decentralized cashless payment system initially meant for financially underserved populations. Instead of just validating transactions, the nodes of the Bitcoin network also run software implementing "the protocol," which in natural language could be understood as a very new type of electronic money, based on transparent databases using order-pointers to chains of cryptographic signatures. It is a software capable of running on any computer and maintained so as to follow the consensus rules hardcoded in the source scripts by Bitcoin's seminal developer(s). It is a software capable of interacting, through the internet, with a global state transition set in its own data format. Block by block, to form an immutable chain of the world's last ledger of account. The inventions of millions of tablets globally have led to a change in the demographics of the regions that are considered unbanked. indoors started to pop up, and have been flourishing particularly in urban settings, where air quality could be largely questionable. Using simplified mobile applications running on always-connected devices, anyone in reach of the internet can lend or borrow a recently transferred, making much-needed funds available quickly either to the ones in need and uninterested in long-term credits otherwise unavailable, or even to those who are willing to install assets on opportunely presented contracts.

5. Integration of Smart Contracts in Global Payments

The separation of implementation aspects from the business logics in smart contracts makes it possible to construct self-enforceable agreements within virtual, global blockchain-driven systems involving cross-jurisdictional parties. Such smart contracts are expected to power applications beyond cryptocurrencies, tokenizing assets, contracts, and financial services across global peer-to-peer networks. These applications typically require the seamless integration of smart contracts with the broader legal and banking environment surrounding the parties involved. Utilizing a qualitative approach informed by the capacity to apply pre existing legal standards to smart-deal defense mechanisms, the outstanding challenges of facing digital global business are examined in the context of cryptocurrencies and international commerce within smart contracts.

Global financial transactions, when taking place in conventional banking, are determined by the terms governing the method of payment and underlying trade of goods or services. This overarching framework involves standard regulations and relies on correspondent banking relationships, commercial letters of credit, and central banks as final guarantors, and financial intermediaries to clear and settle transactions. This comprehensive infrastructure is based on the standardization of agreed terms that are authenticated by the involved parties using a priori agreed-on enforcements, risk management, and arbitrage procedures. In the event of disagreement arising out of the terms, the matter is escalated to legal bodies to enforce the agreed terms or change them in view of the submitted legal evidence. The application of any smart deals should provide references to applicable legal and indicia documents.

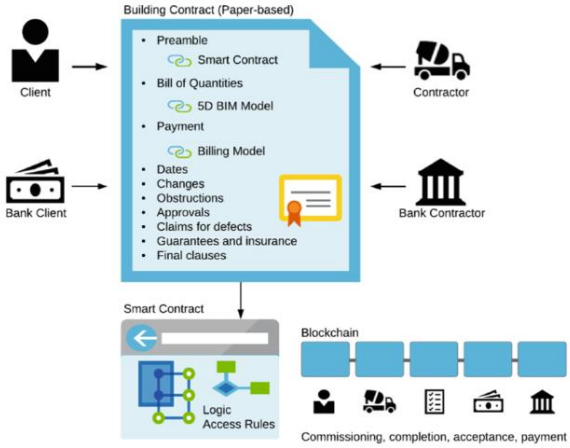

Fig 5: Integration of a Smart Contract

5.1. Mechanisms of Integration Technological advancements such as digitalization and tokenization have significantly improved the phasing of finance. Mobile connectivity and e-commerce growth have increased financial inclusion. Cross-border digital finance also allows the ability to easily access foreign markets, enhances the culture of international online investments, and eventually requires global payments. The digitization of finances is paralleled by the growth of decentralized structures, as the emergence of blockchain technology. The easiest form of sharing is open code-sharing. This offers cryptographic proof and the structured machine to ensure secured identity, thus allowing the transaction and agreement to be carried out. As such open code on the ledger can be as contracts or digital representations of deals programmed with self-executing instructions and auto-performed predetermined actions, thereby executing what is agreed upon. The basic presumption of the connection of smart agreements with the declared objective states that a smart agreement can be considered enforceable and binding under contract legislation. However, the implementation of this technology indeed amplifies multiple legal and financial hurdles.

Accordingly, smart contract applications require feedback and interaction with the external world, which is accessible only through the establishment of integrated mechanisms. Integration mechanisms forward these requests to the oracles and receive the reply data from the oracles. The consensus mechanism confirms the oracle data of the truthful oracle and allows updating the contract state. Finally, blockchain technology is profoundly being used in different sectors for the facilitation of trade and the blockchain revolution will alter the global trading system.

The draft law project on the fundamental principles of electronic law proposes mechanisms through which a smart contract solution can be approved and analyses the mechanisms of integration. The effectiveness of smart contract solutions is dependent on the specific principles. Therefore, little consideration is given to smart contract provisions. The development of general principles, as opposed to detailed guidance, by legislators or governmental bodies in most jurisdictions.

5.2. Case Studies of Smart Contracts in Payments The rapid evolution in the field of payment solutions, especially blockchain technology, has favored the creation and implementation of smart contracts in business relationships. They function as a digital agreement that automatically verifies and executes transactions when pre-specified terms and conditions are fulfilled. They are used for financial transactions specifically because they are cost-effective, accessible and open-source. Besides, they incorporate the reliability, anonymity and security features of blockchain technology, providing transparency and authenticity to the transactions held. These transactions are not only between two parties in an international legal relationship, but they also usually involve money transfers between the contractual partners in differing juridical orders. However, the implementation of smart contracts in payment matters will significantly revolutionize the commercial legal framework of these relationships; settling the dispute more promptly and effectively. Because electronic records may be produced, executed and stored in a decentralized system with virtually no possibility of being tampered with, the evidential value of smart contracts on blockchain technology is critical for immediately determining the factual statement of the partners' transactions. Alternatively, it is much less expensive and time-consuming to agree on a de-escalated price in order to resolve the disputes. In the absence of identical conditions, parties are evolving their settlements into private companies' decisions, with an anonymous forum in many cases.

