Expert Group

Blockchain

Blockchain beyond the hype

Takeaways

1. Blockchain identity management boosts conversion and reduces annoyance.
2. From a privacy perspective cryptocurrency, a digital form of cash, fulfils a consumer need in an increasingly digital society.
3. Blockchain facilitates transparency with regard to provenance and sustainability in a society that is seeing increased demand for such information.

Chair

CryptoTaub

The Impact of Blockchain on Retail

We live in a *connected* world where our online identities are just as important as our offline ones. More and more often, we find ourselves surprised by how little privacy we have these days, and digitization is giving banks increased insight into our financial situations.

In 2009, an innovative new technology emerged that may be able to address some of these issues, offering a viable alternative solution: blockchain. In this blue paper, the Blockchain Expert Group will seek to provide insight into various matters surrounding blockchain, as well as answering the question: "How will blockchain impact the retail supply chain?"

The aim of this blue paper is to make businesses aware of the impact of blockchain technology on the Dutch retail market. After an introduction in which we will explain blockchain in greater detail, we will take a deep dive into issues relating to identity and digital privacy, payment (international payment traffic and a digital alternative to cash), and supply chain management (control over the retail chain and certainty with regard to product authenticity).

1. What Is Blockchain?

Blockchain explained in sixty seconds

Blockchain and bitcoin (or cryptocurrency) are often mentioned in the same breath, but it is important to know the difference between the two terms: bitcoin is an application of blockchain technology, in the same way that email is an application of the internet. There are, however, many more valuable things that can be exchanged using blockchain technology, such as contracts, consignment notes, purchase receipts, loyalty programs, driver's licences, insurance policies, medical records, and property records.

Blockchain is a way to create a digital representation of any type of value, record it and transfer it without requiring a central intermediary. Without a central intermediary, though, where is all this information stored? The answer is the decentralized ledger, also known as the blockchain.

Whereas our current system depends on central parties such as banks, civil notaries and the Chamber of Commerce, which give us the trust we need to do business with one another and allow us to make transactions, blockchain will enable us to work without these intermediaries, based on faith in the software and the network of participants.

For this reason, blockchain, like the web, has the potential to become a disruptive technology and radically change existing business models. Some of blockchain's other features – in addition to its ability to reduce our dependency on intermediaries – include resistance to fraud, less red tape, real-time transaction information and encryption based on mathematical and cryptographic principles.

2. Blockchain and Identity

Although our identity is intangible, for many of us it's an inextricable part of who we are. Nevertheless, we share it more easily with others than ever before. Sharing our identity allows us to make use of online products and services provided by online stores and platforms. It enables us to buy toys or alcohol, for example, or even take out a mortgage or insurance. That's why it's important to make sure that only the owner of a particular identity can make use of these services.

What is your online, or digital, identity? An online or digital identity is an online representation of the identity of a human being, organization or device, consisting of features that describe said identity or its behavior. In the digital world, everyone and everything has a digital identity, but this identity may not always be accepted as the truth by the government or retailers.

Despite the introduction of the General Data Protection Regulation (GDPR) in 2018, it has turned out to be difficult for individuals to affect what happens with their online identities. On average, we have personal information stored in over 100 online locations. Apart from the fact that we are often unaware of who has our information at their disposal in the first place, it is often difficult to have this information removed or find out whether it has been sold to any third parties.

Constantly having to re-enter personal identifying information reduces conversion rates and is often a source of annoyance for consumers. Every time we sign up for a new platform, official body or online store, we have to enter our data all over again. Identification is necessary, but because most computer systems do not interact with each other, this ends up being a very repetitive process. For online retailers, this means that consumers are becoming increasingly reluctant to share information with people or companies that they barely know.

2.1 Identity Management through Blockchain

One of the core characteristics of blockchain may provide a solution to the online identity problem. With blockchain identity management, you remain the sole owner of your identity. You only provide the information that is required to complete the purchase.

