The Blockchain Revolution

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Finalist

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Is is a revolt? No, your Majesty, it is a revolution.

An exceptionally quiet and warm night – thought Louis seated in front of an old oak table covered with dozens of gold coins. Recently, he had not had much time to sit in silence and immerse himself in studying his favourite objects: coins. *It would be much easier to be a simple banker*, he sighed. The silence in the chamber was disturbed for a moment. His complaint was finally absorbed by the Persian carpet that lay proudly on the old floor. Obviously, there were thoughts and worries running through the monarch's head but he did not pay much attention to them. *Problems are born out of thinking* – he thought. He could not understand people – those strange creatures were a real mystery to him. *The world turns too fast – let's focus on coins, solid objects that, unlike humans and their ideas, are predictable and easy to inspect*.

Even though the night was calm and very warm, anxiety hovered in the air. Something was supposed to happen, something was lurking in the darkness waiting patiently to reveal its face.

Then, the heavily-decorated doors flew open with a *tumultuous bang*. The silver moon shone on the red, frightened face of the figure that had sneaked, unauthorized, into Louis's private kingdom: "My Lord…the Bastille demolished" – said the figure, who turned out to be the Duke of Rochefoucauld.

"C'est une révolte?"[1] - Louis

1 s this a revolt? No, Sire, it is a revolution – the famous words that King Louis XVI and the Duke of Rochefoucauld exchanged just after the people of Paris took the Bastille.

asked – he was tired of those people and their ridiculous demands. *Rebels are just part of the way things are* – he thought - *I will not think about it now, I will think about it tomorrow*.

"Non, Sire, c'est une révolution" – the Duke answered and silence followed…

An unusual way to start an intellectual discourse on blockchain, one could say. Two-hundred and twenty-seven years and 92 days after the famous fortress of Bastille was demolished I could not resist the temptation to refer to that famous conversation between Louis XVI and the Duke of Rochefoucauld. The analogy seemed compelling. Given that, we might ask ourselves: Is blockchain a minor revolt or is it a new Great Revolution set to reshape the world as we know it? If the latter is the case, will there be any ethical impact? Will such a revolution be ethical in its essence? What are the compliance and ethical concerns around the adoption of the technology? Whatever the answers to those questions, we should not underestimate the wind of change in the way that Louis XVI once did. What we now might perceive as an evolution, or as a mere revolt, might turn out to be a storm, a revolution redefining finance and/or ethics.

Blockchain est-il une révolte mineure ou s'agit-il d'une Grande Révolution qui va remodeler le monde que nous connaissons ? Dans ce dernier cas, est-ce qu'il y aura un impact éthique ? Une telle révolution sera-t-elle éthique dans son essence même ? Quelles sont les préoccupations en termes de respect de la réglementation et d'éthique que suscite l'adoption de la nouvelle technologie ?

How does blockchain work?

The concept of blockchain is similar to that of a database – it permanently records transactions in a manner that cannot be later deleted or manipulated and can only be sequentially updated. It contains a record of all transactions that have ever been completed on it, creating a never-ending historical trail (Mougayar, 2016).

The technology is based on a chain of 'blocks' where each block groups together individual transactions once they have been validated. Each block is added to the chain through the process of "mining" and, once added, the transactions within the block are considered valid. Since new blocks are confirmed based on the previous block's information, the more blocks that have been added to an existing block, the more a transaction within that block has received confirmation. In order to keep the ledger consistent, any newly created block is broadcast across the network for everyone to see.

Each successive block contains a unique fingerprint ("hash") of the previous code, thus cryptography (via hash codes) secures the authentication of the transaction source and eliminates the need for a central intermediary (Mougayar, 2015). Addresses and signatures are created with the use of private/public key generation. They can only be produced by a private key holder and be verified by anyone seeing a public key, therefore only the private key holder is able to complete a transaction successfully. "It's a bit like your home address. You can publish your home address publicly, but that doesn't give any information about what your home looks like on

