Blockchain as a technology for the transition to a new digital economy

A U Mentsiev¹, E R Guzueva¹, S M Yunaeva¹, M V Engel² and M V Abubakarov³

¹ Faculty of information technology, Chechen State University, 32 Sheripov Street, Grozny, 364024, Russia
² Management department, Grozny International University LLC., 3/25 Kadyrov Avenue, Grozny, 364091, Russia
³ Faculty of Technology and Management in Education, Chechen State Pedagogical University, 62 Isaev Avenue, Grozny, 364068, Russia

E-mail: a.mentsiev@chesu.ru

Abstract. The modern economy is gradually developing and shifting into a virtual economic system. The new digital economy serves as the new model of economic development and redesigns businesses based on utilizing information in b2b relationships. New information and network technologies are becoming significant factors of a globalizing economy and contribute to the rapid transition of the economy from a real economy bound by boundaries to a network one connected by the internet, ensuring digital economy development and innovative business process formation. With the blockchain technology coming into play, the digital economy is set to take a step forward in globalizing the economy. This research explores how the blockchain technology has transformed the digital economy and how this technology can be exploited to make the digital economy an extra mile.

1. Introduction

The digital revolution spans almost over every aspect of the economy. The digital technologies and applications have developed rapidly over the last two decades, opening up new opportunities for interactions and transactions between people and enterprises. The digital economy enables businesses to create value by leveraging the internet to expand their reach to customers and launch virtual markets. Companies that use the internet economy and knowledge in every aspect of their business operations create value, productivity, and efficiency.

The digital economy hence refers to business activities conducted through markets whose infrastructure is based on the internet. It is mainly based on information, connectivity, and applications with the feature of limitless reproduction. In the digital economy, information and data are power.

Developed countries across the globe have greatly benefited from the digital economy. The digital economy ranks among the top six industry sectors in developing countries. The growth can be attributed to an increase in the number of users, faster computing technology, and low-cost internet access [1].

The digital economy is divided into the following component:

- Electronic network

Electronic network is the pillar of the digital economy as it consists of computer networks, software, and applications that span across the globe, allowing for cross-border transactions and eliminating geographic boundaries. The digital infrastructure consists of companies, governments, and individuals.

- Online transaction
Companies that operate on the digital economy generate internet-based transactions. These include companies like online retailers, manufacturers, and shipping services. In recent years, several online services have emerged and reshaped the way people around the globe transact, communicate, and conduct business. Commercial giants like the ride-hailing app Uber and the home-sharing platform Airbnb represent some of the well-known companies utilizing the new digital economy. Platforms like these serve a wide range of markets and objectives.

- Intermediaries
  Through the internet, buyers and sellers have opened up lines of communication that cut out intermediaries, increasing efficiency, and facilitating faster interactions. Facebook, Instagram, and twitter provide such platforms through which consumers readily communicate with their buyers [2].

  The digital economy has increased over the last two decades, and its economic impact rises globally. However, although the digital economy offers many benefits, it faces some challenges. With the growth of the internet and the increase in the amount of data being shared by organizations and individuals, cybersecurity has become a severe issue in the digital economy. There has also been a lag between internet policies and business. Too often, policies and regulations vary across different countries. Developing internet regulations that do not take into account cross-border transactions and interactions seriously undermine the success of the digital economy. Additionally, trust and transparency in the supply chain have become a significant factor in the digital economy [3].

  Hence to ensure progress towards unified information and communication technology platforms for the digital economy, blockchain technology has been adopted by several companies. Recently there has been considerable interest in the digital economy whereby organizations are looking to adopt blockchain. To facilitate the integration of the digital economy with the blockchain technology, the internet of things is also utilized to enhance network connectivity.

2. Blockchain technology

   The detailed technical underpinning blockchain technology is outside the scope of this paper. However, going forward, it is essential to have a grasp of the blockchain concepts, features, and terminologies applied in the digital economy [4].

   Blockchain is a peer-to-peer distributed ledger of transactions stored in a chain of blocks, and that permits records to be shared with all the network nodes without a central authority. Transactions on a blockchain involve any data or digital asset applied to some state and values and saved as an address on the blockchain. Each transaction in the blockchain must be verified by a majority of the nodes in the system so that it can be appended to the blockchain. The nodes must agree, and only then can the transaction be added. This process is known as consensus.

   The following aspects and features of blockchain are much used in the digital economy [4,5]:

   - Decentralization
     The very nature of the digital economy is decentralized with distributed stakeholders and management systems across the globe. Blockchain, being decentralized, offers a platform through which shareholders can have access to the same data and transactions without a single authority and any geographical limits.

   - Improved data transfer security
     All data stored on the blockchain is time-stamped, encrypted, and appended to the blockchain, making it immutable and tamper-proof. What's more, data saved on the blockchain using cryptographic keys protect the identity of patients and involved institutions allowing for anonymity.

   - Transparency and trust
     Blockchain, through its open and transparent nature, creates an environment of trust around distributed companies that use the internet for business and government operations and transactions. This facilitates the acceptance of records, products, operations, and increased customer satisfaction.