Blockchain technology allows you to create a safe environment where all your personal information can be stored securely. This environment is essentially a kind of online safe. The Schluss platform is an example of this. In the future, you will be able to authorize third parties to retrieve information from this safe, instead of having to re-enter your information for every new online store. This enables you to keep track of who is able to view your information and also allows you to revoke this authorization, making this solution completely GDPR-proof. With *zero-knowledge proof* you can even give valid proof of your identity without sharing any concrete information about your identity with the other party. You could compare it to answering a question in a quiz: you can assure the other party that you know the answer, without actually having to give them the answer. You could also compare it to buying a house: the mortgage company is given the assurance that you are able to pay your mortgage, without learning all the details of your financial situation.

Schluss

Using a blockchain ID, transactions can be linked to your identity, allowing you to benefit from personalized discounts and loyalty points without exposing all your personal information. This presents retailers with new opportunities for fostering long-term customer relationships through loyalty programs.

Why Blockchain Is Ideal for Loyalty Programs

Louis Millon, CTO and Co-Founder of Universal Reward Protocol, is working on a blockchain for loyalty programs, which will allow users to accumulate points for various stores within a single system. Retailers, in turn, will gain insight into consumer behavior that goes beyond just knowing which products or services they are buying. The French company has already partnered up with Carrefour and the Galeries Lafayette department store.

Source: Engelbarts, R. (2018). Universal Reward Protocol: waarom blockchain ideaal is voor loyaliteitsprogramma's ("Universal Reward Protocol: Why Blockchain Is Ideal for Loyalty Programmes").

In the short term, the use of blockchain for identity management purposes in the Netherlands will be limited to simple applications, such as buying alcohol and tobacco. It is clear that more complicated blockchain identity-management applications will only be rolled out in the longer term, but that does not make them less important. In fact, a robust online identity will be crucial to digital advances in the future, when validated proof of identity will be a prerequisite for participation in society and the economy.

2.2 The Advantages and Disadvantages of Blockchain Identity Management

The advantages of using blockchain for digital identity management:

- You only have to enter your information once.
- No access without proper authorization.
- GDPR-proof: monitor who has access and revoke permissions (you are in control over your information).
- Easy way to log in/sign up with online stores and businesses (*single sign-on*).

The disadvantages of using blockchain for digital identity management:

- Blockchain is not yet widely accepted by the government and the business community as a means of identification.
- Zero-knowledge proof is at an early stage of development.
- The government has not yet developed an alternative to your passport or ID card. This alternative could be blockchain-based, but in its absence proving your identity online is still a complicated affair.
- There is no helpdesk that you can contact if you lose your password/code. If you forget your password/code, you will no longer have access to your information.

For more information about online identification, see **the blue paper written by the E-Commerce Login & Identity Expert Group.**

3. Blockchain and Payment

Paying can be quite a hassle. From the consumer's perspective, it often comes as a frustrating interruption in the customer journey: there is typically a lot of friction, it's time-consuming, you tend to have to identify yourself again via a PIN or by creating an account, or you're forced to use a specific payment method. For retailers, however, it may be an even more frustrating part of the journey, as they need to purchase special hardware and integrate online payment options. Payments require a lot of admin and the payment acceptance process is very time-consuming and requires considerable resources.

Blockchain will help cut down on all the red tape and costs involved in the current payment infrastructure, as well as reducing counterparty risk. This, in turn, reduces the risk of fraud and resulting damages, ultimately leading to lower prices for consumers. Retailers will no longer have to pay subscription fees to certification bodies or take out pricy insurance policies, and the use of cryptocurrency means they won't find themselves having to deal with illegitimate chargebacks. Together, all these benefits will help retailers avoid liquidity issues.

3.1 Is Blockchain (Bitcoin) an Alternative to Cash?

Paying with cash is an age-old way of doing business. Before the first Amsterdam Exchange Bank was established in 1609 – an institution charged with managing our cash and creating order from a chaos of coins – everyone was responsible for their own financial affairs. Over time, banks have gradually taken over this responsibility to an ever greater degree,

with the digitization of society increasing our dependence on them. Many consumers are aware of and rather uncomfortable with this, opting to use cash for transactions that they do not want to involve their bank in. This can be a choice motivated by the desire for privacy: do I want my bank to know that I am buying certain privacy-sensitive products? As well as providing privacy and anonymity, cash can also be used anytime and anywhere.

