WAVESTONE

REGULATOR'S POSTURE FACING BLOCKCHAIN:

OUR INTERNATIONAL STANDPOINT

WAVESTONE

www.wavestone.com

Wavestone is a consulting firm, created from the merger of Solucom and Kurt Salmon's European Business (excluding retails and consumer goods outside of France) Wavestone's mission is to enlighten and guide their clients in the most critical decisions, drawing on functional, sectoral and technological expertise.

RIGHT NOW, WE'RE BANKING ON BLOCKCHAIN

As a major international consulting firm, we must consider a number of innovative trends and determine the potential and business value they can offer to our clients. We then screen these trends to deduce which will work best for our clients and build our credentials. For blockchain, we have adopted an approach that can really transform our future business landscape. As the use of such technology increases, the intervention of governments, legislators and regulatory bodies has become necessary to manage and advance the burgeoning fintech ecosystem. Within our "Shake Up" initiative, for example, we are already working with a selection of blockchain entrepreneurs.

Additionally, Wavestone recently launched a dedicated Blockchain Observatory. We believe that monitoring blockchain regulation is key to anticipating future trends. Although this first publication is not exhaustive, it encompasses the visions and testimonies of all our international offices, as well as those of some of our partners. I hope this insight will help you to decrypt this protocol and the regulatory landscape in which it currently sits.

JOËL NADJAR
Global Financial Services Director,
Wavestone

AUTHORS

Christine Wrucka

With a computer science background, Christine is Associate Director in Financial Services with 10 years of experience in regulatory and risk management consulting. She pilots missions and provides training in areas including regulatory compliance, audit and cybercrime.
She has developed a particular interest in new methods and operators of payment, blockchain naturally being part of her remit.

christine.wrucka@wavestone.com

Arnaud Pechoux

Arnaud is Senior Manager in Financial Services. He leads large transformation projects for financial organizations, mutual organizations and retail companies.
He is a specialist in the digital transformation of customer and user relations. Within Wavestone he is in charge of the Blockchain Lab as well as the Faktory's chatbot initiative.

arnaud.pechoux@wavestone.com

Dorian Schaal

A Master's graduate in finance from ESCE Business School in Paris, Dorian is a consultant in Financial Services and Digital Transformation.
He advises projects for the development of smartphone applications for banks, as well as other projects linked to technological innovation such as blockchain and new payment methods.

dorian.schaal@wavestone.com

CONTENTS

BLOCKCHAIN:

THE NEW WAVE OF CHANGE

A “tsunami”; The “Uberisation of Uber”; “The Trust Machine”; however you see it Blockchain offers a lot of hope and promise for such a fledgling technology. But these fast-moving trends require pragmatism. We are in the early stages of a technological disruption; a revolution that is forcing us to take a leap in the dark. The winds of change are blowing and our technological landscape is undergoing vast changes with potential to rewrite our outdated standards and rules. The first steps have been taken in numerous countries; we are on the move! The technology ecosystem is on the right track. In addition to corporates and organizations, regulatory institutions and state authorities are now onboard as we try to transform the “beast” of technology into “beauty”.

WHY BLOCKCHAIN NEEDS TO BE REGULATED

In 2015 and 2016, colossal sums were invested in blockchain worldwide. Toward the end of 2016 and throughout 2017 we've seen an explosion in the number of regulatory initiatives and use cases arising from those who were the first to adopt the protocol. Experts predict that by 2020 blockchain will be in mainstream use, but what is this protocol about? How did it become a trend? Despite emerging in 2008, why did it only take off a few years ago? Here, we try to answer these questions.

A SHORT HISTORY OF BLOCKCHAIN

The publication of *The Trust Machine* in The Economist in October 2015 pushed blockchain into the international spotlight. Since then the publicity has skyrocketed and today, blockchain is the biggest thing since the Internet. Although the article was a major catalyst, it was not the only reason for this success.

Penalized by the 2008 subprime crisis, people started to question traditional financial institutions. With communities beginning to show a lack of trust in the financial system, the demand for "people-to-people" solutions grew rapidly. Bypassing supreme power structures and dealing directly on a consumer-to-consumer basis, this sentiment set the trend for blockchain development.

> The Dark Web is an online marketplace selling licit and illicit goods. Bitcoin, and its lack of regulatory controls, made it easy for suppliers to anonymously accept digital payments. It was this dark market association that prompted regulators to be wary of Bitcoin. Note however, that although illegal goods and money laundering certainly did not help Bitcoin's case in the eyes of regulators, it gave the cryptocurrency legitimacy as a means of payment.

Following the financial crisis, Satoshi Nakamoto launched Bitcoin; a cryptocurrency enabling secure exchange without the need for trusted third party[1] intervention. The idea was based on a simple observation: commerce on the Internet was relying almost exclusively on financial institutions to serve as an intermediary for processing electronic payments. For those wary of financial institutions, Bitcoin was the perfect solution. It was safe and anonymous, but people had to learn how to use it. Regrettably, Bitcoin also turned out to be an ideal means of payment for Dark-Web users.

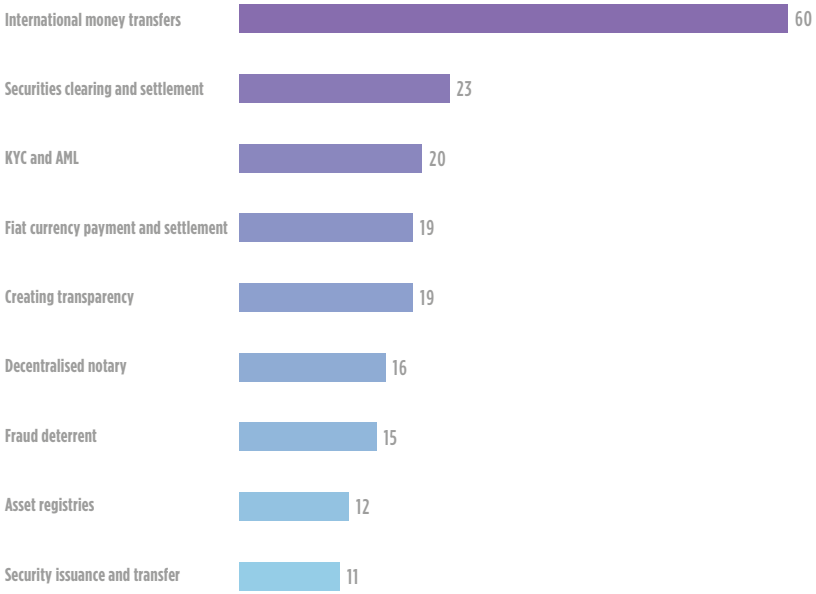
1. https://bitcoin.org/bitcoin.pdf

As interest in the technology grew, banks and regulators began to realize that blockchain was more than just a decentralized cryptocurrency. The concept of its underlying technology as a global, transparent and distributed ledger has the potential to offer a vast number of advantages for financial institutions in need of modernization. Thus triggering considerable interest in blockchain as a protocol.

