



Internet of Value

How the blockchain will transform the economy and society

By Andreas Neef

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1 / Introduction

The blockchain is a database that allows transactions between economic players – companies as well as private individuals – to be documented (i.e., captured digitally), to be authenticated (i.e., to guarantee that the interaction actually took place in the way that has been documented) and to be immortalised (i.e., to ensure that the documentation cannot be amended).

Why, then, is this technology, which plays a marginal role, at best, for today's economy and society, causing so much excitement? To focus one's thoughts, it may be helpful – as is often the case when looking at the future potential of new technologies – to disregard the details of their current development status and forecasts about the commercial viability of individual applications and to start by asking two questions: What does the technology promise? A technology's magical appeal is concentrated in its promise – a technology that lacks promise will not come to anything. And what does the technology want, i.e. what transformation will match its internal logic? Having answered these two questions, we can obtain valuable clues regarding the potential answers to two additional ones: Where will the technology take us? And what is at stake?

2 / What does blockchain technology promise?

Blockchain promises to resolve two of the Internet's fundamental problems: the fact that information can be copied effortlessly, which devalues it, and the loss of trust that results when economic relationships migrate into cyberspace.

Distinguishing between an original and a copy in the cyber-economy was previously deemed to be impossible. It was even seen as part of the very essence of the digital economy that marginal costs in the production of digital assets tended to zero, allowing a copy of an existing asset to be produced with the same level of quality at practically zero cost. That is both an advantage and a disadvantage. Digital assets can be produced very easily in large quantities, are highly portable and are protected from wear and tear. However, the ease with which they can be copied

also causes major problems for manufacturers, since it is virtually impossible to protect the status of an asset as an "original". The problem is exacerbated in the case of digital currencies, since a "copy" of one and the same payment is generally regarded as fraud.

Blockchain technology solves the problem by introducing the principle of scarcity to the digital sphere. Payments of identical amounts can never be copies of each other as they are verified by a global computer network. Each payment is clearly identified and distinguished from other payments via this mechanism.

Blockchain also allows secure transactions to be conducted irrespective of the persons involved. Consequently, it acts as a link to previous technologies and transfers certain of their characteristics to the digital economy. The inclusion of the word "coin" in Bitcoins is not coincidental: they are digital "coins" or cash. Anybody who accepts cash does not need to trust the person paying him, only the currency, in other words he needs to trust that the notes are genuine and are worth the amount printed thereon. If a € 100 note is genuine, it is negligible where it comes from.

The same holds for using Bitcoin. Once a Bitcoin transaction is initiated, the origin of money is immaterial. The question of whether one is dealing with trustworthy business associates does not arise since the system protects the interaction between the partners at every stage. The trust in individual players is therefore replaced by trust in the system – just as it is with cash. The reliability of the payment system and the monetary unit both encourage use of the system and stabilise it.

Thanks to these two aspects, which the inventor of Bitcoin, the secretive Satoshi Nakamoto, embedded in the blockchain protocol, blockchain actually represents something of a quantum leap in the development of the digital economy.

3 / What does the blockchain want?

What does the blockchain want? As described at the beginning, it is a type of universal logbook, or ledger, for transactions of all kinds. According to its internal logic, technology of this kind aims firstly to formalise all economic relationships. Secondly, it seeks to reduce all economic exchange to the documented substrate and to subject it to the rules of the logbook. This means that the idea behind blockchain is a ubiquitous technology, which guarantees transactions are absolutely transparent but, on the other hand, demands strictly regulated processes in economic transactions.

- > **Ubiquity:** blockchain technology is neutral in relation to the "content" it records. Bitcoins and other crypto-currencies are only one application among many. Similar to the World Wide Web, which provided a universal information space for the first time, blockchain is a universal space for the structured representation of value and valuable interactions.
- > **Transparency:** thanks to the blockchain's ability to register economic transactions in a fraud-proof manner, it ensures optimal transparency. Each transaction can be verified by each of the computers involved in a blockchain. This implies – unlike cash whose tortuous pathways are ideally suited to money laundering – an end to grey areas, which are mercilessly exposed by the blockchain.
- > **Rule-based systems:** while Bitcoin was really only the first application of the blockchain to exist, its aspiration to ensure comprehensive regulation of economic transactions in all areas is clearly apparent from the so-called "smart contracts" (see below). To be sure, blockchain technology itself does not set any rules. However, it allows rules to be depicted digitally in the form of "smart contracts" and the rights of all contracting parties to be enforced automatically.

4 / Where will blockchain take us?