Le concept de chaîne de blocs est similaire à celui de base de données – il enregistre en permanence les transactions d'une façon qui ne peut être effacée ultérieurement ou manipulée mais qui peut uniquement être mise à jour séquentiellement. La technologie est basée sur une chaîne de blocs dans laquelle chaque bloc regroupe l'ensemble des transactions individuelles une fois qu'elles ont été validées. Chaque bloc

est ajouté à la chaîne à travers le processus de « minage » qui permet de valider les transactions à l'intérieur du bloc. Afin de garantir la cohérence du registre, tout bloc nouvellement créé est diffusé sur tout le réseau de façon à ce que chacun puisse le voir. Chaque bloc successif contient une empreinte unique (« hash ») du code précédent ; ainsi, la cryptographie (à travers les codes hash) garantit l'authentification de la source de la transaction et élimine le besoin d'un intermédiaire central.

La tempête de Blockchain est analysée de près par les plus importants acteurs financiers et les institutions financières font des investissements considérable dans l'exploitation de la technologie pour leur propre usage. Blockchain peut potentiellement avoir un grand impact non seulement sur les secteurs spécialisés de l'industrie financière mais sur l'ensemble des marchés. Une percée semble imminente,

the inside. You'll need your private key to enter your private home, and since you have claimed that address as yours, no one else can claim the same address as theirs." (Mougayar, 2015).

Wind of change

Blockchain technology is definitely making headlines in newspapers covering many sectors: IT, music, healthcare, politics, law, and social life, to name just a few. The feeling of a breakthrough is almost tangible. Conferences, publications, new impressive ideas and dozens of solemn phrases about blockchain are present in almost every field. For those outside the race, it might look as if blockchain technology is a secret panacea for the world's problems : hunger, economic exclusion, environmental and human exploitation, government abuse, democracy deficit and so on (Meunier, 2017). Is that all? What is there for the financial world, if anything at all?

Those who try to keep up to date with blockchain news will soon realise that the blockchain storm is far from being unnoticed by large financial players. UBS, BNP Paribas, Santander, Société Générale, Euroclear and many other financial institutions have made significant investments in order to harness, rather than hinder, the technology – to use it for financial purposes (IBM, 2015). At the same time, blockchain has the potential to severely impact wide swathes of the financial services industry. Potentially, it could leave its fingerprint on almost all layers of the market, starting with capital raising, through trading, clearing and settlement, ending with record-keeping.

This is already happening. NASDAQ – using Linq – enabled the first-ever blockchain-documented private securities issuance (Nasdaq, 2015). More recently, in January 2017, SWIFT announced its launch of a proof of concept to explore whether distributed ledger technology (DLT) can be used by banks to improve the reconciliation of their nostro databases in real time, thus optimising their global liquidity. (Ninety banks representing more than 75% of SWIFT's cross-border payment traffic are authorised to participate in this PoC (SWIFT, 2017)). In January 2016, the Australian Stock Exchange announced that it was building a blockchain as a replacement for its current platform for the clearing and settlement of trades (CryptoCoinsNews, 2016).

These are only a few examples, there are more and definitely more to come. The sector is sensing the potential and constantly expanding its knowledge of this ill-understood technology. According to a Deloitte report, 61% of senior executives surveyed claimed to have broad or expert knowledge of DLT, 42% believed it will disrupt their industry and 55% of them said they will lose competitiveness if they don't adopt

elle se produit déjà. Le secteur financier perçoit le potentiel et approfondit constamment sa connaissance de cette technologie mal comprise. Cependant, au-delà de la compréhension de la technologie elle-même, ne devrions-nous pas aussi nous intéresser aux défis potentiels en termes de réglementation et d'éthique qu'elle soulève ?

it (Deloitte, 2017). The blockchain storm is so broad that some expect 2017 to be blockchain's make or break year. The time has come, they argue for the numerous proofs-of-concept to finally be implemented (Piscini, 2017).

This is all fair and good. But, beyond understanding the technology itself, should be not also understand the potential compliance and ethical challenges it raises?

The Internet of Value

La technologie a suscité de grands espoirs car elle était censée remédier à de nombreux problèmes économiques et sociaux. Cependant, nous nous sommes rapidement rendu compte que, bien qu'internet se soit avéré un excellent moyen de communication, il n'a non seulement pas permis d'éradiquer de graves problèmes mondiaux mais il a contribué de manière considérable au développement d'autres phénomènes hautement indésirables.

