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BLOCKCHAIN IN THE FIELDS OF FINANCE AND ACCOUNTING: A DISRUPTIVE TECHNOLOGY OR AN OVERHYPED PHENOMENON?

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Abstract: *Blockchain technology became widely known with the emergence of Bitcoin in 2009 and has since gotten a lot of hype as a technology to disrupt the field of financial services. Blockchain was even suggested as a possible solution to UK's border issues after Brexit. While many praise blockchain's promise to enhance the speed and security of transactions, there are some who question the real-world applicability of blockchain. Is blockchain the internet of our time, a disruptive technology or just an overhyped phenomenon?*

This paper looks at blockchain technology, its applications in the fields of finance and accounting, and the disruptive power of blockchain in these fields. We provide an overview of the criticism and obstacles that need to be dealt with for blockchain to realize its potential.

Keywords: *Blockchain, Digital finance, Digital accounting, Digital Auditing, Smart contracts*

Introduction

Blockchain, or distributed ledger technology as it's also called, is the underlying technology in Bitcoin cryptocurrency. It has, however, many more possible use-cases. Blockchain is a transactional database that is secured by cryptography and governed by a consensus mechanism: it's essentially an immutable record of digital events. Due to its qualities, blockchain is a safe and trusted platform for record keeping between parties that might not otherwise be able to trust each other (e.g. Beck, Avital, Rossi and Thatcher, 2017; Cong and He, 2018; Iansiti and Lakhani, 2017; Crosby, Nachiappan, Pattanayak, Verma and Kalyanatraman 2016; IBM, 2018 and Smith, 2018). As blockchain promises to prevent fraud, increase trust and transparency and save time and money by eliminating intermediaries, it is one of the most talked about technologies of today. While others remain skeptical of its real-world applicability, some argue that blockchain technology has the potential to disrupt business the same way the Internet disrupted off-line commerce (Cong and He, 2018).

Blockchain has gotten a lot of hype around it and we have heard about how it is going to revolutionize the world of business (Iansiti and Lakhani, 2017). Finance and accounting are the fields predicted to be most disrupted by blockchain technology (McKinsey and Company, 2018). Traditional financial intermediaries are in increased competition with cryptocurrencies and financial services based on blockchain technology. Blockchain is believed to reduce cost and risk on financial markets by enabling smart contracts, enhancing security and transaction speed.

The financial sector leads the way in developing blockchain applications and business models. While substantial activity exists in practice, less academic research has examined the applications of blockchain for how we organize contemporary economics, society or organizations (Beck et al., 2017). Becker at al. (2017) call for a more critical perspective on blockchain research. In order to fill this gap, we first provide an overview of how blockchain works and examine the possible applications of blockchain in finance, accounting and auditing. We then outline the criticism toward blockchain and analyze the hype it has gotten.

Blockchain research is in its infancy state; the existing research generally targets attitudes towards blockchain, technical information and "the potential future". Research on real-life applications of blockchain is lacking. So far, most of the research has looked at the Bitcoin system and only less than 20% of the research is focused on other blockchain applications (Yli-Huumo et al. 2016). Corporations are eager to release reports on investment in blockchain and boost about the bright future ahead, focusing on theoretical applications in a marketing effort rather than practical issues. The fuzzy promise of blockchain as a revolutionizing phenomenon conflicts with the widespread criticism of the technology. Significant energy consumption, the scalability problem, the lack of regulation and the fear of security breaches raises the question whether blockchain is suitable to implement on a wider scale.

In this article we look at blockchain technology, what it is, how it works, and how the future of blockchain looks like. Specifically, we examine the way blockchain can be used in the fields of finance, accounting and auditing; and what the disruptive power in these fields is based on. We then discuss the criticism blockchain has received and outline the obstacles that need to be overcome before blockchain can become a mainstream solution.

Blockchain

What is blockchain and how does it work?

In this section we look at the basic elements of blockchain. We believe that to be able to evaluate and analyze the impact blockchain can have, it is important to understand the underlying idea behind the technology and the basics of how it works. We will not go into technical details but look at the most important attributes of blockchain and the advantages and disadvantages from the perspective of financial fields.

Blockchain is

- a transaction database
- distributed and decentralized
- validated
- encrypted with hashing
- immutable

Blockchain can be

- a public or private network
- permissioned or permissionless

Blockchain enables smart contracts.