A possible end-point for this blockchain logic might be found in the visions of blockchain pioneers such as Vitalik Buterin – the brain behind the Ethereum Foundation. Buterin dreams of companies that “belong to themselves”, managed by computer programs, and which settle their transactions on the basis of self-executing digital contracts – “like self-driving taxis, which are registered to themselves and finance their servicing from their income”, says Buterin.

To sum up, blockchain technology aims to achieve a new stage in the evolution of the Internet. While an information-based Internet has been in place since the 1990s following the introduction of the World Wide Web, and networks of social relationships emerged with the advent of the so-called “Web 2.0” in the new millennium, the blockchain represents an Internet of Value. What are the specific areas of application? Almost every household has one or several folders with categories such as:

- > Contracts
- > Title deeds
- > Subscriptions
- > Receipts
- > Insurance policies
- > Bank accounts
- > Licenses
- > Health insurance
- > Identity documents

The idea behind the blockchain is that it will lead to all the world’s folders being combined in a universal logbook. What will this mean in actual terms? Where can we see important future areas of application for blockchain technology? Our response will be determined by the degree to which the new technology will interfere with our daily lives. Based on this criterion, we can distinguish three development stages of the blockchain.

4.1 / The financial blockchain

The most obvious applications for blockchains can be found in finance, as their technological core service provides a new paradigm for protecting transactions. From the perspective of blockchain users, the financial blockchain promises increased efficiency and simplified processes thanks to greater transparency to start with. To cite just one example: orders based on payment on delivery – i.e. cash payment on receipt of the goods – currently involve additional work and consequently additional costs. A blockchain-based payment system would be able to allow orders based on payment on delivery to be transacted effortlessly and, most importantly, without cash being involved.

However, blockchain's disruptive potential is far greater. As a peer-to-peer infrastructure, it allows transactions to be carried out without the involvement of intermediaries. However, the latter play a greater role in the financial industry than in any other sector. Banks, stock exchanges and hedge funds have long since created task forces whose role is to sound out the business potential of blockchains. However, will the established providers be those who will benefit from the new technology? As experience during the first decades of the Internet revolution has taught us, a certain degree of scepticism is advisable here.

Interestingly, the blockchain also casts doubt on those business models that first flourished as a result of the Internet. While the idea of a P2P economy spread like wildfire among Net pioneers in the early stages of the Internet, the current reality looks different. The sharing economy is not ruled by users but by companies such as Facebook, Airbnb and Uber. The stock market listing of companies such as Facebook and Google, whose business depends on the personal data of their users, shows how valuable these data are. Users themselves only benefit in as much as they can use the tech giants' offerings free of charge. The Internet has led us to a platform economy, in which the platform operators unquestionably set the tone.

However, if one takes the logic of the blockchain through to its conclusion, platforms such as Uber are precisely the ones that could be rendered superfluous by blockchains. “Instead of putting the taxi driver out of a job, blockchain puts Uber out of a job and lets the taxi driver work with the customer directly”, says Ethereum founder Vitalik Buterin, as cited by Don Tapscott in his highly readable book about the blockchain. The blockchain will therefore enable new business models, which transcend the platform model used by Uber; it is therefore the disruptor of disruptors.

Here, the question as to who will make substantial amounts from blockchain technology remains open. Blockchain-advocates dream of an economy that generates perpetual prosperity based on fairness, transparency and justice. This seems naïve; however, it does not render the fundamental issue of an economy in which mankind is at the heart any less worthy of discussion.

Substantial hopes are also pinned on the blockchain’s ability to boost institutional trust in societies where a lack of trust is impeding prosperity. A lack of certainty regarding ownership, which is not protected by reliable institutions, is regarded as a massive constraint on development in many countries in the world – particularly where ownership of land, which can be used for agriculture, is concerned. Effective administrations and corruption are additional factors, which lead to a loss of trust in the viability of institutions.

Blockchain technology could contribute to the development of stable government and legal systems, since it cannot only be used to generate digital currencies and to depict cash flows. It can also serve as a regulatory force that is not open to manipulation, in relation to ownership and the rights and obligations associated therewith.

4.2 / The blockchain of contracts

A second evolutionary stage of the blockchain is possible where the provision of services is linked to conditions, fulfilment of which is verified via the technology platform. In principle, the blockchain will then not only be able to verify payments or record ownership properly. Rather it will automatically ensure that contracts are complied with, i.e. it will operate as a neutral trust platform, which protects the rights and obligations of contracting parties. Blockchain's character – addressed above – as an automated regulatory system is again apparent here.