It began with the Internet and it was good. Great expectations were vested in the technology that, it was hoped, would cure many social and economic ills. We realised quickly that, even though the Internet turned out to be a great means of communication, it not only failed to eradicate serious global problems, but significantly contributed to the development of other highly undesirable phenomena.

It was meant to enable the social and economic inclusion of billions of people, but that remained a pipe dream. The Internet had a great impact on all aspects of life – it has changed our perception of the economy and finance – yet the technology did not make financial intermediaries evaporate. Instead, it was consumed by them and utilised for their own purposes (e.g. Internet banking).

The Internet triggered a lot of problems around privacy rights. It also became a weapon in the hands of criminals involved in illicit activities (pornography, money laundering, cyber-attacks, piracy *etc*.). It turned out to be a way of conducting a brand new type of 21st century war: a war of disinformation. We now lead two lives, the physical one and the one where our virtual equivalent leaves its trace online. This trace can be followed. The information might be collected for a number of purposes (both political and commercial) and we might not have any idea that it is happening. This Internet is the Internet of Information, information that is spread across the Web, uncontrolled by data subjects. It definitely has some value but is not value itself. The technology that is sometimes referred to as the Second Era of the Internet: distributed ledger technology (DLT) or its subcategory, blockchain (terms often used interchangeably), is supposed to address the aforementioned issues – it is said to transform the Internet of Information into the Internet of Value (Tapscott, A., 2016).

Emergence of the technology

The most fundamental problem with the Internet of Information is connected to the issue of so-called "double-spending". If one posts a photo on the Web or sends it to someone, one is not deprived of the ownership of it. Once a photo is posted on the Internet anyone can download it – the same photo can be sent an infinite number of times. The question is, how we can we get back to

Internet a créé beaucoup de problèmes autour des droits à la vie privée. Il est aussi devenu une arme pour les criminels impliqués dans des activités illicites et s'est avéré être un moyen de mener un tout nouveau genre de guerre au 21e siècle : les guerres de désinformation. La technologie du registre distribué (DLT) ou sa sous-catégorie blockchain (termes souvent utilisés de façon interchangeable) est parfois vue comme la seconde ère d'internet. Elle est censée répondre aux préoccupations susmentionnées et ainsi transformer l'internet de l'information en l'internet de la valeur.

Le problème le plus fondamental avec l'internet de l'information est lié au problème dit de la « double dépense ». Si une personne doit envoyer de l'argent numérique via le réseau, le destinataire visé et les autres internautes doivent être sûrs qu'il/elle est effectivement en possession de l'argent envoyé. Le concept de chaîne de blocs est une

the old good days, where the physical transfer of assets (such as photos or CDs) meant that one relinquished ownership. In this case, that would be the ownership of a digital asset. This issue was identified primarily in relation to digital money. If one is supposed to send digital money via the network, both the intended recipient and remaining web users need to be sure he/she actually owns the money sent (Nielsen, 2013). The concept of blockchain is a solution to that problem. It follows the idea first proposed in 2009 in a white paper by the mysterious Satoshi Nakamoto (a programmer or a group of programmers), whose true identity has never been revealed.

Nakamoto's idea constitutes an underlying scheme for Bitcoin – a cryptocurrency and a payment system based on DLT. The currency itself – Bitcoin – takes the form of an address that is a sequence of bits that can be stored in a "wallet" (a computer programme). Unlike government-issued money that can be inflated at will, the supply of Bitcoin is mathematically linked to twenty one million bitcoins and that can never be changed. A bitcoin holder is anonymous unless the Bitcoin address can be associated with a wallet and a wallet with a person. Bitcoin transactions take place on the bitcoin network that is open to everyone (unrestricted distributed ledger). In order to perform a transaction, a bitcoin owner sends a message along with a signature over the network specifying that cryptocurrency is being sent to a new address. All network participants can verify that transactions are legitimate since addresses associated with unspent bitcoins can be identified in a stored ledger or validated by the entire network. That ledger (a set of accounts) is itself a database spread across multiple sites (a shared database) – and it is called blockchain. The bitcoin blockchain is operated by a decentralised authority not a centralized authority as in the case of government–issued currencies. The participants transact with each other directly without the involvement of any intermediary. Physical bitcoins do not exist – they exist only virtually as balances associated with public and private keys (Koeppl & Kronick, 2017).