Furthermore, a blockchain technically improved fast primarily in cryptocurrency transactions and gained important tools for payment relations in many states. Therefore, adoption and governmental encouragement to use a blockchain were considered. The platform provider must provide reasonable means to enable the parties involved to have lower collateral. Generally, this can be achieved by setting aside the pre-specified funds and entering into a smart provider's smart contract controlling them, where their conditional release will be determined. Relatively to other features, along with secure roads, machine execution and stability city-scale load, low-cost blockchain-ecosystems for small businesses can be accomplished by utilizing generalised pre-conceived

models of software architecture. Finally, the proposed algorithm solves a wide range of resource allocation issues with additional constraints, giving priority to some of them.

Equ 3: Smart Contract Execution Time (E)

$$E = \frac{N}{P} \times (L + V)$$

where:

- E = Execution time of the smart contract (in milliseconds),
- N = Number of participants (in the smart contract),
- P = Number of actions or transactions in the contract,
- L = Time to execute legal compliance checks,
- V = Time to verify the transaction against the blockchain ledger.

6. Conclusion

... as a service from the approval or execution of the loan itself. This is also the tactical stance taken by ê for most of the cloud's applications for capital and collateral in global securities finance. However, this does not diminish the network's legitimate potential to disrupt the market, including the intentions of central bankers and regulators to explore proof of concepts. Pre-defined, automated smart contracts within a permissioned blockchain are seen by some as an inevitable development in financing capital. Local regulators will be presented with a variety of design and oversight models, the development of which is already occupying their agendas. There are many things that consumers and suppliers alike take for granted but which are far from free market norms or universals. Good examples include contract terms, conditions, and guarantees, and the enforcement and remediation of breach. In securities finance, the ability to define and bind these things has always been politically constrained, but this in no way undermines the development of objectively "good" rules or standards. Reg Loans are a fundamental example of a contract that without the blockchain foundation improves only the quality of information and the temporariness of registration. It does not eliminate potential non-compliance with the event terms. On the other hand, a purely written non-Internet paper contract with a content regulation foundation filed with the state authority will clarify what grounds are supposed to be accepted, but it is still unclear (outside the contract) when the event terms should be accepted. A further analysis can identify several reasons for the lack of blockchain foundation, including regulatory concerns, administrative difficulties, and the possibility that parties are part of a business secret.

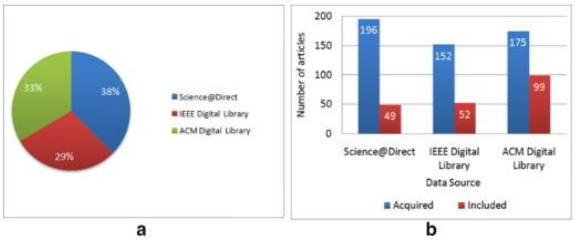

Fig : Blockchain smart contracts

6.1. Future Trends As with any technology still in its infancy, the real-world use of blockchain technology is evolving. However, its potential has already sparked a great deal of imagination. While financial services are likely to be the most fertile ground for the development and use of blockchain technology, other uses may include tracking the flow of global commodities, assets, and aid, etc., tokenization of non-financial assets, i.e. investing in new and relatively illiquid assets, etc. The new transactions also have to raise security-related considerations that did not exist before, and part of the currently available security solutions are not fit to protect new vulnerabilities. Since 2009, blockchain technology has made possible cryptocurrencies such as Bitcoin that can be easily transferred between users once a consensus protocol has validated the holding user balance. In 2014, the Ethereum project used the underlying blockchain technology to launch a decentralized platform featuring smart contracts. A smart contract is a computer protocol that eliminates the need to use third parties to enforce digital agreements. More concretely, smart contracts are self-executing contracts with the terms of the agreement between buyer and seller written directly into lines of code. Since then, a number of blockchain platforms offering smart contracts have or are near to be rolled out. Smart contracts between two users on a blockchain are as secure as the underlying blockchain network technology, and there is no reason why such a technology could not be extended between parties living in different countries. At the current stage, financial institutions compete both against cryptocurrencies and other Fintech companies providing digital currencies transaction services without the overhead cost due to existing compliance and use restrictions . On top of that, the use of smart contracts raises new risks and issues that differ from others already faced in the current business environment, and already established incumbents are likely unprepared to counteract.

There is a growing awareness that blockchain technology could drastically disrupt the existing financial industry infrastructure. The financial services industry has experienced a number of changes in response to the rise of Fintech startups. In contrast to other

sectors, the financial services industry is peculiar in that partnerships and acquisition practices between Fintech startups and established institutions can be difficult. Such a closure may lead to an increased defensive behavior by Fintech startups, and open cooperation could go unrealized. Other parts of the financial services industry are slowly starting to realize that blockchain technology could significantly affect their market and are taking precautions to be prepared before a critical mass of market share is lost to new entrants. Finance and business scholars have also contributed to the debate by examining either the technological features of blockchain platforms or the uptake of cryptocurrencies, but less attention has been dedicated to the likely responses of involved actors.

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