The insurance industry, which is already considering new, blockchain-driven business models, is directly affected by this approach. In agriculture, for example: "Conditions and rules could be specified in the blockchain, which trigger compensation for the farmer based on confirmed weather data in real time", writes Munich Re. That is only one example of many. Delays affecting flights or train journeys could be insured in the same way. Similarly, apartments could be automatically "released" when the rent is paid; conversely, if payment is not made, access will be refused. And anybody who is caught speeding will pay a higher premium for his car insurance.

Sensors that automatically feed data – about weather conditions, for example – into the blockchain in real time will provide the basis for smart contracts of this kind. Generally, claims and benefits can be linked automatically on the basis of the technology – that is the vision, at any rate, whose implementation, as other automation technologies have shown, may still be some way off yet. However, it is already clear today that the insurance industry will change on the basis of modern information and communication technology. Risk capital invested in insurance start-ups has grown explosively since 2014. How will we insure ourselves in ten years and who is going to make money from this? The answer to this question is more open than ever.

Smart contracts could also play a key role in the Internet of Things. The vision of "Industry 4.0" (or the "Industrial Internet"), which has been the subject of much discussion in recent years,

is essentially based on the idea of decentralising production and logistics processes, automating them and gradually making them more autonomous. This development will reach an endpoint when manufacturing orders can travel independently through the value-added chain to the end customer. However, the more machines become autonomous, the more important it is to control their actions and to ensure that systems operate within the framework of their specifications. Smart contracts are ideally suited for this purpose. Blockchain technology may therefore be the key with which the Industrial Internet can become a reality.

4.3 / The biographical blockchain

At the third stage of development, the blockchain lives up to its claim to ubiquity. Every individual's day-to-day digital life will be depicted in the blockchain and will be transparently verifiable to a far greater degree than it is today. A biographical blockchain will be produced, documenting all stages of life from cradle to grave seamlessly.

Such a situation is certainly far off – although it is consistent with the internal development logic of the blockchain described above and its inherent aspiration to depict absolutely all areas of human life and to make this the basis of traceable transactions.

Today, people already store data from their fitness trackers, including heart rate, sleep quality and calorie consumption, in the cloud. It is no great step from this to a future health blockchain. Anybody who fails to eat sensibly or take enough exercise will have to bear the costs of these failures directly in this future scenario. School marks, training results and certificates from educational courses will find their place in the personal "skills blockchain" and will encourage life-long learning (the first schools in the US are already experimenting with this). Anybody who applies for a job will have to grant his or her prospective employer access to the details of his or her biographical blockchain, which will set out all the stages of his or her career to date in a clear and watertight fashion. This will make it far more difficult to ma-

nipulate one's own curriculum vitae. The blockchain knows what you did last summer!

These examples show that blockchain technology not only qualifies as a positive utopian ideal but also provides grounds for all kinds of dystopian speculation. If George Orwell were to write his classic 1984 today, blockchain technology would certainly play a major role.

As much as the examples suggest that everybody in the biographical blockchain knows everything about everybody, the picture is naturally deliberately exaggerated. Of course there will be control mechanisms and statutory framework conditions, which allow individuals to release parts of their own private information store or their own digital identity selectively depending on the context. However, the expectations on the individual must not be underestimated – firstly the pressure to participate in the biographical blockchain, to maintain one's own digital identity and to augment one's own digital reputation; secondly, the pressure to disclose objectively relevant information in response to requests or solicitations. Or do you have something to hide? Social conflict lines are marked out here.

5 / What is at stake?

Even if there are still many technological, economic and legal question marks from today's perspective; the blockchain principle will become a key element of the digital transformation of our economy and society moving forward. A culture of dealing with blockchain technology still has to emerge. Blockchain technology cannot answer the sensitive questions for us that are raised here. The biographical blockchain in particular shows very clearly the two-faced nature of this development.

In addition to increased efficiency and cost benefits, blockchain technology promises, above all, an end to arbitrariness: in future, decisions will be made on the basis of solid evidence and with the involvement of artificial intelligence; intermediaries will be margin-

alised; life will be made more difficult for fraudsters; there will be less scope for corrupt behaviour. Incorruptible transparency and the automation of transactions in the blockchain will create a new quality of certainty in the Internet of Value.

Grey zones and areas of ambiguity are at stake on the other hand. After all, grey areas not only provide shelter for criminal machinations – they are also places in which goodwill, individual scope for decision-making and generosity in business, administration and social interaction are at home. Maintaining the positive aspects of a lack of transparency is certainly one of the most important social tasks in the transition to a blockchain economy.

About the author

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About Z_punkt

Z_punkt The Foresight Company is a leading international strategy and foresight consultancy that focuses on strategic future issues. It translates findings derived from trend and futures research into practical advice to facilitate strategic management. Using corporate foresight processes, Z_punkt helps companies to make the most of sustainable future markets.

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