When the banks set the rules

At the time, blockchain was seen as a threat to modern banking, given that its autonomous and trustworthy profile replaces the bank's role as intermediary. However, it emerged that should banks wish to remain at the forefront of the technology and implement blockchain in their own operations, they can operate at unprecedented levels of efficiency at a fraction of their current costs. As soon as they realized this, banks started investing heavily in blockchain, thus sending entrepreneurs worldwide the message: *"Blockchain has an immense potential, you should look at it more closely"*. A Deloitte study carried out in 2015 highlights the first use cases identified by the banks:

Top Bank Initial Use Cases For Blockchain - 2015 (in %)



Source: EFMA and Deloitte, n° 3,000

From euphoria to reality

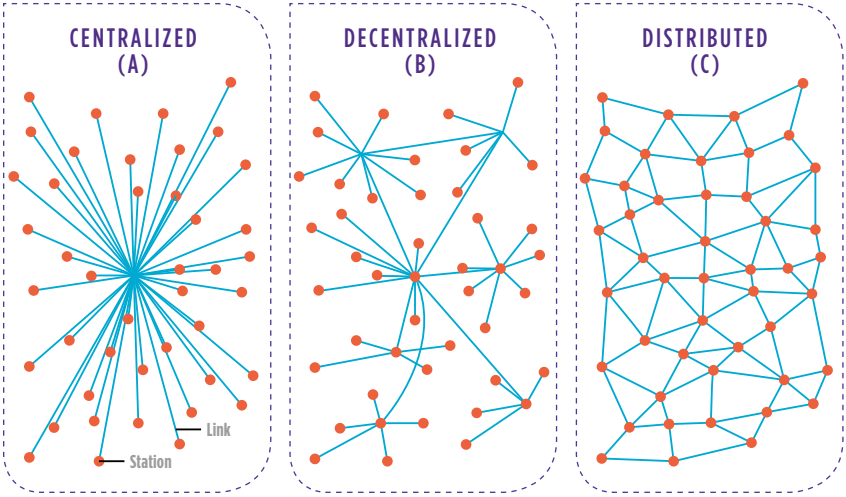
In light of this, banks and financial organizations decided that cooperation was needed to help blockchain move forward. Most of these financial players decided to join forces within a pool or a consortium to invest in blockchain. Initiatives such as open innovation labs were set up to carry out Proof of Concepts and test feasibility.

As such, limitations began to emerge and disagreements over the technology prompted some "first insiders", such as Goldman Sachs, to withdraw from the R3 project. The different collaborative movements helped these players to identify barriers and, as such, begin to understand the major challenges involved in exploiting the potential of blockchain technology to the full, notably with respect to regulatory issues.

REGULATORY ISSUES

When talking about regulation, it is crucial to understand the different regulatory models pertaining to transactions between a principal (public or private power), and an agent (a consumer):

- a two-way relationship (for example, buying a coffee with money): the public indirectly act as a regulator through the way they choose to spend their money;
- a third-party transaction: the producer is regulated through the delivery of a service (a natural or public monopoly such as an electricity supplier is formally regulated by a public regulator that works for the government);
- an oligarchic system: several consortia collude to obtain the power to regulate the supply of materials;



- a decentralized or federal system: part of the power and regulatory authority is entrusted to local people who ensure that regulations are respected;
- a distributed system: everybody has the power to transact - buy and sell (PriceMinister, Airbnb, etc.) - regulations are derived from rules enforced by the platform.

A “distributed ledger” is a database, allowing users to create, send and store information in an efficient and secure manner. Its “distributed” properties ensure that:

1. Operations can be carried out safely without a central administrator. In this way, need for the intervention of a known and trusted third party is removed.

2. The ledger is always available for examination which makes it easily auditable. Every recording is traceable since it is connected to the recordings before and after it in the ledger.

3. Because every node of the network possesses its own version of the ledger, anyone wishing to falsify information would have to change the information stored in each copy of the ledger. This immutability means that the ledger cannot be modified.

These characteristics guarantee that the distributed ledger has an optimal level of reliability, while giving each participant access to the same, real-time, updated information.

Nevertheless, people tend to confuse DLTs with blockchains: the DLT is, in fact, a form of database, whereas blockchain is a protocol.

As illustrated below, after examining blockchain’s potential as a distributed ledger, the reputed bank consortium, R3, has chosen not to use the blockchain technology to build its DLT solution, Corda.

In our publication, we will focus on the DLTs that do use blockchain technology.

INTERVIEW

Laurent Kratz, co-founder of ScoreChain

THE POTENTIAL OF DLTS IN THE FIELD OF ASSET MANAGEMENT

Six major banks (ANZ, BNP Paribas, BNY Mellon, DBS Bank, RBC et Wells Fargo) will participate to a global initiative under the aegis of the SWIFT network: the "Distributed Ledger Technology" (DLT), in order to determine if it can help the bank institutions to consolidate their database Nostro in real time.

The DLT offers a possibility of disintermediation of the traditional processes and seems to be able to allow important economies of scale but is facing a lack of responsiveness from the governments and public regulation authorities. A global harmonization and a common governance are the two foundations that need to be laid to offer an appropriate framework to this technology and encourage a global and efficient development of initiatives related to the DLTs.

The DLT, revolution or diversion? Irrational exuberance or future of the banking sector?

To talk about this, we have met Laurent Kratz, co-founder of Scorechain, a Luxembourger company founded in 2015 and specialized in the providing of Bitcoin and Blockchain services to actor of the Bitcoin market.

Through the Fundchain initiative, Scorechain has tried to demonstrate that it is possible to evolve from a centralized technology to the DLT and "smart contracts". The reality is that all the regulation, law maker and the financial enforcement authorities have been compelling for years for the market players to adopt a stricly centralized approach. How do you see a gradual convergence between these two extreme: is it possible? If yes, in one stage or progressively?

Two main scenarios are emerging:

1/ A progressive evolution, slow and costly: to operate today, the regulation and the supervisory authorities are asking a "mirroring" approach next to the existing model. The work has to be done twice and in parallel, because only a legal person can be responsible for the ledger on the on the part of the funds of the "Management Company"[2]. This cannot be replaced by the technology.

2/ The revolutionary approach (through new entrants like Fintechs) based on a 100% DLT/Blockchain technology, allowing a direct technological process between the asset manager and the investor, without a broker.

Leave things unchanged would be highly detrimental for the market in its globality.

2. Specific term in Luxembourg

Are innovators going to approach the financial authorities to convince them to take these new models into account?

