2017

BLOCKCHAIN - THE NEXT BIG THING?

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INTRODUCTION

Blockchain is on everyone's lips and all over the news, but only a few people can really explain what it's all about. In the attempt to understand this new technology, most of us switch off after hearing technical explanations such as "cryptographic procedures". However, Blockchain technology could lead to far-reaching changes in the handling of transactions (monetary or contractual) in the near future. The financial sector, in particular, is already investigating the new possibilities of changing entire business processes. Other industries are increasingly seeing the benefits and working on solutions to take advantage of transparency, safety and effectiveness.

Blockchain could revolutionize online transactions

The purpose of this article is to give an overview of the Blockchain technology and to generate a general understanding. We will explain on a high-level what Blockchains are and will elaborate on the advantages and disadvantages to be considered. Based on these findings, we will look at examples and first projects in the tourism industry that are already using the Blockchain technology.

The most striking characteristic of Blockchain technology is its decentralization. Data and transactions are not stored on a single server; they are decentrally distributed over numerous individual computers.

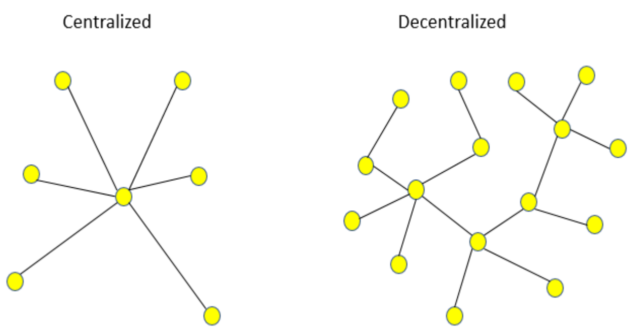

Diagram 1: Centralized vs Decentralized Structure

Accordingly, Blockchain can be defined as a transaction protocol between parties, where each change is recorded and accessible to all users. The advantage and decisive driver for innovations is that there is no need for mutual trust and complete transparency.[1]

This technology could pave the way for safe internet transactions in the future. To get started, the user needs to install a client and create a wallet in which transactions are managed. The user then receives two automatically generated keys, a private one (which works like a password) and a public one that is used as a digital signature for each transaction.

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1 https://www.welt.de/wirtschaft/bilanz/article167051623/So-funktioniert-die-Blockchain.html

The following is a short explanation of how
the Blockchain works:

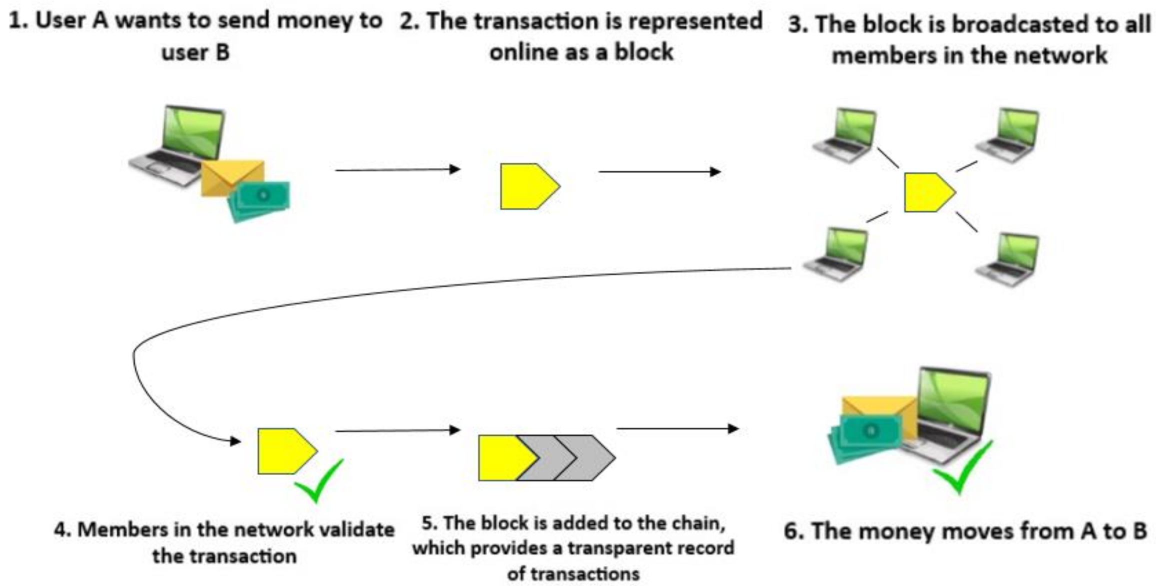

Diagram 2: Blockchain Workflow (Source: www.consultancy.uk)

1. A transaction between two parties is to be made - this is the elementary foundation of the Blockchain technology. These two parties can exchange information which could be either the transfer of money, the conclusion of a contract or a document of any kind. The sender creates a transaction that contains information about the receiver's public key, the value of the transaction and the sender's digital signature.

