Blockchain Education as a Catalyst for German Innovation and Economic Strength

Summary: Blockchain technology is an integral part of a future-oriented and competitive German economy. It can be used to increase efficiency and reduce costs. An education initiative is needed in Germany to strengthen confidence in and expand knowledge of blockchain technology. Above all, the aim must be to train urgently needed specialist staff. In this position paper on the topic of "Education", the Blockchain Bundesverband describes its view of the role of blockchain technology and also outlines the need for education policy measures. Specific recommendations for action are addressed so that business and society in Germany can make meaningful use of this key technology.

The Blockchain Bundesverband aims to play a constructive role by offering citizens, business, politics and all other interest groups a platform for the exchange of knowledge.

Definition of Blockchain and Web3

Blockchain is a technical solution for managing data in a distributed infrastructure without a central authority in a traceable and tamper-proof manner by consensus. With blockchain, it is possible to verify transactions (for example, in payment transactions with cryptocurrencies) without a central authority in a trustworthy and transparent manner.[1]

Since the introduction of the Bitcoin blockchain in 2009, the technology has developed significantly. Programmable blockchains are now more widespread (e.g. Ethereum), on which advanced applications can be built using smart contracts. These are also called "Web3" applications. Web3 is supposed to be a "new generation" of the internet that stands out from existing platform economies ("Web2") thanks to decentralized technologies.[2]

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[1] cf. bsi.de
[2] cf. Stellungnahme zum Fragenkatalog des deutschen Bundestags zu Web 3.0 und Metaverse, 2022

1. Why Blockchain Education is so important

Our world is constantly changing, but never before has this change been as rapid as it is now. Blockchain is a key technology, particularly in light of the digital transformation of our economic and financial system and the changes to the legal framework. The relevant qualification of specialists to manage this transformation, as well as the creation of acceptance among the population with regard to the use of blockchain technology, is of particular importance. The following aspects underpin this need.

The Electronic Securities Act (eWpG), which regulates trading in electronic securities, was implemented in June 2021. In addition, the Markets in Crypto-Assets Regulation (MiCAR) came into force on a European level in June 2023. This comprehensive regulation creates a legal framework for digital assets based on blockchain technology. In order to implement this at a national level, the German Federal Ministry of Finance presented the draft bill of the Financial Market Digitization Act (FinmadiG) in October 2023.

In terms of regulation, Germany and Europe are therefore playing a pioneering role in the blockchain and web3 industry. However, in order to actually exploit this potential, the right conditions must also be created in terms of education policy. For example, there is currently a lack of opportunities to gain qualifications for the industry at many levels. This is not just about presenting Germany as an attractive location for education and work, but also about securing the opportunity to remain economically competitive.

Use Cases

Ever since the cryptocurrency Bitcoin became the focus of public attention, the underlying blockchain technology has also attracted a great deal of attention. Its potential to enable efficiency gains and cost savings in various industries has proven itself in many use cases.

Above all in the financial sector, which is already in a state of constant transformation, industry experts see a wide range of potential uses for blockchain - particularly in the areas of real-time transfers and the settlement of shares and derivative financial instruments. A separate ecosystem has now formed around "decentralized financial services" (DeFi). The energy industry is also seen as having great application potential, with around 20% of industry experts even seeing the technology as a game changer for the energy industry.[3]

Associations and organizations such as the OWM have described the potential of the technology well in their blockchain study[4]. Despite this recognition, however, they fear that implementation will take a long time, particularly due to deficits in education and standards. Trend topics are also developing outside of the traditional financial market and the real economy that offer enormous potential and could revolutionize the Internet and its use.[5] Industrial use cases that can be subsumed under the "Industry 4.0" concept are particularly noteworthy.[6]

The synergetic interaction between blockchain and artificial intelligence (AI) in particular is seen as offering enormous potential for efficiency.

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[3] cf. Statista, 2024
[4] cf. OWM Blockchain-Study, 2019
[5] cf. Token Study Konrad-Adenauer-Stiftung, 2023
[6] cf. Plattform-i40.de

An Excursus on Blockchain and AI

The combination of blockchain and AI is fundamentally changing the technological landscape[7] Early education initiatives are crucial to equip the next generation with the necessary skills to expertly combine both technologies and maintain a sustainable market economy in the face of international competition.

Blockchain technology brings its capabilities for secure and decentralized data management. This enables a trustworthy and tamper-proof data basis, which is of crucial importance for AI systems. The transparency and immutability of blockchain creates a reliable basis for data collection, which significantly improves the quality and integrity of data used by AI algorithms.[8] Similarly, the use of AI in critical infrastructure, and also in news production, should be recorded in a transparency register.

The interface between blockchain and AI also creates new opportunities for data sovereignty and management. By making ownership and access rights to data transparent, the blockchain allows individual users to exercise more control over their personal information. This not only contributes to the protection of privacy, but also to people's willingness to share their data for educational and research purposes.

Challenges

A recent survey by *Bitkom Research* 2023[9] produced the following results: the greatest potential is seen in the improvement or new development of services and products (95% and 85% respectively) and the reduction of transaction costs (80%). The availability of qualified personnel (84%) and technical expertise (82%) were identified as the greatest challenges to activating this potential. However, current legal uncertainties are also perceived as negative (76%). The majority of companies advocate greater support for the training and further education of blockchain experts (57%).

The importance of blockchain technology goes beyond economic aspects. Education and science play a decisive role in this context. The Blockchain Bundesverband is convinced that education and science on the topic of blockchain are essential in order to understand and utilize the social opportunities and challenges of blockchain technology.