Bitcoin's early history is shrouded in controversies (Bitstamp – $5 million loss, Silk Route – $200 million of anonymous online drug sales using bitcoins, Hong Kong's Mycoin and a fraud of at least $21.8 million after the bitcoin trading platform suddenly collapsed (Cryptocity, 2015)). Exchange heists, stolen wallets, mysterious bankruptcies and missing CEOs eroded the image of the technology and quickly many ethical concerns arose. The question emerged – is a technology that is surrounded by scandals regarding its illegal and unethical use in its early stages able to address the ethical issues it was aimed to eliminate? Is the medicine more dangerous than the disease itself?

solution à ce problème. Tous les participants au réseau peuvent vérifier que les transactions sont légitimes étant donné que les adresses associées aux bitcoins non dépensés peuvent être identifiées dans un registre ou validées par l'ensemble du réseau.

Les débuts de l'histoire du bitcoin sont controversés. La question suivante s'est posée : est-ce qu'une technologie, dont les débuts sont marqués par des scandales relatifs à des usages illégaux et contraires à l'éthique, est capable de résoudre les problèmes éthiques qu'elle était censée éliminer ? Le remède est-il plus dangereux que le mail lui -même ? La publicité négative et la confusion conceptuelle ont conduit les gens à considérer le blockchain qu'utilise le bitcoin, comme la véritable innovation issue du phénomène bitcoin. En effet, on s'est rendu compte que s'il n'était pas certain que le bitcoin révolutionne le monde, la technologie sous-jacente, était bien capable de le faire.

Negative publicity and conceptual confusion laid the ground for people to begin to refer to the underlying technology of bitcoin – blockchain – as the real innovation coming out of the bitcoin phenomenon (Allcoin, 2017). It has been realised that even though bitcoin might not revolutionise the world, its underlying technology can.

Ethical application of DLT

Distributed ledger technology might be an impressive catalyst for a whole range of applications that will promote ethics or address unethical activities both in the financial sector and beyond. This technology could enable the inclusion of billions of people into the economy, especially those who, for whatever reason, don't have a bank account (e.g. widespread use of mobile phones for payments in Africa partially replacing the need for having a bank account). The blockchain might create a true sharing economy by providing lending rooms (participants lending and borrowing among themselves without any middlemen) that could help address the problem of inequality and unfair distribution of wealth. The significant cost reduction (potential to reduce infrastructure cost by up to $ 20 billion a year (IBM, 2015)) may once and for all end the remittance rip-off (transaction costs ranging from 0% to 3%). The forgotten idealistic dreams of the direct democracy where voters supervise their representatives and are given back the control over their lives might be possible now as DLT could help to reinvent the government (European Parliament, 2016). Further, two big ethical nightmares of the Internet of Information might be finally addressed. Firstly, blockchain could enable citizens to own and manage their data and protect privacy. In this regard, data would be treated as an asset class and be given back to data subjects. Secondly, the technology has the potential to finally enable an author to command fair compensation for creative work and to protect their intellectual property rights (Tapscott, D., 2016). Imagine a song that has a smart contract attached to it and manages itself. Each time the song is used for a commercial purpose, viewed or downloaded as a ring tone, it executes a contract thanks to protocols encoded in it. This is not fiction, this is already happening (Imogen Heap – a British singer has already put her music on a blockchain (Mycelia, 2017)). As the blockchain technology removes the problem of double-spending, digital assets such as music can now be traded on the secondary market as old CDs used to be – without the risk of being copied an infinite number of times.