In the initial phase, the two major challenges will be to change the actual regulation and convince the authorities to implement new models without a central authority. Thus, innovators like Fintechs won't be able, in the first place, to directly compete with traditional actor based on strictly regulated financial instruments. They will therefore have to turn towards less regulated instruments and focus on niches like "hedge funds" and other alternative funds.

Today, colossal sums are invested in the DLTs, to permit, in the long run, to develop a competitive business beside the classical players, as soon as the regulatory framework will be favorable. To this day, we can talk about a sort of favoritism with respect to centralized models that benefit the temporary protection offered by the regulation in force. How to get out of this deadlock?

It's really complicated for incumbents to bring innovation and historically this has seldom been the case. Innovation is more likely a matter for new entrants such as Fintechs. That's why they need to strive to demonstrate Distributed Ledgers is one of the technologies of the future by raising awareness, so regulators can adapt quicker. And yet, discussions around how to adapt have started.

In my point of view, DLTs fintechs are under the watchful eye of the Luxembourgish regulator. I think regulators start caring but they are not legislators. For that reason, even if legislators are on the right path, they need to be more proactive. Indeed, sometimes regulators are constrained to follow the use trend if a majority of investors express the need. The ICO (Initial Coin Offering in the Ethereum Blockchain) for example: this initiative has been very popular, the investors are massively demanding for this kind of instrument. The regulation should be put into question and harmonised as soon as possible to foster a rapid adaptation to specificities of the DLT.

JEAN DIEDERICH
Partner, Wavestone Luxembourg

This raises the question as to whether the regulations in force correspond to blockchain. In the next section, we give an overview of the regulatory measures taken to frame, guide and follow-up on blockchain initiatives. Degrees of maturity are quite heterogeneous from one country to the next. In the next section, a brief disclaimer concerning the regulatory framework will be made, followed by a discussion on the blockchain labs and Sandboxes, as well as at the bills and laws that are either for or against blockchain development.

THE REGULATORY LANDSCAPE IN FINANCIAL SERVICES

INGREDIENTS FOR AN APPROPRIATE REGULATORY FRAMEWORK

We have seen that strict regulatory measures tend to limit new entrant activity. Imposing high entry barriers makes it difficult for application and software start-ups, as well as established traditional technology providers to invest, develop, test, and implement innovative technology solutions, due to the lack of regulatory and government support. Lack of access to investment capital, together with high entry barriers that prevent development and the heavy regulatory burden create a rigid environment that is not conducive to the rapid technological transformation we are seeing in digitalization.

From an international perspective, we will now look at the framework set up to promote blockchain initiatives.

Blockchain Labs

The blockchain lab is a sort of research center that synthesizes all the fundamental knowledge and provides a regular flow of specialized reports necessary to understand complex ecosystems[3]. The lab tests these ecosystems by developing projects and Proofs of Concept (POCs) covering a wide range of industries and business areas that leverage blockchain technology. It also provides strategic and technical advice by adopting an opportunity-identification and problem-solving approach. In addition, thanks to the network, the lab is able to connect with various startup teams and therefore assist clients in structuring the best investment deals.

> In France for example, the two major regulatory institutions – the Autorité des Marchés Financiers (AMF) and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) – have created a dedicated Fintech division. The aim of these labs is to offer a single point of entry for innovative startups and notably to provide regulatory advice to Fintechs during the start-up phase.

Sandboxes

Like all fledgling technological innovations, blockchain technology has given rise to several uncertainties concerning the real benefits and potential risks. Depending on the tradeoff of advantages and the disadvantages, the regulator decides whether or not

3. Acculturation, training, IT Framework, Guidelines, Proof of Concept, etc.

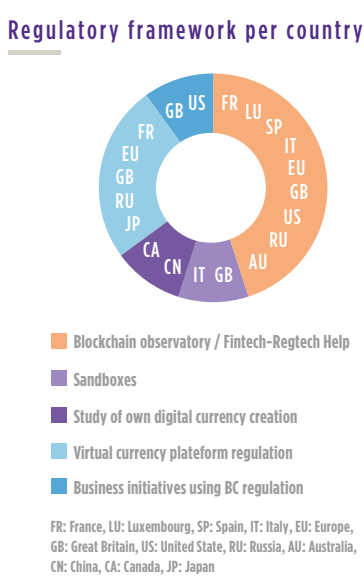
to promote the innovation in question. Regulations are constantly exposed to a risk of obsolescence due to the speed of technological innovation. However, the adoption of innovations must always be weighed against reliability and safety requirements.

To do this, the regulatory authority sets up a sandbox together with industry. This gives players a better understanding of the challenges facing the technology, and an idea as to what the infrastructure will look like and what is going to be impacted in the area that will be disrupted. The Sandbox can then provide the IT framework and guidelines, as well as advice and rules to all new entrants, enabling the regulatory body to efficiently perform its regulatory task. Experience and feedback provided give regulators a better understanding of the challenges involved. This activity indicates any changes necessary to adapt the regulatory environment allowing it to better regulate these businesses whilst ensuring that the legislation does not hamper innovation. Two such initiatives have emerged in Europe:

/ **Italy** The National Bank discussed the question of developing this innovation to facilitate collaboration between startups and Fintechs and traditional actors with various stakeholders, including financial institutions, technology providers operating in the banking sector and academics, as well as public and supervisory authorities. The institution has set up an internal multidisciplinary work group dedicated to the analysis of national blockchain initiatives.

/ **UK** The Financial Conduct Authority (FCA) developed its "Regulatory Sandbox" as a development platform to allow businesses to "test innovative products, services, business models and delivery mechanisms in a live regulatory environment". The Regulatory Sandbox gives businesses temporary FCA authorization to try out their products in a "safe place" testing environment. In addition, the FCA has signed several cooperation agreements with other leading financial services regulators to lend support in the development of international projects. For example, the Australian Securities and Investments Commission (ASIC) and the Monetary Authority of Singapore (MAS) have established a referral environment for innovative businesses seeking to enter each other's markets.

Some examples of regional legislative initiatives



While regulatory bodies in some of the countries cited in this Insight have already given positive responses to requests for business accreditation, most regulatory institutions in the countries under review are still in the blockchain tech observation phase.

/ **Arizona** In February 2017, the governor of Arizona – Doug Ducey - was looking to use blockchain to secure contracts. On March 29, he signed a bill that recognizes blockchain signatures and smart contracts under state laws.
Notably; "a signature that is secured through blockchain technology is considered to be in electronic form and to be an electronic signature [...]. A record or contract that is secured through blockchain technology is in an electronic form and an electronic record[4]."
Arizona is the second state in the US to regulate the use of blockchain for contracts and data management, after Vermont decided to authorize the use of blockchain data in court trials.