Figure 1. Blockchain's attributes. Sources: The Accounting Blockchain 2018, McKinsey and Company, 2018 and IBM, 2018.

Blockchain first emerged in 2009 when the cryptocurrency Bitcoin was launched by an anonymous person or persons going by the name of Satoshi Nakamoto. Bitcoin is a digital currency "mined" by people on computers all around the world using software to solve mathematical puzzles. Blockchain is the underlying technology behind Bitcoin. It is important to understand that blockchain and Bitcoin are not the same. You can think of blockchain as an operating system, such as Windows or Macintosh, and Bitcoin is only one of the many applications that can run on that operating system. Despite all the technological innovations (such as telephone lines, credit card systems, and the internet) that have made trading faster, more efficient and more trusted, many business transactions remain inefficient, expensive and vulnerable. (IBM, 2018) As blockchain promises to prevent fraud, increase trust and transparency, and save time and money by eliminating intermediaries, it could be the answer for making business transactions more cost-effective, efficient, safe and secure.

IBM's (2018) elevator pitch for blockchain goes as follows: "*Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An* asset *can be tangible (a house, a car, cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved.*" So blockchain is a way to record and store information in a way that is very safe for all parties involved.

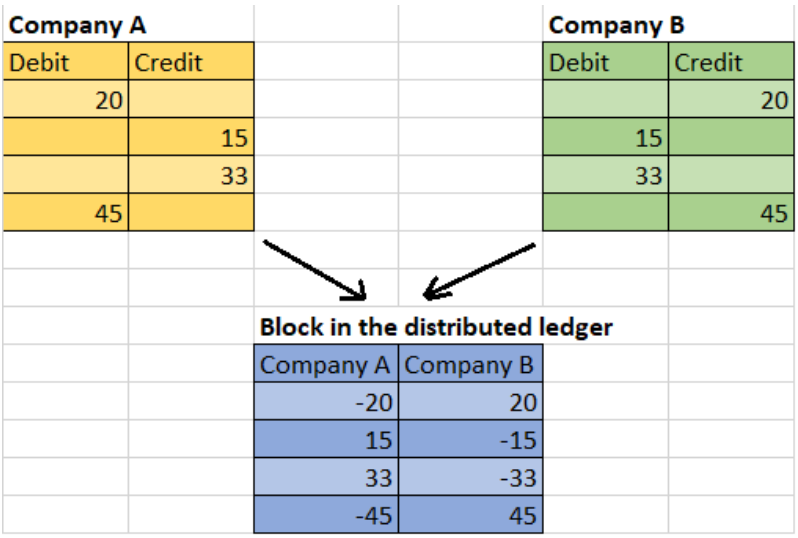

Figure 2. Triple entry accounting. Source: CEO Blog, 2015.

Although blockchain technology is also called distributed ledger technology and we are looking at the possible applications in finance and accounting, it is worth mentioning that blockchain is not a financial tool on its self. Smith (2018) points out that blockchain isn't an accounting platform, journal entry tool, or a replacement for accounting software. Blockchain does, however, build on the idea of traditional double entry accounting system by "adding a third entry" that has both sides of a transaction validated in the same block. In traditional trading situation both parties keep their own records of the event, their own ledgers. This gives room for error as the records don't always match, and there is a need for third party confirmation in the shape of an audit. With blockchain the transaction is first validated by both parties and then the transaction is recorded in the shared ledger as figure 2 (CEO Blog, 2015) demonstrates. This way everyone always has the same, correct information in real-time thus saving time, eliminating mistakes, and the need to reconciliate accounts between parties come the end of the financial year (Business Learning Institute, 2017).

Each block in the blockchain is linked to the previous block, making a chain. As the blocks cannot be changed, the history of an asset or transaction can always be tracked reliably. If there is an error in the data, instead of removing a block, a new block with the correct information is created. There are two problems with this system. Firstly, how can it be verified that the first input data is correct? Blockchain cannot verify if an asset that is recorded in the blockchain actually exists. But once it's in the blockchain, it's there forever and it's considered to be true. Secondly, a blockchain can become huge and slow, since no information can be erased.