2. The transaction is written in a data block and represented online as a "block".

3. The block is broadcasted to every party in the network. Those in the network are included in the process to verify if user A has the appropriate rights for the transaction.

4. If the transaction of the block is correct, the block needs to be validated. The most common concept for this validation is the "proof of work" principle. Proof of work, also called cryptographic or computational puzzle, describes the solution of a difficult mathematical assignment that is done by so-called "miners", which are computers or groups of computers which verify transactions and are rewarded for this with cryptocurrency.

5. Afterwards, the validated block can be added to the chain in an unmanipulable way. These blocks are secured with a number and contain reference numbers to be uniquely identifiable.

6. The new state of the block is distributed to the nodes in the network, and the document or money arrives in the wallet of the other party.

If someone tries to change one block of the chain, the hash values of the block and the following blocks, too, will be changed. The other nodes will realize the manipulation and exclude the "false" block from the main chain.[2] This is a very safe way of doing transactions via the internet. The fact that it is very difficult to hack and steal data from such Blockchains makes it attractive for many industries in the economy.[3]

BITCOIN

The most famous example of utilizing Blockchain technology for transactions is the so-called cryptocurrency Bitcoin. Bitcoin enables the money transfer from one account to another without having intermediaries like banks involved in the transaction.[4]

Cryptocurrencies like Bitcoin could be a standard form of payment

It is a form of digital currency, created and held electronically. No one controls it. Bitcoins aren't printed, like dollars or euros. Documents of title are secured in a personal wallet and the exchange rate from bitcoin to any other currency is determined by supply and demand.[5]

In recent years, this digital currency has grown enormously, and one of the reasons for this is that eCommerce nowadays is still based on financial institutions as third parties to process electronic payments. To work around this "trust"-based process, Blockchain was invented as a way to have an independent technology where no trust is needed from any of the parties involved in a transaction.[6] Overall, there are more than 700 cryptocurrencies. Examples of those are Litecoin, Ripple or IOTA.

[2] https://www.computerwoche.de/a/die-grundlagen-von-blockchain,3330054

[3] http://www.consultancy.uk/news/13484/blockchain-technology-how-it-works-main-advantages-and-challenges

[4] http://www.europarl.europa.eu/news/de/headlines/economy/20160126STO11514/bitcoin-und-co-vorteile-und-nachteile-virtueller-wahrungen

[5] https://www.coindesk.com/information/what-is-bitcoin/

[6] https://bitcoin.org/bitcoin.pdf

ADVANTAGES

There are definitely numerous advantages to the Blockchain technology. One of the reasons many people already make use of this transaction method, is the disintermediation. As already mentioned above, Blockchain enables two parties to make an exchange without involving a third party in the process. This transaction strongly reduces the risk of releasing any information to other parties not involved in the exchange.[7]

Another very important aspect of Blockchain is security. The data in the Blockchain is not only complete, consistent and accessible from all over the world with an internet connection, but due to its chain structure, it is impossible to change a block retrospectively. Furthermore, the aspect of a decentralized network plays an important role. Without having one central point of data storage, it is almost impossible for failures to occur and the resistance against malicious attacks is extremely high.[8] To illustrate, let us assume that "the distributed ledger is shared across 5,000 computers and a hacker wanted to change some information recorded in one of the blocks, they would have to hack all 5,000 computers simultaneously."[9] This makes the Blockchain so secure against hacker attacks.

Blockchain technology ensures safe and fast online transactions

One important aspect when it comes to transactions is the speed at which they can be processed. Blockchains make it possible to reduce the time of transactions to a few minutes (measured as the time a miner needs for the validation), thereby enabling its users to make 24/7 exchanges. In contrast, money transfers between different banks need time for clearing and can sometimes take up to several days. By eliminating the intermediaries in the Blockchain process, transaction time is decreased tremendously. Moreover, the elimination of intermediaries in the transaction process not only saves time, but also leads to lower transaction costs. By not having intermediaries in place, overhead costs or commission fees are eliminated completely.[10]

7 https://www2.deloitte.com/nl/nl/pages/innovatie/artikelen/blockchain-technology-9-benefits-and-7-challenges.html

8 https://www2.deloitte.com/nl/nl/pages/innovatie/artikelen/blockchain-technology-9-benefits-and-7-challenges.html

9 http://www.consultancy.uk/news/13484/blockchain-technology-how-it-works-main-advantages-and-challenges

10 https://www2.deloitte.com/nl/nl/pages/innovatie/artikelen/blockchain-technology-9-benefits-and-7-challenges.html

DISADVANTAGES

Up to now, Blockchain is not equally known and accepted in all parts of the world. To make it widely applicable, some disadvantages and challenges need to be solved before it can become a well-accepted technology for transactions.