Some go even further in their approach to using this technology, by fostering the creation of a new national digital currency which allows them to maintain control and helps to stabilize the financial system.

/ **Canada** In 2015, the Canadian government began to look into the cryptocurrency as a means to jumpstart the economy and reduce financial transaction costs. As such, by the end of 2016, the Central Bank of Canada began to develop a digital version of the Canadian dollar based on blockchain technology (the CADcoin), a blockchain initiative designed to create a wholesale payment settlement system.
The aim of the CADcoin system is to facilitate the exchange of Canadian dollars with their digital currency equivalent which could be settled by participating banks. The project,

4. https://cryptoinsider.com/new-arizona-law-gives-legal-status-Blockchain-based-smart-contracts/

launched by a closed blockchain network comprising the Central Bank and financial institutions, is focused more on reducing transaction costs at the national level than on controlling the economy.
Nonetheless, the Central Bank still believes the Bitcoin is positive for the Canadian economy.

/ **China** In 2014, the People's Bank of China explored ways to build its own cryptocurrency, based on blockchain. While the initial aim was to reduce transaction costs, this initiative should also enhance transparency and help counter money laundering and tax evasion. Although the official launch date has yet to be set, the PBC has announced it will issue its own cryptocurrency to provide more liquidity to commercial banks if required[5].
Printing money and the fight against counterfeiting are expensive for public authorities in a country with a population of 1.4 billion people. Adding digital currencies to scriptural money can also enhance transaction speed, convenience and transparency and, as such, cut out the middleman in the payment process.
In addition, the aim of these operations is to reinforce central government control on the foreign exchange markets inside the country.
To combat the strengthening of the Bitcoin, the Chinese government initially endeavored to forbid Bitcoin transactions, then tried to devalue it.

Disclaimer concerning regulations in the financial services

Note however, that the above chart does not reflect the willingness to curb possible drifts of such a technology and the initial aim of financial system regulations:

1. KYC and the two-fold fight against money laundering and financing of terrorism
2. Payment operability security
3. Personal data protection

Concerning the 1st and the 2nd points, regulators in the countries reviewed in our study, particularly the European states (notably France, the UK and Luxembourg) and Japan, are in the process of reinforcing current regulations. As leverage to achieve this France (via the Ministry of Finance) and the UK (via the FCA), for example, have carried out public consultations with players in the blockchain sector to structure the use of blockchain for transmitting financial securities and recording transactions. Some initiatives, such as KYC, have already been launched.

5. https://www.bloomberg.com/news/articles/2017-02-23/pboc-is-going-digital-as-mobile-payments-boom-transforms-economy

Topic Overview

Compliance activities, notably Know-Your-Customer (KYC) and Anti-Money Laundering (AML) make up the bulk of business-related costs for banks and related institutions[6] such as insurance companies. Compliance costs relate to the time and effort spent on confirming the identity of the entities with which they intend doing business. Documentation must be dispatched and verified before undertaking any business dealings with potential clients.

The blockchain database also acts as an alternative solution to replace and enhance current KYC / AML processes by providing a single, decentralized identity network. The fact that identities managed on such a blockchain network cannot be modified and are verified by other nodes on the chain (i.e. banks) establishes a level of identity trust.

Case Study

KYC Chain

The KYC Chain is a blockchain network currently being developed to address this KYC/AML compliance issue. This chain will serve as a platform for banks to verify the identities of entities on the network and assess the compliance of their doing business with them. Compared with current processes, entities on the platform would benefit from the fact that they would have fewer checks (and double checks) to carry out, as well as greater control over the information presented to other parties and enhanced visibility on how banks assess their identity[7].

For banks, the KYC chain would reduce client-onboarding costs. Once an identity is established and verified on the KYC chain, the owner of a particular identity would retain control over it, but all changes made to the identity would be recorded on the blockchain, ensuring a full paper trail of activity back to the first day the identity was established.

Current regulatory constraints pertaining to blockchain tech properties

With regards to blockchain technology, several issues must be dealt with, namely:

- The "right to be forgotten" and KYC updates made during the business relationship since it is impossible to modify identities in the blockchain
- Sharing confidential information and personal intra-group data when some subsidiaries are governed by regional regulations forbidding the geographical transfer of data
- Sharing confidential information and personal intra-group data which is not permitted under current legislation

Disclaimer regarding the risks of identity fraud

The added value of data sharing allowed by DLT between the different entities of a same group and requires only one verification runs the risk of disseminating a fake identity until the next KYC update.

6. https://www.accenture.com/us-en/insight-banking-on-Blockchain
7. http://kyc-chain.com/

At the European level, regulatory trends are beginning to reflect mounting concerns surrounding virtual currencies. According to the European Commission, "transactions with virtual currencies benefit from a higher degree of anonymity [...] and therefore entail a risk that virtual currencies may be used by terrorist organisations to conceal financial transfers"[8]. To rectify this situation, the European Commission wants to extend the scope of the fourth Anti-Money Laundering Directive (AMLD) to include the virtual currency exchange platform. The objective is to reduce anonymity so as to prevent the recurrence of bad experiences, as in the case of Ripple. This can be achieved by combating money laundering (AML) and the financing of terrorism (CFT).

Topic Overview

No regulations existed when blockchain first came into mainstream usage. Some early adopters that started using the technology sometimes found themselves not adhering to relevant financial services legislation. Ripple for example, bypassed regulations and failed to register as a money services business.

Case Study

Ripple

Under the pretext of offering solutions enabling banks to carry out transactions directly, instantly and with certainty of settlement, Ripple was in fact concealing its real activity. They were hosting a virtual currency exchange platform, selling digital tokens to clients to settle payments on their network.

Ripple boasts a client portfolio that currently includes 15 of the top 50 banks and operates in 9 countries. However, in May 2015, the US federal anti-money laundering agency, the Financial Crimes Enforcement Network (FinCEN), announced that Ripple Labs Inc. (Ripple) and its subsidiary had been ordered to pay a $700k civil penalty for operating as an unregistered money services business[9]. Ripple agreed to undertake remedial measures to ensure future compliance with AML/CFT obligations.

> Transactions with virtual currencies benefit from a higher degree of anonymity

Regarding the third point on personal data protection, regulations are also being reinforced. For example GDPR legislation, is being extended to financial institutions.

8. https://bitcoinmagazine.com/articles/new-eu-directive-may-impose-anti-money-laundering-regulations-on-bitcoin-wallet-providers-1468424029/

9. https://www.fincen.gov/news/news-releases/fincen-fines-ripple-labs-inc-first-civil-enforcement-action-against-virtual

Topic Overview

GDPR ensures the protection of personal data by following principles based on consent, right to information, right of access, rectification and portability, the right to forget and on safety measures, focusing particularly on data confidentiality (Regulation (EU) 2016/679 of the European Parliament and of the Council dated April 27, 2016[10]). This raises the question as to whether the measures carried out regarding personal data protection apply to blockchain technology.