Another possible application is record-keeping. It has been estimated that approximately 70% of people worldwide who hold a piece of land do not have a valid title to it (Tapscott, A., 2016). This is a serious economic blocking factor. Those

La technologie DLT pourrait être un catalyseur impressionnant pour toute une série d'applications qui contribueront à promouvoir l'éthique ou à résoudre des problèmes liés à des activités contraires à l'éthique dans le secteur financier et au-delà. La technologie pourrait permettre l'inclusion de milliards de personnes dans l'économie, en particulier ceux qui, pour une raison quelconque, n'ont pas de compte bancaire. Blockchain-pourrait créer une véritable économie du partage et contribuer à résoudre le problème de l'inégalité et de la répartition inéquitable des richesses. En outre, deux grands cauchemars éthiques de l'internet de l'information pourraient finalement être éliminés. Premièrement, Blockchain-pourrait permettre aux citoyens de détenir et de gérer leurs données tout en protégeant leur vie privée. Deuxièmement, la technologie peut potentiellement permettre enfin à un auteur de recevoir une rémunération équitable pour son travail créatif et de protéger ses droits de

"squatters" cannot borrow money against their invalid titles, which slows down the economy as a whole. Blockchain might solve this issue thanks to immutable records that cannot be tampered with by any central government or individual. Under the new technology, there could be a full record of ownership starting with the point in time when an asset was "issued" to the network. This could finally enable fair trade as there is an impact on the supply chain. Each blockchain user would have the possibility to verify whether a given product was produced in ethical conditions, whether workers were fairly compensated for their work and who will be a beneficial owner of proceeds from a transaction (making sure they don't support individuals or governments violating human rights, laws, destroying the environment). Furthermore, easier traceability of funds might constitute a serious obstacle for criminal activities such as fraud or money laundering.

All indicated ethical applications of blockchain are not abstract concepts, some of them are already operational such as Everledger – a global, digital ledger that tracks and protects valuable assets (e.g. diamonds) throughout their lifetime journey. An asset's defining characteristics, history, and ownership are collected to create a permanent record on the blockchain. This digital thumbprint is then used by various stakeholders across a supply chain to form provenance and verify authenticity (Everledger, 2017). All the aforementioned potential applications of DLT might enable or at least improve transparency, ethical trade, and contribute to a healthy economy based on ethical foundations.

Ethical Revolution?

William Mougayar in his 2016 book: *The business blockchain: promise, practice, and application of the next internet technology* states that blockchain: "Is making us rethink the old ways of creating transactions, storing data, and moving assets, and that's only the beginning. Blockchain cannot be described just as a revolution. It is a tsunami-like phenomenon, slowly advancing and gradually enveloping everything along its way by the force of its progression… Blockchains are enormous catalysts for change that affect governance, ways of life, traditional corporate models, society and global institutions" (p. XXI). This change entails many ethical issues that should be addressed or at least discussed before the technology is fully adopted. Is blockchain a revolution? It might be the case though that is yet to be seen. We might further ask ourselves whether this potential revolution is ethical. We might even broaden the scope of the question and ask whether any revolution – especially a technological one – has ethics built into its DNA. We should not forget that each revolution has also

propriété intellectuelle. Une autre application possible est la tenue de registres. Selon les estimations, environ 70% des personnes dans le monde qui possèdent une parcelle de terre n'ont pas de titre valable.

De telles applications éthiques de Blockchainne sont pas des concepts abstraits, certaines d'entre elles étant déjà opérationnelles. Toutes les applications potentielles susmentionnées de la technologie du registre distribué (DLT) pourraient permettre ou au moins améliorer la transparence, le commerce équitable et contribuer à une économie saine fondée sur des bases éthiques.

Blockchain est-elle une révolution ? Cela pourrait être le cas, quoique cela reste à voir. Nous pourrions, en outre, nous demander si l'éthique est inscrite dans son ADN. L'éthique sous-

an unethical face – the face of those who have been left behind, the face of those who will not embrace the technology and so will miss the innovation train, the face of winners and losers.

Ethics stands behind the values for which blockchain technology was created: depriving centrally-own intermediaries of control over individuals' lives. In its essence, the values behind blockchain are not that much different from those fought for during the Great French Revolution: *Liberté-Égalité-Fraternité*. A revolution, however, can have a will of its own. It can live its life in a total contradiction to and separation from morally beautiful virtues that were supposed to underpin it. Blockchain was designed to enable the economic inclusion of those who are economically weak and it is supposed to be the sword pointed at institutions that for ages benefited from the fact that they provided trust to the market. This weapon as any weapon, however, can easily be misused. Rather than the predicted inclusion, we might witness the exclusion of those who do not understand the technology and are left behind.