One of the negative aspects of the Blockchain technology is software vulnerability. Bugs and mistakes in software codes occur more or less frequently and could endanger the whole chain of blocks. From the perspective of organizations and companies, the Blockchain technology needs to ensure a high level of stability and security with regards to external threats.[11] Whereas it was mentioned as an advantage above, the concept of decentralization could also be considered a threat. Given this decentralized structure, the probability of all participants being attacked simultaneously is very low. Nevertheless, if for instance, an internal participant, who knows the system, was able to attack the chain, this could lead to major disruptions in the technology.

Furthermore, one also has to take into account the perspective of the general public as well as the view from organizations. Cultural acceptance is an elementary aspect with regards to the further development of Blockchain. Should the number of users stagnate over the next years due to a lack of acceptance, the technology will be unable to replace large financial institutions to any considerable extent. From an organizational perspective, it is important to see both sides of the financial changes. On the one hand, as mentioned above, the technology could definitely reduce transaction costs in the future. On the other hand, after an extensive change management process within the organization, companies also face substantial implementation costs. Depending on how high this figure is, the total savings from transactions need to be weighed up very carefully.

According to Digiconomist.net, a single Bitcoin transaction now consumes the same amount of energy as five households in one day. At present, the entire system of these virtual coins swallows 0.07 percent of the world's electricity. With the spread of this technology, the network could become overloaded and payments could therefore be slow. It remains to be seen how this develops in the future.[12]

[11] Blockchain Value System (2017) p. 27

[12] http://www.handelsblatt.com/finanzen/maerkte/devisen-rohstoffe/blockchain-der-stromfressende-alleskoenner/20007958.html

FIELDS OF APPLICATION

The financial sector, in particular, is working on new possibilities offered by the Blockchain technology. However, other industries, such as mobility, energy and tourism, are also starting to look for innovative business ideas that will change business concepts in regard to security, costs and simplification of processes. On the whole, Blockchain can be used in all industry sectors where payments and contracts are needed and where transparency and comprehensibility are required.

The first airlines and travel agencies started to accept Bitcoins as a form of payment

The cryptocurrency Bitcoin was the first application to use Blockchain technology; more specifically, Blockchain was developed for Bitcoin transactions or as its backbone. Because of Bitcoin, Blockchain has been introduced to various industries. The internet currency can be used all over the world and is considered to be very secure due to the decentralized processing without worrying about currency exchange or passing through a trusted intermediary.

The first online travel agencies and airlines (airBaltic, LOT polish airlines) have started to accept payment with Bitcoins. A recent study assumes that at present around 3 to 5 million people actively use Bitcoins worldwide.[13] Even politicians are committed to the further exploration of the possibilities offered by the Blockchain technology. In Hawaii, for example, an application was made for founding a working group to investigate the possibilities of Blockchain technology, especially the applicability of Blockchain technology to existing processes. The long-term objective is to integrate Blockchain technology in order to strengthen the regional economy through innovation.[14] One advantage would be that tourists could buy regional products without paying exchange fees for local currency. The tourism industry as a whole can benefit from low transaction costs, availability around the clock and independence from weekends and bank holidays.

Below, we will highlight two examples of how Blockchain is currently seen by different players in the market and how they plan to utilize the technology. The development is still at an early stage, but already, around 1,200 startups and companies like IBM and

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13 https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-04-20-global-cryptocurrency-benchmarking-study.pdf

14 https://www.btc-echo.de/hawaii-politiker-wollen-tourismus-mit-blockchain-foerdern/

Microsoft are working on different Blockchain solutions.

TUI CEO Friedrich Joussen sees far-reaching opportunities in the Blockchain technology. Within the next few years, he wants to increasingly negotiate parts of the company's structures via Blockchain. TUI is currently testing a new project called “BedSwap” with the purpose of converting hotel bed capacities into a Blockchain. [15] As a result, capacities could be managed transparently throughout the TUI Group and virtual inventories could be made available directly to the customers. Central intermediaries would not be needed, costs could be saved and overall, efficiency could be increased, as could the utilization of hotel bed capacities.