On the one hand, the complexity of the subject stems from the intrinsic nature of blockchain as distributed systems. It seems relatively straightforward to control for private and hybrid blockchains for which the mining community and data storage infrastructures can be mastered. However, this appears much trickier for public blockchains where data access protection, based on certified identification and authentication systems as well as on the definition of authorization levels, is becoming a priority to ensure traceability.

Case Study

Recommendations

Putting theory into practice, the first thing to do would be to request the identity of the author (which is the notary's task). These would then be structured into a hybrid blockchain in a smart contract involving several partners (notary, tax services, banks, insurance provider etc.) to whom a person would give, in accordance with the GDPR, his/her explicit consent (with the possibility of automatic periodic consent renewal), and whose discretion should be ensured until his/her death.

Thereafter, only a public officer (carried out via an electronic identification, such as a certified eIDAS) would be authorized to trigger the smart contract by declaring the end of the blockchain. The partner would then receive, through a secure transfer, the statements established under the terms of the contract to execute them. This example highlights the importance of a well-established numerical identity that is certified and cannot be modified by a third party.

Another issue blockchain is confronted with is the "right to be forgotten". Blockchain retains a trace of all operations and rehashes made across the entire chain, at every iteration. Other than setting up a form of governance to administrate the removal of contaminated blocks (complex governance could be allowed via "51% attacks"), which could be a conceivable solution for private blockchains, how can personal identity removal be treated in, and propagated throughout, public blockchains?

Thereafter, the person in charge of processing should pay particular attention to this kind of technology and master its different functional, organizational and infrastructural aspects so as to comply with GDPR regulations. While European regulations insist on the principle of sovereignty and data protection, blockchain clearly offers users the opportunity to take back control of their numerical data.

10. http://ec.europa.eu/justice/data-protection/reform/files/regulation_oj_en.pdf

Blockchain and the insurance industry

Insurance is one of the first sectors to have recently made large investments in blockchain protocol. Drawing on the experience of micro-insurance and peer-to-peer insurance[11], this sector benefits from a new form of blockchain; the smart contract. Automation of contract operations mitigates all interactions between the principal (company) and the agent (insured party[12]). Parametric insurance ensures a perfect match with blockchain. The "minibon" is a good example to illustrate how the state can set up a legal framework to foster this use case in the insurance sector (*see Laurent Leloup's Focus below*).

For the micro insurance model, one can consider autonomous entities of persons (groups of insured persons). Since the rules of insurance in this case would be configured on a smart-contract basis, premiums paid by the insured parties would be pooled on the blockchain and available for compensation in accordance with rules specified in smart contracts. The basic pillars of insurance are maintained and the insurance company - as the middle man - is squeezed. This forward-looking vision is based on the concept of Autonomous Decentralized Organization (ADO).

> Automation of contract operations mitigates all interactions between the principal and the agent

Due to the lack of interactions between the insurance company and the end-user, the need for Customer Relationship Management in this sector is particularly limited. It would seem that the only moment of significant contact with clients is during the claims process and also the onboarding step.

Regarding loyalty programs, therefore, blockchain can offer support using colored coins. Running a loyalty program on a blockchain and managing loyalty points as a bonus or a penalty for example is already possible and works very well.

If no points are redeemed, part of the loyalty program can easily be managed on a blockchain.

11. brought mainly by developing countries

12. Time-consuming management steps such as claims reporting, verification and the triggering of compensation are virtually eliminated. Associated structural costs also decrease: accounting provisions, management costs, people management and workload. Three main sources of leverage: cost reduction, processes to reduce back-office operations and compensation process automation. Automation of compensation processes: process simplification accounts for 80% of the potential of Blockchain in the insurance sector Today, the reimbursement procedure for a client can be optimized, as some tasks are redundant and not fully efficient

FOCUS

Laurent Leloup, Founder of Chaineum, Blockness and France Blockteck

FRANCE REVISES LAW TO PROMOTE THE BLOCKCHAIN

In France, a particular type of promissory note, the minibon (formerly known as the bon de caisse) will shortly be represented and transmitted via Distributed Ledger Technology (DLT), following the publication of forthcoming laws on the blockchain applying to certain financial securities.

Bons de Caisse

As defined by the Decree dated August 25, 1937, bon de caisse are basically debt securities representing a portion of a loan. Purchasing a bon de caisse is equivalent to granting a loan to the issuer.

This is, therefore, a fixed-term investment, normally made via a financial establishment, whereby the investor receives a nominative or bearer security. Bons de caisse are nominative (i.e. issued in the owner's name); they cannot be traded or sold.

At maturity (generally after 1 to 5 years), the lender receives the principle plus the interest due (calculated on the initial fixed rate). Unlike interest paid on bonds, which is paid annually, interest on these debt securities is paid at maturity. In general, the longer the investment, the higher the interest rate.

Minibons

Article 168 of the August 6, 2015 Macron Law (for Growth, Business and Equality of Economic Opportunities) reformed the legal framework of the bon de caisse, allowing this type of debt security to be traded on crowdfunding platforms as of May 2016.

To remain abreast of the surge in crowdfunding, and notably crowdlending of interest-bearing loans, the French government created a new class of bons de caisse, called minibons, for crowdfunding purposes. Investments are capped at €2,000 per investor for interest-bearing loans and at €5,000 for interest-free loans. Created by the ordinance dated April 28, 2016 and supplemented by the decree dated October 28, 2016, Minibons, can only be traded via crowdfunding platforms that are Crowdfunding Advisor (CIP) or Investment Services Provider (ISP) certified.

Minibons and the Blockchain

The April 28 2016 law relating to bons de caisse and the creation of the minibon, stipulates that the issuance and disposal of the latter may be carried out via a DLT system enabling authentication of

these operations under conditions to be defined in a future decree, thus allowing recourse to blockchain technology. The Sapin 2 bill will give the government the right to decree by ordinance the measures required to use this technology for the representation and transmission of non-listed securities. During parliamentary debates on this bill, the government presented the blockchain as "an innovative information technology allowing users of a network to validate, by consensus, exchanges and transactions between several participants without intermediary of a centralized body".

The Blockchain Ordinance Project and Public Consultation

This law not only provides the first legal recognition of blockchain's validity, but also the first definition of the technology: the law stipulates that the system will be based on a "Distributed Ledger Technology" (DLT) enabling authentication of disposal operations. Prior to this project, the French treasury launched, at end-March, a public consultation on "blockchain ordinance" applying to certain financial securities. The aim of this was to gather the opinions of the different stakeholders, as well as to establish the underlying principles and the regulatory level to be implemented for this reform. Following the public consultation on May 19, the French Ministry of Economy and Finance will publish a summary of the feedback.