Blockchain is a decentralized and distributed network as opposed to the traditional centralized way of storing information. Figure 3 (Institute for the future, 2016) demonstrates the differences between a centralized and decentralized and distributed network Each participant in the network becomes a part of the database that stores the blockchain and when the information is shared it is hard to hack. When a traditional centralized system is hacked all the data is corrupted, but to hack a blockchain database you would need to have access to over 50% of the network. The existing information can then be verified by comparing the individual hash ID of each block to the ID of the same block in the other computers in the network. When a consensus of 51% is reached (at least 51% of the computers verify the same hash ID) and both parties of the transaction have validated the new transactions, a new block with the transaction data can be added to the network. When this is done, the new transaction is available in real-time for all the participants of the network. Because of the consensus mechanism the blocks or the data in the blocks is immutable, which means that they cannot be altered (e.g. Smith, 2018, Crosby et al. 2016). The consensus mechanism and validation of transactions from both parties prevent fraudulent entries and so called "cooking of the books", thus making blockchain a very safe way of making transactions.

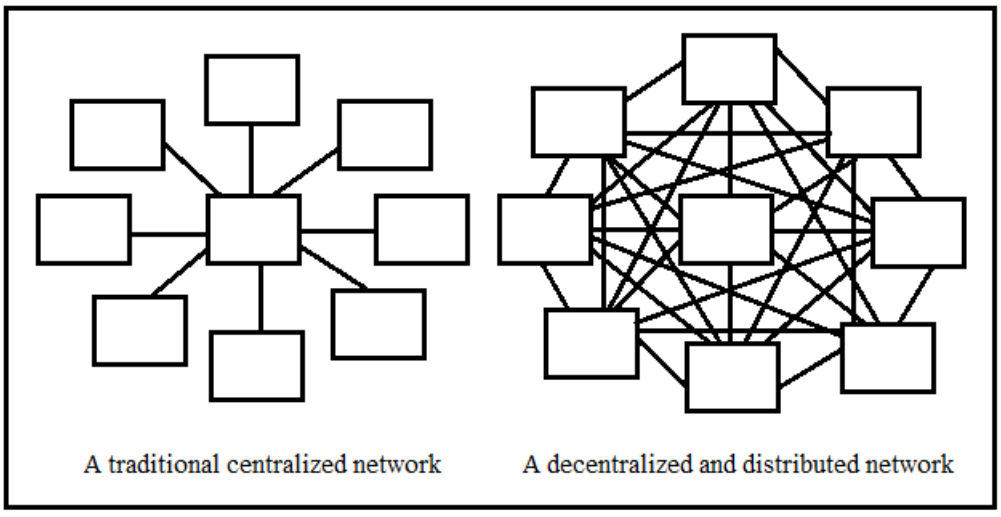

Figure 3. Examples of centralized and decentralized, distributed networks. Source: Institute for the Future, 2016.

Hashing

As explained in the previous section, blockchain is very secure because it is decentralized, consensus-based, and encrypted. Blockchain uses a specific type of encryption called cryptographic hashing. We will now explain why this specific method of encryption is so safe and how it works.

Hashing differs from traditional cryptography in that it only works one way. Traditional encryption works two ways and the encrypted data can be decrypted back to the readable form with an encryption key. A hash cannot be decrypted by any known algorithm yet. This means that a hash is theoretically impossible to decrypt and the only way to "read" the information in

the block would be by guessing and this would take forever (Massessi, 2018). However, it is predicted that in the future super computers will be able to crack hashes.

The data in each block in a blockchain is secured using a cryptographic hashing algorithm resulting in a hash. The hash is always the same for the same data, so it's kind of like a digital fingerprint. If the data changes at all, even by one letter, the hash also changes. This makes changing the block impossible, because if you would change the data in one computer the hash would not match with the hashes from all the other computers in the distributed network and the information would not be validated (Massessi, 2018).

A good example of hashing in our everyday lives is passwords (Massessi, 2018). We all have an email account and we give the email account provider a password to secure our account. Often the email provider does not save our password, but instead saves the hash of the password we give when we create the account. When we are logging in they hash the password we give them and compare it to the hash they have in store. This way, if the email provider is hacked, the hackers won't get the password only the hashes.

While blockchain is theoretically impossible to hack, the adjacent application can be hacked. So blockchain is the underlying technology that we use to store the information and an accounting software retrieves the information from the blockchain to create a financial statement, for example, and this accounting software can be hacked.