To ensure that Germany does not lose competitiveness in the age of rapid technological change and digital transformation, good educational policy conditions must be created. Although the German government recognized the potential of blockchain at an early stage and drafted its own blockchain strategy back in September 2019,[10] the measures mentioned there are not being implemented sufficiently in the view of the Blockchain Bundesverband. The majority of companies surveyed by *Bitkom Research* would also like to see a more political commitment to blockchain - in particular an update to the German government's blockch*ain strategy (*Blockchain-Strategie der Bundesregierung) and a pioneering role for the authorities with regard to blockchain (70% each)[11].

In the following, we present how education and research on blockchain technology can be made more successful.

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[7] cf. Die Blockchain-Technologie, Bundesnetzagentur 2021
[8] cf. Blockchain und künstliche Intelligenz (KI), IBM
[9] cf. Blockchain - Wo steht die deutsche Wirtschaft?, Bitkom Research 2023
[10] cf. Blockchain-Strategie der Bundesregierung, 2019
[11] cf. Blockchain - Wo steht die deutsche Wirtschaft?, Bitkom Research 2023

2. Existing Educational Gap

Anyone who wants to learn more about blockchain and Web3 is currently often reliant on private online offerings. Not only can the extent of information be intimidating, but the quality of the information can also be difficult to assess.

Blockchain literacy is particularly important with regard to fraud or dubious offers in connection with cryptocurrencies. Fraudulent actors not only harm citizens, but also the industry as a whole. Educational programs are therefore an essential component in educating citizens and countering misunderstandings in connection with the technology. We are therefore in favor of publishing reputable sources for citizens.

In addition to general knowledge, however, there is also a lack of blockchain experts: traditional educational programs, such as at academic institutions , are few and far between in connection with blockchain.

The register of the EU education project CHAISE lists about a dozen German institutions that offer courses related to blockchain.[12] At the same time, the research project suggests that the demand for blockchain specialists will increase significantly in the coming years.[13]

We therefore see that the educational measures in the field of blockchain technology are currently not sufficient to

➔ disseminate the necessary knowledge to the broad masses of our society and meet the internationally required educational standard

➔ and to meet the demand for blockchain specialists.

The Blockchain Bundesverband is therefore committed to ensuring that Germany's educational institutions introduce or expand blockchain training and implement further, target group-oriented educational measures as part of a broader blockchain education initiative.

The goal is not only to make Germany an attractive location for education and work, but also to ensure Germany's economic competitiveness in the face of technological change. Germany in particular, with its strong positions in mechanical and vehicle engineering and in the chemical industry, can benefit massively from the connection of (autonomous) machines and vehicles to a transparent and efficient control backend of the future - but it can also fall significantly behind if the combination of engineering skills and hardware production as well as the digital service components for the solutions of tomorrow are not successfully mastered.

Blockchain education should be used in the most targeted way possible. The CHAISE Blockchain Skills Report for 2021 shows that blockchain developers in particular are in high demand. However, blockchain skills are also needed in related areas such as marketing, product management, design and finance.[14] Training courses should therefore be specialized or interdisciplinary.

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[12] cf. CHAISE - The Registry of Blockchain educational and training offerings
[13] cf. CHAISE - Annual Blockchain Skills Forecasts, 2023
[14] cf. ibid.

3. Call for action

The Blockchain Bundesverband recommends the following course of action:

- **Promotion of Educational Measures in the Field of Blockchain Technology**

  Our recommendation is the targeted promotion of blockchain-related educational programs. This includes the development and establishment of courses and chairs at private and state colleges and universities as well as the development of further training programs for teachers.

- **Publication of Reliable Information for Citizens**

  In order to promote the understanding and use of blockchain technology in society, we recommend the targeted provision of well-founded and easily accessible information. Transparent and broad-based educational work through interactive platforms and media cooperation is essential here. This includes a comprehensive presentation of the functions, areas of application, opportunities and risks of blockchain. We emphasize the need to continuously update this information in order to keep pace with the dynamic technical and regulatory developments in the field of blockchain in Germany and to ensure a sound knowledge base for citizens.

- **Establishment of Blockchain Hubs at a State and Federal Level**

  We strongly recommend the establishment of blockchain hubs, both at a federal and at a state level. These should serve as key contact points for SMEs, start-ups and other stakeholders to promote knowledge transfer, the pooling of resources and the exchange of best practices. The creation of these platforms will not only strengthen innovation, but also facilitate collaboration between different economic sectors. We see these hubs as essential in order to intensify the application of blockchain technology in multiple areas and thus promote competitiveness in Germany.

The Blockchain Bundesverband aims to create a forum for the interdisciplinary exchange of knowledge. The primary goal is to promote a deeper understanding of blockchain technology and to enable collective participation in its ongoing development and innovative applications. In this sense, the platform is intended to enable citizens, educational institutions, political decision-makers, economic players and all other relevant interest groups to network with each other and exchange and deepen their knowledge of blockchain technology. Together, the further development and practical implementation of this technology is to be driven forward.

Conclusion

Blockchain technology is a decisive factor for Germany's ongoing competitiveness. From the perspective of the Blockchain Association, we recognize that despite Germany's pioneering regulatory role, there is already a significant education gap. Our recommendations for action are aimed at successively closing this gap. The identification of specific use cases and the promotion of basic research are just as important as the development of a broad range of educational opportunities at universities and other educational institutions. These and other strategic measures are crucial in order to strengthen and secure Germany as a location for innovation and business in the long term.

To achieve this, the Blockchain Bundesverband is actively promoting blockchain literacy to ensure the effective implementation of blockchain education into German society. With a future-oriented model, the association is also stepping up its efforts to advance the scientific debate on DLT, blockchain technologies & co. in order to strengthen the basis for progressive innovations and their application.

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