SITA is testing a venture at Doha airport to simplify passenger handling. Using a token, passengers can pass through security as they would with a mobile boarding pass; their personal data is stored in a Blockchain. Due to the Blockchain protocols, trust can be created so that individuals or authorities do not have to take care of visa controls. Passengers benefit from the fact that their data is not stored with the respective authority or government and their privacy is thus protected. And airlines, airports and security authorities also benefit, as control processes are simplified and accelerated.[16]

IMPACT ON EXISTING BUSINESS MODELS

Blockchain technology could influence today's business models in different ways and possibly even disrupt some of them. Consider, for example, the possibility of peer-to-peer communication: Blockchain makes it possible for contracts to be placed in a chain and for contract fulfillment to be handled automatically. So, if a hotel room is booked, payment could be made automatically and key transfer could be replaced by token-based door opening. In the case of Airbnb, it could be possible to eliminate the intermediary between the owner and the customer, as the data (ID, contracts, payment) and fulfillment information would be available decentrally in the Blockchain network.

The US start-up company loyyal has developed an idea that could discourage the travel industry's existing bonus programs. Enable bonus points collection of different partners in

[15] https://www.tuigroup.com/de-de/medien/storys/themenspecials/digitalisierung-und-innovation/2017-06-22-tui-nutzt-moeglichkeit-der-blockchain

[16] https://www.sita.aero/pressroom/news-releases/sita-explores-travel-identity-of-the-future

a single wallet. Customers have the opportunity to collect points centrally rather than in many different programs. For customers, the advantage is quite clear: they can get a significant reward more easily and faster than they could with individual programs, and they no longer have to dig through different opaque bonus programs. The advantages for the airlines include the simplification of processes and increased customer satisfaction through improved service. Also, they can increase direct sales, which have been greatly reduced by OTA's market power. Experts assume that, if this becomes a viable option in the future, there could be 4 to 6 Blockchain-based loyalty programs, each of which would feature one large airline, a hotel chain and other partners grouped together. [17]

FUTURE OUTLOOK AND CONCLUSION

Since the entire technology is still in development, it remains to be seen what other new business models will be developed. Blockchain could be an option when reconsidering existing business models, especially when it comes to performance pressures, increasing mobile usage, rapid third-party innovations and growing customer expectations. With regards to cost savings and improved customer experience, airlines should use Blockchain solutions if they want to keep a durable and market-leading brand – just like financial companies are already starting to discover new services and retailing sectors today. At present, the possibilities through digital currencies, especially, are seen as an opportunity for the travel industry. For airlines that are using BSPs (Billing Settlement Plans) and IATA Clearing House billing, there could be new possibilities regarding invoicing and accounting. The data flow and funds between airlines and travel agencies could be simplified, as could the accounting between different airlines of an interline or codeshare agreement.

Experts see great potential for the travel industry

Along with BSP accounting, Amadeus wants to use Blockchain for baggage tracking. This would make it possible to track luggage in real

[17] https://hbr.org/2017/03/blockchain-will-transform-customer-loyalty-programs

time. So, if a flight were cancelled or rebooked at the last minute, a notification would automatically be sent to the passenger and the baggage information could be updated in the Blockchain network, so that the delivery could be organized.

Relating to Blockchain technology, most experts see the biggest opportunities for tourism in paying by cryptocurrency. As mentioned earlier, there are many more possibilities that can evolve through the Blockchain technology. The early adopters have created numerous applications; yet so far, none of them has pushed through and it seems there is still quite a way to go.

Experts assume that the applications will grow strongly from 2018, but the technology will only reach its full maturity in about 7 years.

Overall, it is important to keep an eye on developments and to be open to new possibilities. As innovations become market-ready, they can and should be adopted by other industries, thus ensuring that a certain technology standard is kept and available for customers across industry borders.

About PROLOGIS

With more than 15 years of experience and serving more than 50 airline clients worldwide, PROLOGIS is one of the leading aviation consultancies in the world. All PROLOGIS consultants have an average of 7 years of active experience in the airline industry; they are experts on Distribution & Revenue Management, Ground Operations & Airport Processes, Revenue Accounting, Network Planning & Scheduling, IT-Services (System Migration, Evaluation and Implementation). As a result of the international consultancy projects at network, low-cost and charter airlines in more than 34 countries, PROLOGIS knows best practice and can help to implement it into every client's existing structures.

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