This project is particularly positive for the blockchain ecosystem in France and abroad in that it lends official credence to blockchain technology and underscores the importance for organizations and economic players of appropriating the technology in order to develop new use cases, and the possibility for investors to finance the expansion of blockchain startups (Blocktechs).

BLOCKCHAIN PROTOCOL EFFICIENT IN OTHER SECTORS

Our study of blockchain with regard to financial services indicates that the protocol is appropriate for other sectors and seems particularly valuable in business cases that:

- can be split into separate steps;
- hold data which can, or must be displayed to anyone;
- have no real-time requirements to carry out transactions;
- need to tackle cross-border interoperability issues;
- are not subject to heavy regulations;
- do not want to waste time having to manage multiple stakeholder requirements and governance;
- do not have much money to invest.

In the next part of our study, we look at some regulated sectors that already use blockchain; Energy, Transport and the Drugs-Safety Cycle.

Moreover, sectors such as Supply Chain, Fashion and Fishing[13] are also "blockchained" in some countries. Blockchains that are enhanced by electronic tracking technology are already delivering impressive, real-life results.

We must look beyond the financial vision of bitcoin to understand the added value offered by blockchain as a protocol. In the next section, we go one step further and explore domains where business expectations are closer to blockchain fundamentals. In instances when data is less sensitive, when instantaneous transactions are not mandatory and when the regulatory role is less central or the regulator cannot do its job, blockchain excels.

13. https://www.provenance.org/

CURRENT BLOCKCHAIN TRENDS

In this section, we discuss the industries where blockchain is flourishing. The scope of use is extensive. To understand the added value of blockchain as a protocol we must look beyond the financial vision of bitcoin. As we will see, once the mechanics and strengths of blockchain have been understood and mastered, the technology can be used in a countless number of ways. But first, let's consider the protocol as a real base for global economic development.

CERTIFICATION USING BLOCKCHAIN

INTELLECTUAL PROPERTY AND DATA RIGHTS MANAGEMENT

Topic Overview

Content assets and intellectual property are now more digitized than ever before, with ownership and use rights exchanged and distributed at a faster rate. This media trend has given rise to new risks and issues in terms of ownership and use that, at present, are poorly managed. Furthermore, the costs associated with managing these risks are deducted directly from potential earnings of content-producers, managers and syndicates.

Case Study

Mediachain

Mediachain is a blockchain that manages the ownership and distribution of content such as images/ pictures and songs. User-generated media that is put on the blockchain (the "Mediachain core") retains attributes of ownership and other "metadata". Other users on the blockchain can subscribe to the content, an action which would also be executed and recorded on the ledger.[14]

This type of blockchain activity will help to determine precisely which users are consuming what content, thus addressing a usage problem the music industry is currently facing. For this reason, Mediachain was recently acquired by the digital streaming company Spotify to help with purchase attribution, an unresolved problem that has caused legal issues and fines for Spotify in the past.[15]

PROCESS CERTIFICATION: WHEN BLOCKCHAIN MEETS THE SUPPLY CHAIN

Topic Overview

Suppliers and buyers alike will benefit from increased transparency and better information through the use of "tokenized tracking"16 and smart-contract execution. Increasing trust will not only lead to cheaper and more streamlined supply chains, but also limit some of the negative externalities created by the current process.

Case Study

Alibaba

Alibaba, the Chinese e-commerce and business giant, has launched an initiative utilizing a blockchain to ensure that the quality of the food and drugs sent through their services is maintained from start to finish. Like other supply chains, end-to-end processes for food and drugs are subject to fraud and non-compliance[17]. In China, food fraud is a substantial problem that can lead to sickness and even death[18].

The company plans to build a pilot blockchain in partnership with AusPost (Australian Postal Service), Blackmores (a nutritional-supplement maker), and PwC. The blockchain would increase the power of control measures (such as quality inspection) by ensuring that the correct parties perform controls and that the results are not tampered with and are

14. http://www.mediachain.io/
15. https://techcrunch.com/2017/04/26/spotify-acquires-Blockchain-startup-mediachain-to-solve-musics-attribution-problem/
16. https://hbr.org/2017/03/global-supply-chains-are-about-to-get-better-thanks-to-Blockchain
17. http://www.pwccn.com/en/press-room/press-releases/pr-240317.html
18. http://news.xinhuanet.com/english/2008-12/01/content_10441344.htm

visible to the appropriate parties. The subsequent reduction in fraud would enhance consumer health and confidence and potentially lower quality control costs, making for fewer regulatory penalties and more efficient pricing[19].

Case Study

Cantina Volpone's Falanghina

Cantina Volpone's Falanghina, a major wine merchant in Italy, has collaborated with EzLab and EY to create a new blockchain-based tracking system for the Italian wine industry. The new Wine Blockchain is designed to provide consumers with reliable information about the wines they purchase by allowing them to access details about a wine's cultivation, production process, and point of sale (data that will be securely stored using blockchain technology).

Through Ethereum, the platform will store blockchain records with details about the wine's supply chain, geographical origin, and quality. Consumers can use their smartphones to access this certification data by scanning QR codes on bottle labels. This platform was launched to counter foreign competition and counterfeit wine products that have caused substantial monetary losses in recent years in Italy.

THE CADASTRAL BLOCKCHAIN

Topic Overview

The creation of a centralized property rights system required to modernize developing countries helps to:

- Change relations between those that rule and those that are governed and, as such, give citizens the legal tools they need to defend their property against the risk of expropriation
- Institutionalize the right of ownership. This notably allows administrations to make decisions in the case of conflict on land issues, and above all, to facilitate property tax collection

Case Study

Ghanaian Property Register

In recent years, Ghanaian public authorities have sought to modernize their administration by adapting their legal framework to the reality of their territory. One of the major development vectors is the creation of a land cadastre listing all current titles of ownership. Indeed, up to now, the system of property rights favored customary law (representing about 80% of the Ghanaian land system), giving tribal chiefs the power to legislate land issues at the local level. Thus, there is no centralized data permitting the creation of a national cadastre.

Several obstacles are currently obstructing the implementation of land system reform:

- Taking the census of property titles is a costly and administrative process;
- Notification of changes in property ownership in some cases is only communicated to village chiefs. Setting up a cadastre would therefore become rapidly obsolete if information is not centralized and updated;
- The lack of independence between political and land administration bodies fosters the corruption of cadastral files.

Developing a cadastre based on blockchain technology is one way to address these issues. From a practical point of view, people wishing to register their land on the cadastre of their city can fill in a form available on the internet. The data is then stored in the blockchain and cannot be removed to avoid data piracy.