Smart contracts

One of the big advantages of blockchain is that it enables smart contracts. Szabo coined the term "smart contract" already in the 1990's (e.g. Tapscott and Tapscott, 2016), but there still isn't a universally accepted definition of the term. Cong and He (2018) define smart contracts as "*digital contracts allowing terms contingent on decentralized consensus that are tamper-proof and typically self-enforcing through automated execution.*" So, smart contracts are self-executing contracts that work based on if-this-then-that (IFTTT), meaning that when certain predetermined terms are met the contract executes automatically. An example of this could be automated insurance payments. If certain criteria are met the insured will get the payment without any human involvement.

Another good example of an application of smart contracts in the financial field are smart bonds. Smart bonds could autonomously escrow trades, keep immutable ledger of ownership, auto pay coupons & maturity, and keeps full transaction history available to participants in real-time. Smart bonds would also enable people to invest in bonds with smaller amounts of money, thus opening up the market for a lot more people (Launay, 2018).

Blockchain in businesses

As earlier mentioned, there isn't a lot of prior research on real-life applications on blockchain other than Bitcoin. Blockchain can, however, in theory be applied to multiple different business ideas, and there are a lot of applications being developed. While blockchain can be public or private and permissioned or permissionless; businesses would mostly benefit from private, permissioned networks (McKinsey and Company, 2018). This would mean that only the companies or individuals involved in the business could join the network and everybody would have permission to see only their own transactions. Bitcoin is a public, permissionless network that is free to download, install, and run on a computer server. This means that anybody can join the network and make transactions.

To join a private network, individuals must verify their identities and be approved by the other members of the blockchain (Smith, 2018). An insurance company could, for example, set up a blockchain network and then approve its clients and care facilities to be members. The

clients would, of course, only see their own insurance information. If the insurance company used smart contracts, insurance payments could be paid automatically through the blockchain network using smart contract as mentioned earlier.

Businesses would benefit from the real time availability of data, encryption, and security of said information. Benefits of blockchain also include reduction of business friction, and delivery of information to interested parties in a more efficient way. The elimination or reduction of intermediaries would save time and money and, in this way, create value to the end user of the information. Private blockchains could also grant review rights to external entities, such as auditors (Smith, 2018).

Blockchain in the financial services

Financial services' core functions of verifying and transferring financial information and assets very closely align with blockchain's core transformative impact (McKinsey and Comapy, 2018). Therefore, blockchain can be a disruptive technology especially in the fields of finance and accounting. Blockchain promises to prevent fraud, increase security, trust, and transparency; saving time and money for all parties. But as blockchain is still an immature technology the applications are mostly experimental or theoretical.

Blockchain in Accounting and Auditing

Smith (2018) provides an analysis on the implications of blockchain in the field of accounting, auditing, and attestation. The current audit methodology has two shortcomings: transactions and accounts are verified using sampling, meaning that not all transactions and accounts are actually verified. This means that auditors can only give reasonable assurances as opposed to a complete feedback on the performance of the organization. With blockchain technology these shortcomings can be improved upon. The transaction data in the blockchain is already validated by the transaction parties and approved by the consensus mechanism. As the data cannot be altered, as it is timestamped and hashed, auditors basically have a ready-made audit trail to examine. This way confirmations will no longer be necessary either. Blockchain also enables the development of continuous auditing of for example inventories (Smith, 2018).

The Big 4-audit firms have all started to develop blockchain based applications. According to Smith (2018) KPMG started to work on a blockchain in 2016 and partnered with IBM Watson to begin automating and streamlining audit processes and examinations. PwC and Deloitte started developing blockchain applications already in 2014. PwC is testing different blockchain technologies and advising clients on their various uses. Deloitte is developing an internal application. EY partnered with Accenture and is experimenting with editable blockchains. Each of the Big 4 companies seems to acknowledge the disruptive power of blockchain. They are piloting private, public and permissioned blockchain technologies to better adapt to client needs (Karajovic, Kim and Lasksowski, 2017).

Blockchain in Finance

As mentioned earlier, blockchain technology was initially created to support Bitcoin trade. The fundamental idea of Bitcoin (to eliminate intermediaries, be anonymous, and trust a system without legal protection) might not be applicable in other industries. Blockchain technology, however, can be implemented by itself. Financial markets are characterized by a system of "consensus-by-reconciliation"; transactions are verified and validated by the counterparty. Consequently, financial markets aren't built on absolute trust in the market or competitors.