Blockchain has the potential to be a great force for societal transformation. It might fix some serious problems in modern society: atrocities, rigged elections, decision-making stalemates, governance crisis (Bulkin, 2016). On one hand, the economy based on DLT can offer unprecedented levels of efficiency and the buy-in needed to establish cooperation at the scale required. On the other hand, if no ethical framework is created, a system designed to counteract power imbalances can be used to generate them. This way "blockchain can support a social system that is, in fact, much worse than what we have today, one in which power abuses will become more prevalent and a lot harder to address" (Bulkin, 2016).

The revolution will certainly do away with some financial institutions in the as we understand them today. The blockchain tsunami might leave behind a brand new world of finance – it might be like a fire consuming everything on its path – it might leave only ash or be the new beginning – the fresh rich soil for plants to blossom. We might as well end up seeing "all the vices of the Old World peering from the new garments;[singing] a new song, but it [will end] ever in the old refrain: Bread, meat, gold, and blood!" (Krasiński, 1835)[2].

Trojan horse?

In April 2016 at Metro Expo the Vice President of Sberbank (Andrey Sharov), Russia's biggest bank by assets, opined that the advent and spread of blockchain technology will see banks disappear by 2026 (CryptoCoinsNews, 2016a). It appears to be a great paradox. The industry whose entire existence is

2 "The Undivine Comedy": the Count to Pancras – reflection on revolutionists behaviour.

tend les valeurs pour lesquelles la chaîne de blocs a été créée : priver les intermédiaires centraux de tout contrôle sur la vie des individus. Les valeurs derrière Blockchain ne sont essentiellement pas très différentes de celles défendues pendant la Grande Révolution française : Liberté-Egalité-Fraternité. Une révolution, cependant, peut avoir une volonté propre. Nous ne devrions pas oublier que chaque révolution a également un visage non éthique – le visage des laissés pour compte, le visage de ceux qui n'adopteront pas la technologie, le visage des gagnants et des perdants.
La banque de détail, les services post-transactionnels et la tenue de registres sont des exemples de services financiers sur lesquels l'adoption éventuelle de cette technologie de Blockchain a un impact. L'industrie dont l'existence même est menacée par l'adoption de la technologie investit en même temps massivement dans son développement. Comment expliquer ce paradoxe ? La technologie est-elle un cheval de Troie ou la

jeopardised by the adoption of the technology is, at the same time, investing heavily in its development. This does not relate purely to retail banking. The industry that is said to be greatly impacted is post-trade securities clearing and settlement (a set of services where the buyer and the seller compare trade details, approve the transaction, change records of ownership and arrange for the transfer of securities and cash). In April 2016 the European Central Bank issued an occasional paper in which it stated that DLT has the potential to speed up the settlement and clearing of financial assets (bonds, equities, *etc.*), eliminating the liquidity and credit risk. It has been concluded that almost all post-trade functions will be impacted by the adoption of the technology: a) custody – due to smart contracts and self-executing algorithms that will update accounts automatically; b) settlement – as trading and clearing will occur instantaneously (trading platforms to be connected to distributed ledgers); c) clearing was said to still be required for some derivative transactions, however netting and margin calls will become automatic; d) safe-keeping will be facilitated by recording of ownership in distributed ledgers; e) ancillary banking services are also to be impacted as, for instance, the need for collateral will be dramatically reduced and its availability on the market will increase. Nevertheless, some functions will still need to be performed by post-trade services providers – such as the notary function – as the involvement of regulated entities will still be required at least in the current regulatory landscape (ECB, 2016). This, however, does not apply to reporting obligations as blockchain technology could facilitate the collection, consolidation, and sharing of data for reporting, risk management, and supervisory purposes. With DLT one could easily imagine the world where regulators have real-time access to all relevant records.

Spirit of Laws

Retail banking, post-trade services and record-keeping are only a sample of financial services impacted by the possible adoption of the blockchain technology. What is the source of this paradox? Is the technology a Trojan horse or is the blockchain revolution simply like Saturn: it devours its own children (G. Büchner)? The said paradox brings with it serious conflicts of interests – it is inadvisable to expect a professional to support the development of the technology that might push him off the cliff. The financial institutions face an ethical dilemma here. They should be aware of this and act very cautiously. Distorting the technology to keep a dominant position in the market would mean eroding its ethical roots.