19. http://www.the-Blockchain.com/2017/03/30/alibaba-tackle-counterfeit-food-china-Blockchain/

THE ROLE OF BLOCKCHAIN IN DEVELOPING SMART CITIES

BY IMPROVING BUREAUCRACY EFFICIENCY

Topic Overview

Blockchain technology has the capability to address some of the inefficiencies related to governmental and bureaucratic activities. Paper-heavy activities that require signatures, dates and transport are ripe for modernization through blockchain's immutability combined with its authentication features. This modernization would not only reduce the cost of these processes, but also speed them up and boost activity volumes.

The same authentication concept could also be applied to voting processes, not just for government activities and elections, but also for shareholder voting on corporate activities. Taking this even further, the concept of a digital identity on the blockchain could serve as immutable identification in other areas such as payments. While these concepts are being discussed, the largest active authority working on such a project is Smart Dubai.

Case Study

Smart Dubai

The city of Dubai has the ambitious goal of becoming the "world's first blockchain powered government" and has enlisted the help of blockchain thought leaders IBM and ConsenSys to help them. The project will be co-led by two Dubai organizations, Smart Dubai and the Dubai Future Foundation, with IBM acting as Dubai's blockchain strategic partner and ConsenSys as the blockchain city advisor[20].

The migration target for the city (set for 2020) includes a digitization strategy to secure government documents on the blockchain including visa applications, bill payments and license renewals. Dubai plans to open its platform to accommodate international travelers, by helping with identity management, including passport verification, visa processes, car rentals, payments, and wireless services. The strategy is also looking to enable citizens to create new businesses across many different economic sectors[21].

Smart Dubai will begin launching pilot programs in August and is looking to use the technology to transform major, everyday experiences[22].

The combined counseling of IBM and ConsenSys will provide a unique dynamic, as both players champion different blockchains; IBM with Hyperledger's Fabric and ConsenSys with Ethereum. If Dubai is open to leveraging both technologies it would provide the world's best set of functional use cases, allowing each chain to showcase its strengths and weaknesses. The emergence of smart cities may be the next big blockchain trend and Dubai is making a convincing case to be considered the global leader in this domain.

20. https://menaherald.com/en/countries/uae/smart-dubai-kicks-off-first-ever-city-wide-implementation-Blockchain-selects-ibm-lead-strategic-partner-consensys-city-advisor/

21. http://www.smartdubai.ae/dubai_Blockchain.php

22. http://www.coindesk.com/dubai-government-ibm-city-Blockchain-pilot/

AND THE TRANSPORTATION OF ENERGY

Topic Overview

A few large utility and infrastructure companies dominate their respective fields in a near-cartel fashion, often serving as the exclusive buyer and supplier of electricity, travel and transit, cable, phone, and internet services. This power is granted to such companies to protect consumers from sub-standard or inconsistent services, and provide suppliers with a more stable source of demand. The economies of scale that these companies benefit from reinforce their usefulness, and create a cycle of necessity that can be both wasteful and harmful.

Blockchain technology has the capability to compliment or replace the activities of some of the large companies by serving as a transparent, efficient, and effective network for energy or other assets to be managed and exchanged. Infrastructure security (physical and cyber) is also an acknowledged priority of utility companies (i.e. energy, water) and regulators that could be addressed by blockchain[23].

Case Study

Brooklyn Microgrid

Brooklyn Microgrid is currently in the process of developing a community Microgrid for solar energy using the Ethereum Blockchain in the Gowanus and Park Slope neighborhoods of Brooklyn. The project is being developed by two companies - LO3 & Consensys – which have already had success with a similar test project:[24] the TransActive Grid, a Microgrid supplying energy to 15 houses in the same area.

Community Microgrids offer an innovative grid-operation approach that serves to achieve a sustainable, secure, and cost-effective energy system by providing long-term, locally-generated power security within a community. While these Microgrids are currently being designed to run in parallel with existing energy infrastructures, they could eventually replace existing structures if successful.

23. https://www.eia.gov/energyexplained/index.cfm?page=electricity_delivery

24. http://www.npr.org/sections/alltechconsidered/2016/07/04/482958497how-blockchain-helps-brooklyn-dwellers-use-neighbors-solar-energy

GOING FURTHER:

THE BLOCKCHAIN TO FACILITATE CROSS BORDER ECONOMIC TRADE

In 2030, 60% of the world population will be living in a metropolis[25]; a fact that gives rise to discussions around smart technologies to connect humans and cities. Cities are becoming increasingly connected with each other so that they can interact and benefit from what their neighboring cities have to offer.

To illustrate this trend, let's look at one of the most important and ambitious projects of the century: OBOR – One Belt One Road. This consists in establishing an economic road connecting Europe with Asia via North Africa and Russia. Initiated by Beijing and Hong Kong, the project is still in its early stages and has raised the question of how to connect countries with very different infrastructures, different currencies, often unstable governments and, for the most part, without a full stack banking system in place. This is where blockchain comes into play.

To talk about this, we met Gilbert Reveillon, President ICT and Digital Economy from Comité National des Conseillers du Commerce Extérieur de la France (French Trade Advisor) and Charles D'Haussy, Head of Fintech at InvestHK, a Hong Kong based state agency, facilitating foreign investments.

25. http://www.un.org/en/development/desa/news/population/world-urbanization-conspects-2014.html

INTERVIEW

Gilbert Reveillon, President ICT and Digital Economy from the Comité National des Conseillers du Commerce Extérieur de la France (French Trade Advisor)

What can you tell us about this mega program OBOR?

OBOR is the acronym for One Belt-One Road, a reference to China's strategy to establish new international trade corridors. In 2013, President Xi Jinping launched a new trade strategy to develop China's opportunities for the Middle East, Africa and Europe. More commonly known as the "silk road", also known as the "silk belt". In terms of Public investment, one can compare it to the Marshall Plan, but 10 times bigger, planned for 10 more years. In terms of commitment of public, private and government resources, it exceeds €500 billion per year, with a 10-year forecast aiming at $8 trillion over the entire period.

Why is such a program driven from Hong Kong and why is Blockchain on the list to support it?

Hong Kong aims to begin the counterpart of major international and European Finance marketplaces; it is the major marketplace finance for OBOR. But the 3 marketplaces Shangaï – Singapore – Hong Kong are all competing to attract outbound international flows from Brexit… but the 2 Chinese marketplaces are committing to this national goal. To fully understand why Blockchain is believed to be a potential solution for handling part of OBOR transactions, one should remember: still a great part of Chinese people are unbanked, even though 60% of ecommerce ($450Bn in 2016 #1 rank worldwide) is done using smartphone. Internet in China is massively used in a C2C way and marketplaces allow great P2P enhancement. In China there is also a greater concentration of marketplace lending activity: more than 2500 lending platforms were running in 2015. Peer-to-peer lending has been also a way of compensating for this lack of a banking framework. So the regulator tends now to monitor this activity by reducing the number of platform in order to manage "China Out Bounds" transactions (see controls of exchanges). As China's domestic production surplus is massive, Blockchain has got assets to promote and spread it.