Blockchain technology could, in theory, be applied to reduce risks and costs by enabling smart contracts, digital rights management, and attractive new business models (Trautman, 2016 and Morini, 2016).

At the 2016 World Economic Forum financial leaders predicted that "cash in ten years probably won´t exist" and the implementation of blockchain on a larger scale. According to cryptocurrency exchange website coinmarketcap.com, the combined market capitalization of cryptocurrencies was $8.629 billion in 2016 (Trautman, 2016). On March 1st, 2019, the market capitalization was approximately $130,293,615,515 according to the same exchange. Cryptocurrencies are trending and evolving; creating the need for a structured and regulated market.

Friedlmaier et al. (2018) conduct a study aiming to map the impact of blockchain on various industries. The authors study a sample of 1140 startups that have implemented blockchain technology to examine industry sector, application of technology, and funding. The findings show that 42,2% of the sample companies represent the finance and insurance industry. The applications include financial exchanges and trading (181 companies), payment processing (63 companies), financial services (59 companies) and wallet (29 companies) among others. The Finance and Insurance Industry is also the industry that receives the largest venture capital funding, with $805.60 million. Approximately 50% of all venture capital funding came from the United States; a country that welcomes blockchain innovation and encourage innovation clusters to develop.

Real-life applications of blockchain

In this section we will describe a few of the blockchain applications we find interesting that are being developed and tested.

The Swedish Land Registry

Swedish Authorities have a vision to digitalize the Swedish Land Registry and base property transactions on smart contracts. An innovative project to launch an application to serve as an interface for all parties involved was started in 2016. The project is a collaboration between the Swedish Land Ownership Authority, two Financial Institutions, a Telecom Company, a Blockchain start-up, an IT Company, the Swedish Tag Agency, a Real Estate Broker and a Consulting Firm. The Lantmäteriet App would enable quick ownership-status checks, effective information sharing, and smooth signing of contracts using digital signatures. Important documents would no longer be sent by regular among the different parties, instead they would be neatly and securely stored in the App. Today, the system requires 3-6 months from signing the contract until ownership status is transferred. Up to 10% of applications are denied due to errors in contracts. Smart contracts would decrease the amount of errors, and consequently make the process faster and more secure. A successful trial was conducted in June 2018; ownership of a property on the Swedish Island of Gotland was successfully transferred using the Application. Due to lack of regulations and other practicalities, the new system has not yet been implemented (Kairos Future, 2017).

Microsoft and Ernst & Young

In 2018, it was reported that Microsoft and Ernst & Young (EY) are collaborating to launch a blockchain to alleviate problems afflicted with content rights and management of royalties. The aim is to eliminate intermediaries and let funds flow from users to the person with the copyright

for the property. The system will be based on smart contracts, increasing trust and transparency between actors. EY claims that the network will have the capacity to process millions of transactions per day. There are 86400 seconds in a day; indicating that the system would have to process 11 transactions per second on average to reach the 1 million mark. This is theoretically in line with the findings of Xu et al. (2016); public blockchains, like Bitcoin, have the capacity to process 3-20 transactions per second on average. EY has, however, not provided any real research regarding what the estimates are based on.

The Australian Stock Exchange

In 2017, the Australian Stock Exchange ASX, pronounced that they would replace their existing clearing and settlement system with a blockchain-based system in 2020. The new system is based on Digital Asset's (a New York based fintech company) distributed ledger technology and will introduce 50 new features that will lead to cost reductions. It allows settlement participants on both sides to pre-match the transaction earlier in the settlement period without committing the transaction for settlement. The new system will be taken into use in a two-and-a-half-year period. According to the current ASX managing director and CEO, Australian Stock Exchange will be the world's first major stock exchange to integrate blockchain technology. (Williamson, 2018) In 2019 ASX announced that the system update would have to be delayed by six months to devote more time for user development and testing (Reuters, 2019).