Cash is still the most widely used means of payment in the world, even though the Netherlands is either behind or ahead of the curve, depending on how you look at it. Research conducted by the European Central Bank (ECB) has shown that 79% of all over-the-counter transactions in the eurozone are paid in cash. This percentage is lower in the Netherlands, though it is still a solid 45%. The same study also shows that most people use cash due to a lack of good alternatives (including digital alternatives) and that many retailers do not accept cards because of the high transaction costs involved.

With the emergence of bitcoin, a digital alternative to cash has suddenly appeared. It has exactly the same features and is digital to boot, making it highly mobile, very secure and unaffected by national borders.

3.2 The Advantages and Disadvantages of Blockchain in the Payment Landscape

The advantages of blockchain (bitcoin) as a means of payment:

- Low transactions costs.
- Protects consumer identity.
- Highly mobile.
- Transcends national borders.
- Bitcoin is still very much in development and is aiming to become an entirely frictionless digital form of money.

The disadvantages of blockchain (bitcoin) as a means of payment:

- Not yet widely accepted as a means of payment, partly due to its high volatility.
- High volatility means people are less inclined to spend bitcoin.
- As yet, there are no laws and regulations governing cryptocurrency.
- Retailers who decide to accept bitcoin as a means of payment first need to think carefully about how they will deal with their business's bitcoin balance.

Blockchain will not replace our current payment infrastructure, but it may become a supplement to it. The true added value of blockchain lies in the fact that transactions in a blockchain can be programmed. This has numerous benefits, such as the ability to process automated transactions via a suspense account, preventing counterparty risk.

4. Blockchain and Supply Chain

Blockchain holds great promise as an effective and innovative potential solution to multiple persistent, age-old challenges. More and more retailers are realizing that blockchain offers opportunities to streamline operations and processes, provides security with regard to product authenticity, and allows for shorter supply chains.

Managing modern supply chains is a challenging task. The delivery speed that consumers have come to expect ("Order before 23:59 for next-day delivery!") requires major visibility and flexibility, as companies must be able to maintain optimal stock levels while being able to deliver anywhere, anytime. Transparency and visibility are enormous challenges. Most retailers have virtually no insight into what their supply chain looks like beyond their primary supplier. The fact that the chain consists of numerous links results in a considerable amount of paperwork and stakeholders which, in turn, leads to risk and inefficiency. More and more players appear to be concerned by this. A contaminated ingredient in a food product, for instance, can seriously damage a company's reputation if the company is unable to quickly trace the cause of the problem.

Diamond Verification
In the past, the provenance of diamonds could only be verified with paper certificates. Nowadays, every diamond is assigned a unique, identifiable code based on the shape, color, clarity and carat. In addition, stones weighing more than 0.16 carats are given a serial number during the classification process, which is engraved on the diamond and recorded in a blockchain. All diamond certificates can be accessed in the blockchain, allowing consumers to check whether their diamonds are genuine and conflict-free.

Source: ABN-AMRO (2017) Nooit meer nepproducten. De impact van blockchain op de Retail ("No More Counterfeits. The Impact of Blockchain on Retail").

In an ideal world, everyone would have access to extremely reliable information, which would allow us to make rational decisions about quantities and product composition at exactly the right time. Currently, however, procurement professionals are faced with the challenge of working with outdated data derived from various sources, and dealing with empty shelves and stock that is stuck in distribution centers or warehouses. *It is unsurprising, then, that over-ordering* and inaccurate orders tend to be the rule rather than the exception.

The complexity of today's long chains and the need for smart solutions are leading to a growing interest in the potential of blockchain technology in the supply chain.

4.1 Supply Chain Management with Blockchain

Blockchain has a wide range of potential applications in supply chain management. It can be used to improve stock management and guarantee product authenticity. It can also be a tool to help track *product provenance*. Blockchain can help retailers give consumers more confidence in products, transactions and data integrity, at lower costs than ever before. Blockchain applications can help retailers to improve visibility in the supply chain, guarantee the provenance and authenticity of their products, speed up transactions and reduce processing costs. To explore this potential, retailers need to develop joint projects with other players and chain partners in order to test how and where they could integrate blockchains into their companies or operations. Retailers who take a proactive approach will be able to benefit quickly by transforming labor-intensive tasks into fully automated processes, facilitated by blockchain.