Regulation wise, how is China facing Blockchain challenges?

Chinese people have entered an era of conquest and export. OBOR is a perfect example of this dynamic in structural & political manners. At the same time, they are putting in place a legislation

framework by July 1, 2017, to help them on this path to even stronger cybersecurity and law enforcement : KYC, transparency and tracking of transactions, control and monitor quality of operations as well as clean asset management… This is the equivalent of the European GDPR following decades of the French CNIL best practices. One of the major differences for Chinese people is the way they use the Internet (out of the DNS managed by ICAAN since 2006[26]) and for foreign companies the location of their servers and other Back-end also content management is mandatory in China, in order to comply with political upmost controls[27]… As China has got major issues to tackle such as product quality, fraud failures and security issues – due also to their follower and copier strategy in the 1980s and 90s - Blockchain now has the inherentfeatures to do that as recognized by engaged resources from worldwide Chinese leaders such as Alibaba[28].

ARNAUD PECHOUX
Senior Manager, Wavestone Paris

INTERVIEW

Charles D'Haussy, Head of Fintech at InvestHK
THE ONE BELT ONE ROAD PROJECT

This project aims to enhance cross border economic trade; can you tell us about it?

Belt and Road is a global economic planning initiative; an infrastructure project involving the construction of routes and harbors, etc. from Asia to Europe, via Kenya, India and Russia. More generally, it is a regional economic planning program headed up by Beijing to facilitate growth, as well as economic and cultural trade. It will impact a total of 3 billion people hailing from a variety of countries, some of which have underdeveloped infrastructures and varying degrees of financial maturity. This is where blockchain comes into play.

You represent a Hong Kong based agency. What legitimacy does Hong Kong have to drive this project?

Hong Kong is a super connector; a "regional town", with an enormous volume of business and transactions with China and the world. Because all activities and companies located in Hong Kong are regional firms, when it came to designing the blockchain,

26. https://ternumeric.hypotheses.org/172

27. https://www.frstrategie.org/publications/notes/web/documents/2006/20061012.pdf

28. http://www.coindesk.com/alibaba-pwc-partner-to-fight-food-fraud-with-blockchain/

it immediately became a cross border debate. From the outset, therefore, Hong Kong took the subject of blockchain very seriously. Designed almost because of its super-connector business model, both at the financial level, with the colossal amounts of liquidity involved, and in terms of product diversity, blockchain boasts properties that seem to fit well with HK's specific profile. The government rapidly understood the strategic advantage offered by blockchain, and to make further progress in this area, it would like to establish dialogues on standards and governance.

What kind of a consortium will it be?

The idea behind this project is to create a blockchain consortium like ICANN for the Internet which establishes standards and makes strategic decisions. Currently under development, it will be launched in September 2017 after a major political forum.

A lot of thought has been put into the blockchain consortium at all levels with a view to determine how to handle identity, governance, consensus methods, trust process, transaction methods and the legal environment. This is a structural approach. HK wants to set up rules for producing, creating and carrying out business deals with China. This involves establishing consensus and trust processes. For example, business deals with Kenya are not handled through the classic network but via a solid and structural approach. Visions should be cross border and cross industry. At this stage, the choice of solutions provider is not an issue; the correct protocol and consortium must first be set up before looking for the right blockchain technology providers to interoperate and implement it.

Definitively, what do you plan to do to make blockchain mainstream?

HK would like to promote blockchain in these countries so that it can carry out transactions with them. To do this, if these countries want to work with us, we will provide an open source blockchain-based solution enabling them to carry out deals with us. We'll offer a way to handle personal and commercial entity identities by providing standards and governance that have been established by our consortium. Countries wishing to do transactions with us must agree to these governance and legal aspects.

The first step in the planning is to focus on top players then it's up to private companies to react and follow suit. Thereafter, everybody can get involved at their own level.

CHADI HANTOUCHE
Senior Manager, Wavestone HK

CONCLUSION

Since Satoshi Nakamoto announced the launch of Bitcoin in 2008, blockchain technology has made huge steps forward. Different types of blockchain are still emerging and researchers continue to pursue their quest to find derivations and optimization solutions such as colored coins, the side chain, and the off chain. Most institutions at the core of the financial services sector view blockchain, and more generally DLTs, as a major technological revolution, although its development is undeniably being restricted by the emergence of several restraints. When drawing up financial regulations, regulatory bodies must decide whether they want to chase after the movement or work with it to build an aligned legal framework. This is key to ensuring equilibrium, worker protection and business development.

For players operating in sectors that are not regulated or are not subject to tight legislative controls, things run well. Nevertheless, logic goes beyond regulatory barriers. These players often use blockchain assets as they emerge: choosing to benefit from a trusted blockchain network that provides data retention security and transparency, as well as immutability of stored information, IT infrastructure resilience, and lower operating costs than those offered by well-known IT solutions.

Blockchain/ DLT technology is still in its early stages. Before it can reach its peak, however, it will have to tackle several major issues that have not been covered in this this Insight: scalability, open-source protocol governance, cross border cooperation, sustainable investments and friendly interaction with end-users. Independent and expansionary progress in these major areas, however, is a considerable obstacle which will be hard to address.

In this first review, we have given our international perspective on this major phenomenon and its consequences on regulation. We hope that this qualitative analysis, which draws on contributions from all our offices around the world, has proved enlightening. We look forward to preparing our next publication on the subject and giving our updated vision of regulation and blockchain.

Logic goes beyond regulatory barriers

CONTRIBUTORS AND OFFICES

Paris
Christine Wrucka, Associate Director
Arnaud Pechoux, Senior Manager
Dorian Schaal, Consultant
William Riche, Consultant

Marseille
Sandra Courpasson, Manager

Hong Kong
Chadi Hantouche, Senior Manager

United Kingdom
Mathew Wells, Senior Manager
Marlena Zakrzewska Millard, Account manager

New York
Brian Smocovich, Consultant
Caleb Ferguson, Consultant
Thierry Sanvee, Partner
Samuel Desta, Senior manager
Ismail Fahad, Manager

Madrid (BIP)
Juan Rufat, Head of Financial Services
Antonio Sanz, Senior Manager

Italy (BIP)
Marco Antichi, Senior Partner
Barba Enzo, Partner

Belgium
Frédéric Hertogs, Partner

Luxembourg
Jean Diederich, Partner
Cécile de Barsy, Director

WAVESTONE

www.wavestone.com