Criticism of Blockchain

Environment & Scalability

Blockchain, specifically Bitcoin mining, is frequently criticized for its environmental impact. Mishra, Jacob & Radhakrishnan (2017) conduct a study to map the energy consumption of bitcoin mining. The study covers a 4-year period, lasting from September 2014 to November 2018. Information is obtained from the Blockchain.com website and the public mining pool Slushpool. Estimates regarding total energy consumption are based on number of transactions, number of miners and the complexity of the cryptographic puzzle. It is assumed that miners will need more efficient and energy-consuming computers to stay competitive. The authors claim that the system will require at least 9.92 Gigawatt to process 100 million bitcoin transfers per week. Blockchain technology has, until now, failed to gain any significant market power. Consequently, it is difficult to comprehend the scale of the environmental impact.

If Blockchain technology were to be implemented in a larger scale, scalability is an obstacle to overcome. Xu et al. (2016) claim that public blockchains, like Bitcoin, has the capacity to process 3-20 transactions per second on average. This is significantly fewer than the 2000 transactions VISA has the capacity to process per second. Catalini & Tucker (2018) acknowledge that tensions between miners and developers of applications regarding scalability already exists.

Trust & Security

Catalini and Tucker (2018) discuss the issue of trust in blockchain systems by presenting an optimistic and a pessimistic perspective. The main question is whether a distributed ledger system can replace trusted traditional intermediaries. The optimistic view acknowledges the shared access to information and possibilities for collaboration and growth. Blockchains remain competitive thanks to forking; if users are unhappy with the current blockchain, resources can

be allocated to creating a new superior blockchain containing the same information. The pessimistic view presents the dangers associated with Bitcoin mining. As blockchain technology trusts anonymous miners to process transactions, theoretically this means that the person accountable for possible breaches of security can remain anonymous.

Stinchcombe (2018) questions the accuracy and integrity of data stored on the blockchain. The example of purchasing an e-book using smart contracts is used; how can you trust that the system is audited in a way that ensures that the transaction is correct? Who is responsible for errors in the smart contract when there are no intermediaries? Another example introduced is a theoretical voting system based on blockchain. It is argued that developing countries would benefit from an incorruptible and fair voting system based on blockchain. The question is: can an Afghan villager be sure that the vote was registered and counted correctly based on information in an application? Applying blockchain on a wider scale would require a responsibility from "regular users"; they will need sufficient software security and technical skills. The main problem is that there is no way of assuring that data stored on a blockchain is correct. In the context of supply chain blockchain: if a farmer, responsible for putting data into the supply blockchain, claims his mangos are organic, how can we be sure that they in fact are organic, and not sprayed with pesticides?

Blockchain is frequently criticized for the occurrence of 51% attacks. When an individual miner or mining pool control more than 50% the mining power, they can manipulate the system to their advantage. If a 51% attack occurs, ownership of virtual assets can be transferred. "The lie becomes the truth" and the blockchain is manipulated. The occurrence of 51% attacks raises the question of whether we can trust data stored in a blockchain (Boireau, 2018).

Cryptocurrencies, most notably Bitcoin, does not have banking intermediaries. Bitcoin trading builds on trust in the blockchain system and people within the system. Boireau (2018) claims that permissioned blockchain systems are an easy target for hackers. A permissioned network, favored among financial institutions, is a closed network that you gain access to by presenting a private key (Yeoh, 2017). If a hacker gains control of a private key it is irrelevant how secure the blockchain is. In 2016, Hong Kong based cryptocurrency Exchange Bitfinex was hacked, resulting in Bitcoin equivalent to $75 million being stolen (Popper, 2017). The threat of hackers is relevant to all cryptocurrency exchanges and corporations considering blockchain implementation. Boireau (2018) suggests implementing Hardware Security Modules to protect blockchain; this is the technology used to verify Personal Identification Numbers when withdrawing money from an ATM.

Regulation

Blockchain technology offers new solutions to process and store personal data. Herian (2018) discuss the impact of the EU General Data Protection Regulation (GDPR) on Blockchain. The GDPR framework was introduced in May 2018, it aims to give back control over personal data to the subjects. The idea is that no personal data can be processed or stored without the explicit consent of the person in question. Another key feature of GDPR is the "right to be forgotten", indicating that all personal data can be erased from the system. GDPR undermines business applications of blockchain technology, this is due to the fact that GDPR is in direct conflict with the notion that no data in a block can be erased or tampered with.