4.2 The Advantages and Disadvantages of Blockchain in the Supply Chain

Using blockchain in the domain of supply chain management has the following advantages:

- **Improved stock management**
  As the complexity of SKU management (Stock Keeping Unit management, a method for keeping track of inventory) is increasing and product lifecycles are decreasing, making sales forecasts has become considerably more complicated for retailers in industries such as food, fashion and personal care. Retailers and their supply chain management partners can make smart use of blockchain solutions that provide a *single source of truth* and can facilitate automatic orders and payment based on *smart contracts* (digital contracts recorded in the blockchain). Increased insight into products' location or position in the chain will increase operational efficiency by allowing for more accurate forecasting, which will reduce over-ordering and improve stock management.

- **Product authenticity**
  When counterfeit items are difficult to distinguish from the real deal, this can lead to declining sales and deterioration in the value of real products, affecting companies that design luxury consumer goods. A blockchain solution can increase consumer trust by allowing customers to scan a code engraved onto the product, which gives them access to the product's entire history, including its chain of ownership. ReCheck is an example of this kind of solution, allowing consumers to identify the original manufacturer of the product, and – if it is a second-hand item – see a list of the previous owners.

ReCheck

- **Product provenance**
  Supermarkets specializing in organic, non-GMO foods can benefit from the ability to boost consumer trust and assure customers that organic labels are not just a marketing tool or a strategy to charge higher prices. Supermarket chains and their suppliers can use a blockchain solution to increase trust in their products by allowing customers to track products from farm to store.

Blockchain in Supermarkets

Albert Heijn customers will soon be able to track the exact route traveled by their bottle of orange juice from the factory where it was produced to the supermarket it ultimately ended up in. Customers will be able to use their smartphone to scan a QR code to track the journey made by the oranges from the moment they were first picked from a Brazilian tree.

Source: Hallema, T. (2018). Albert Heijn gebruikt blockchain voor sap ("Albert Heijn Uses Blockchain For Juices").

Like any new technology, blockchain also faces certain challenges:

- **Transparency**
  All stored information can be made accessible to all authorized users. This makes information less susceptible to fraud, but for sensitive information such as medical records or voting behavior, full transparency can be a drawback rather than a benefit.
- **Speed and energy consumption**
  Low speed and high energy consumption are a major challenge for universally accessible blockchains, such as Bitcoin and Ethereum.
- **Vested interests**
  Disruptive technologies often face major resistance from the powers that be, who realize that their business models are under threat and will do anything they can to prevent this.
- **The technology is still in its infancy**
  Blockchain is still young. More time is needed to discover new revenue models and solid use cases.

5. Conclusion

The newspapers are full of articles about new technologies such as artificial intelligence, big data and blockchain, but opinions about the impact that blockchain will have are divided. The debate brings to mind an adage about the impact of new technology, also known as Amara's law: we tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run. Amara's law also seems to apply to blockchain. The crypto bubble that emerged at the end of 2017 and burst during 2018 bears this out.

Ultimately, blockchain could replace some of the services provided by banks, civil notaries and even government agencies. Currently, it is international platforms such as Airbnb, Uber, Booking.com and Peerby that are facilitating peer-to-peer concepts, but, eventually, blockchain could start doing the same, posing a threat to the aforementioned platforms. *Disrupt the disrupters!*

Blockchain technology opens up many new opportunities. It is important to remember, however, that the technology is currently in an early stage of development. After we've come out of the trough of disillusionment, we do expect to see meaningful applications that will have clear added value for both consumers and retailers.

The impact of blockchain on retail, in other words, is expected to be minor in the short term, but major in the long run. As such, we would recommend that retailers: Join in, take training courses and foster understanding and awareness. Start experimenting and learn from the outcome. Join others, work with the government and get started as soon as possible. Learn and experiment. "Think BIG, act small!"

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