The fact that blockchain technology faces serious governance, regulatory and legal issues is no surprise. In January 2017 ESMA, in its report pertaining to DLT

révolution de Blockchain est-elle simplement comme Saturne : elle dévore ses propres enfants ? Ce paradoxe s'accompagne de graves conflits d'intérêts – il n'est pas recommandé d'attendre d'un professionnel de soutenir le développement de la technologie qui pourrait le pousser en bas du précipice. Les institutions financières sont confrontées à un dilemme éthique ici. Elles devraient être conscientes de cela et agir avec beaucoup de prudence. Déformer la technologie pour conserver une position dominante sur le marché signifierait une érosion de ses fondements éthiques.

Le fait que la technologie de Blockchain soit confrontée à de sérieux problèmes de gouvernance, de réglementation et juridiques n'est pas une surprise. Les régulateurs et législateurs du monde entier commencent à reconnaître l'impact que la technologie du registre distribué (DLT) est censée avoir sur le

and securities market, stated that: "at this stage, [it] believes that it is premature to fully appreciate the changes that the technology could bring and the regulatory response that may be needed, given that the technology is still evolving and practical applications are limited both in number and scope"(ESMA, 2017). It is worth noting that regulators and legislators all over the world are starting to recognise the impact that DLT is supposed to have on the regulatory and legal landscape. Laws, recommendations, opinions, interpretations are issued almost each day in all parts of the word. These relate mainly to digital currency but are expected to change in the near future (Hawaii's Blockchain Exploration Bill (Cryptogolds, 2017), Poland's Financial Ombudsman calling for Bitcoin Exchange Regulation (PolskieRadio.pl, 2017), BitLicense rules by NYSDFS (Morgan Lewis, 2015) – these are only a few examples).

The impact that DLT might have on the legal system is colossal. As the technology storms all aspects of life it will besiege all fields of law and change them. Intellectual property law (fair compensation for the intellectual property), property law (land registers), inheritance law (smart contracts), data protection law, criminal law (AML, commerce crime, fraud), administrative law (record-keeping), contract law (smart contracts), securities law, corporate law (IPOs, proxy voting, DAOs[3]), constitutional law (e-voting), banking law (both private and public), patent law – all those and possibly many others are open to blockchain's assault.

The law in its essence is derivative vis-à-vis the reality. It is being created after certain processes, occurrences, phenomenon emerged – it is not created *in abstracto*. This is where ethics might come into play. The technology is hard to capture by legislation, it sneaks, it winds like a wild river and when you think you have already seized it, it turns out to have flooded the brand new area you have not expected it to occupy. The unregulated space is huge. Is this space where things that are not prohibited, actually perpetuating a problem? Are activities that are not explicitly against the letter of law ethical in the eyes of the public? The ethics of blockchain appears to be that the hidden spirit of the law has not yet arrived. However, this does not mean it is not already applicable. A set of ethical norms might be of great value for legal systems based on Roman Law, especially in continental Europe where legal norms are extracted from legal texts: this is where ethics has the final word. The lack of harmonisation and standardisation is blockchain's biggest challenge. The financial industry should make an effort to create common business rules and sound governance arrangements

3 DAO – decentralized autonomous organization – an automated company operated by hard-coded rules enforced on a blockchain.

paysage réglementaire et juridique.
La technologie me se laisse pas facilement circonscrire par la législation, en conséquence un immense espace non régulé subsiste. Est-ce que cet espace n'est pas à la source du problème ? Les activités, qui ne sont pas ouvertement contraires à la lettre de la loi, sont-elles éthiques aux yeux du public ? L'industrie financière devrait s'efforcer de créer des règles communes et des accords de gouvernance sains, basés sur l'éthique, même en l'absence de lois et de réglementations régissant la technologie.

based on ethics, even with the absence of laws and regulations governing the technology.

Ethical Blockchain?