Lack of regulation remains an obstacle for implementation of blockchain technology. Legislation regarding blockchain is still its infancy; the field is dominated by technical codes, lacking the consequences for non-compliance associated with traditional legal codes (Yeoh, 2017). In the European Union, a Virtual Currency Task Force has been created and virtual currency exchanges are subject to the European Anti-Money Laundering Directive. The EU has, however, ruled that cryptocurrencies aren't subject to value-added-tax (Blemus, 2017). In

the United States of America, regulations are imposed by the Federal Reserve, The Securities and Exchange Commission, the Treasury Department and States. One notable example of state level legislation is the BitLicense, a framework imposed by the state financial regulator in New York. The goal of BitLicense is for corporations to fulfill requirements to obtain a license. The Securities and Exchange Commission published a guidance in July 2017 stating that under certain circumstances virtual tokens can be considered securities. The EU and the US both hesitate to impose strict regulations, fearing that innovation will be damaged. Japan remains the only country to officially accept virtual currencies as a legitimate method of payment (Yeoh, 2017) (Blemus, 2017).

Is blockchain just an overhyped phenomenon?

As previously mentioned, traditional blockchain technology supporting Bitcoin will have to develop to be applicable in other industries (Morini, 2016). Experts claim that features of Blockchain are already available in different forms, therefore blockchain as a revolution is unrealistic.

Philip Hammond, the UK Chancellor of the Exchequer, made headlines when he suggested that Blockchain technology could solve the Brexit border issues; "There is technology becoming available, … I don't claim to be an expert on it, but the most obvious technology is blockchain…". The British Government are considering Blockchain technology to monitor the border between Northern Ireland and The Republic of Ireland. The idea is that tariffs would be paid online in advance and all goods registered, and consequently the border would remain open and digitally monitored. Hammond's statement was mocked for being unrealistic and naïve. Blockchain technology remains "a wildcard"; the system is not developed enough to be implemented on such a scale and the digital monitoring is a regulatory grey area (Harris & Chu, 2019).

The example above illustrates a key issue when discussion blockchain; blockchain technology is not a revolutionary power or game-changer in itself, it is up to us humans to create the systems. Blockchain as a mechanism to monitor a border is not a bad idea in theory. Problems arise when you consider cost of implementation, scale of the system, and the legality of surveillance.

Conclusion and future outlook

In the previous sections the technological features of blockchain, possible applications in finance and accounting, real-life examples, and criticism of the technology were presented. The technological features of blockchain are praised for enhancing speed and security by enabling smart contracts (Trautman, 2016). Due to scalability issues, lacking regulation and security threats some question if blockchain technology is suitable to implement outside the bitcoin context (Morini, 2016). So, is blockchain a revolution or just a hype?

The expression "The Sky is the Limit" is a cliché, but when discussing the future of blockchain it is suitable. If blockchain technology manages to overcome the obstacles discussed in this paper, there is no telling what we might achieve with it. Institutions, governments, authorities and corporations are eager to present innovative blockchain applications. Whether these new innovations and ambitious projects will ever be applied in practice is a different debate. As pointed out by Herian (2018), Yeoh, (2017) and Blemus (2017) stricter regulations regarding blockchain will have to be imposed to enable future application. This is in line with Stinchcombe (2018), who raises the question whether we can verify that data in a blockchain is accurate and transactions audited correctly. Trust in the blockchain is fundamental for its very

survival. The other problems (like scalability, energy consumption and security) can theoretically be solved by powerful computers and improved software security systems. Trust in a system, on the other hand, is built over a longer time-period. A blockchain with paranoid users and anonymous miners will probably not enhance collaboration and a sharing-economy.

Smith (2018) argues that it is not possible to fully project or analyse the implications of blockchain technology on the accounting profession yet. While we cannot accurately predict the future of blockchain technology, we do know that the future in general is digital. At the 2018 World Economic Forum in Davos, 100% of the participants believed that even if the cryptocurrency bubble bursts, the token economy will prevail (World Economic Forum, 2018). The fact remains that the increasing amount of data and number of transactions will require new innovative systems. It might very well be that blockchain isn't the right technology to revolutionize the industry, but at least it's a step in the right direction.

We urge academics, practitioners and authorities to continue researching, innovating and developing blockchain technology, applications based on blockchain and smart contracts, and the regulatory framework for blockchain and its applications. We especially call for more efforts to be put in the resolution of the obstacles outlined in this paper.

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