It is time to pose the crucial question: is DLT ethical in its essence? The answer appears to be obvious, a technology cannot be labelled as being ethical or unethical – it is only a tool and the tool is only as ethical as the people who use it. Some claim blockchain could have prevented the DNS's denial of service attack (ConsenSys, 2016), Soros leaks (CoinDesk, 2017), the Wells Fargo scam (Cointelegraph, 2016) or Lehman Brothers collapse (Finance Magnates, 2016), others would rather see the technology as the new Manhattan Project. We have yet to see who is right. However, at this very early stage, some concerns need to be raised.

DLT might consume an unsustainable amount of energy, which is mainly a problem with unrestricted distributed ledgers such as the bitcoin blockchain (and the computing power required for validating transactions). The technology might become a job killer; it might be vulnerable to attacks as the protocols are all based on the same methodology; it might carry operational risks (software can have bugs). The consensus on changes to the network/codes might be difficult to achieve and the management of those codes might give rise to potential conflicts of interest. There is a question mark over the scalability of the technology (can it be replicated on a wider scale?) and over its interoperability with existing systems (Delivorias, 2016). Due to the public nature of a ledger and permanent recording, some personal data protection issues might arise, one of them being the right to be forgotten. Furthermore, there is a potential risk of fraud as private/public keys, when stolen, might be used fraudulently to record fictitious transactions.

A well-known social fact is that people are much more likely to commit violence against victims they can't see. Blockchain is an environment where anonymity is prevalent and physical presence cannot be felt. This might lead to a whole range of unethical behaviour such as child pornography, weapons trade, ransom viruses or attacks on the freedom of speech (Bulkin, 2016). This behaviour might be encouraged by the freedom to use value without restrictions by centralised political powers. The technology might make transactions virtually impossible to trace or control, which can motivate people to abandon essential ethical norms – particularly if there is little or no risk of being found out.

Si les problèmes relatifs au comportement potentiellement contraire à l'éthique ne sont pas traités suffisamment tôt, la technologie du registre distribué (DLT) pourrait devenir un espace idéal pour le déploiement d'abus généralisés. Comment résoudre ce problème ? L'une des réponses possibles passe par les outils offerts par la

If concerns regarding potentially unethical behaviour are not addressed early enough, DLT might become a perfect space for widespread abuse. How can we solve this issue? One of the possible answers is through the tools offered by the technology itself. The unified

technologie elle-même. Un ensemble unifié de principes/règles éthiques pourrait être créé et volontairement adopté par les organisations qui opèrent sur une chaîne de blocs. Ces principes pourraient éventuellement prendre la forme de contrats intelligents, intégrés dans le réseau. Si cela se produisait, les règles éthiques seraient propagées à travers les chaînes de blocs et nous assisterions à une diffusion sans précédent de l'éthique à travers le monde. La révolution de Blockchain se transformerait en révolution de l'éthique.

set of ethical principles/rules might be created and voluntarily adopted by organisations that operate on a blockchain (Bulkin, 2016). Those principles could possibly take the form of smart contracts, embedded into the network. If this were to happen, ethical rules would be broadcast across blockchains and we would witness the unprecedented spread of ethics across the world. The blockchain revolution would convert itself into the revolution of ethics.

The wind of change is coming. However, the explosion of enthusiasm might soon need to be tempered. Is the technology a new Great Revolution? Personally, I would say that it is, bearing in mind all obstacles following from the adoption of DLT. We could legitimately assume there will not be one master blockchain but rather an invasion of separate blockchains gradually flooding different sectors (e.g. Euroclear & Paxos bankchain gold initiative). Segmentation appears to be inevitable with some kind of a governing body in the heart of a blockchain network (a restricted ledger) at least at the first stage of the blockchain storm. There is a great risk that the DLT revolution might devour its own children, therefore financial institutions should tackle the ethical aspects of this revolution carefully – otherwise, they might unintentionally contribute to their own collapse as Louis XVI once did.

* * *

It was a sunny day in January 1793. Louis was standing surrounded by the people of Paris. He looked, surprised, at the shining blade that was supposed to end his, a monarch's, life. It was familiar to him. What an irony – Louis thought – I helped to construct it…[4]

4 Louis XVI was guillotined on the 21st of January 1793. Legend says the king improved the project of a guillotine submitted by A. Louis (Cisek, 2006).

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