   - Smart contracts
     To enhance trust in the blockchain, smart contracts are utilized. A smart contract is an immutable computer protocol intended to digitally facilitate or enforce the transfer of digital assets or negotiations between the nodes involved. Smart contracts take in information or data as input and assign a value to
it depending on the conditions stated in the contract. The contract is then executed according to the contractual clauses, ensuring that unlike a traditional contract, a smart contract is always executed, as stated in the blockchain [6].

3. How blockchain technology is transforming the digital economy

Almost every individual in the globe is aware of blockchain technology due to the rise of bitcoin and the various altcoins (alternative coins). Blockchain technology was initially created to provide the bitcoin platform with both anonymity and security in the world of finance. However, since the conception of bitcoin, many developers and researchers have developed independent ways to implement the technology. Over the years, blockchain technology presented a vast number of various applications in the economy, which are being implemented by some of the top companies in the world [7].

3.1. Blockchain for the supply chain

The current supply chain in many nations is broken. Decades ago, supply chains were relatively simple because much of the transactions and commerce were local. However, with the growth in the digital economy, the supply chain has become incredibly complex. Additionally, since manufacturing has been globalized and a large portion of it is only done in a few countries like china, the supply chains are heavy with their complexity.

Currently, it is incredibly difficult for customers and businesses to know the actual value and state of products as there is a significant lack of transparency. Similarly, it is challenging for companies across the globe to verify the authenticity of a product [8].

To counter this, some companies have implemented blockchain technology due to its decentralized and secure nature. Global retailers like Walmart have implemented blockchain technology to track the sales of its products like pork in china. Walmart utilizes the distributed ledger system to record product status at each step of the supply chain. Its system lets the company see where each piece of meat originates from, was processed and who bought it. Alibaba has also adopted blockchain technology in the fight against food fraud.

Just a few years after blockchain’s inception, these companies have improved transparency, integrity, collaboration, and customer satisfaction across the globe.

3.2. Blockchain for transactions and financial services

Financial institutions have long been termed as being technologically-stunted organizations and too reliant on outdated legacy systems and processes and slow to adapt to the demands of the ever-changing technology. With the new emerging waves in technology, financial institutions have not only incorporated blockchain into their processes but have also kept pace with innovations, and they are leading it [9].

Several large organizations and institutions have invested in blockchain-focused research and developments. The bank of Canada and the authority of Singapore, for example, have announced their cross-border, cross-currency transfer using blockchain [5].

Other notable institutions include JPMorgan chase, which recently launched its jpm coin, a blockchain-based token that enables the transfer of payments between financial institutions accounts.

3.3. Blockchain as an alternative source of capital

In most developing countries, access to bank loans is often difficult, as most banks require extensive collaterals and insurances that most individuals and start-ups do not have. This makes the problem of funding important as these countries need that small businesses and start-ups to grow their economy. With the development of the digital economy, loans have been made easily accessible to individuals across the globe. However, extensive collaterals and securities are also required [9].

Blockchain provides new solutions to the informal lending process helping small businesses, start-ups, and individuals gain access to secure sources of financing. Over the years, a few new start-ups have emerged from the financial services offered by blockchain. For example, the start-up OmiseGo offers decentralized wallets and asset-based value exchange for start-ups and individuals. Additionally,
Wetrusts start-up offers insurance and lending circles within existing trust-based networks among communities as an alternative to the current formal insurance and lending institutions [5].

Start-ups in developing countries are utilizing these services to acquire funding, which in turn grows their economy. In this use case, blockchain offers an impressive middle platform between informal and formal lending and enables the process to be cross-border while utilizing the digital economy [10].

4. Challenges

4.1. Lack of experts
Blockchain developers and experts are among the 20 fastest-growing job skills with the demand increasing with more than 200% in 2018. The lack of training programs has left this emerging market in a tight glut.

4.2. Public culture
Blockchain technology represents a total shift from the traditional ways of doing business and transactions. Blockchain places and trust and authority in a decentralized platform without the need for any central authority. For many organizations and individuals, this may be very and unsettling, and they may have a difficult time adapting [11].

5. Conclusion and recommendation
Compared to the traditional economy, the digital economy has transformed how nations and businesses carry out their operations. However, the digital economy is approaching its peak, and new innovative technologies are required. Blockchain has helped nations realized an enhanced digital economy that involves the connectivity of governments, businesses, and individuals as a single entity around the globe.

With the adoption of blockchain technology, the digital economy looks to take the extra mile.

To enhanced cross-border business transaction, transparency, and trust in businesses and governments and secure trades, firms and governments are encouraged to take the lead in coming up with new and innovative ways to find people driven blockchain solutions that grow the digital economy.

References
[1] Viriyasitavat W, Anuphaptrirong Th and Hoonsopon D 2019 When blockchain meets Internet of Things: Characteristics, challenges, and business opportunities Journal of industrial information integration 15 21-8
[2] Sundararajan A 2019 Commentary: The Twilight of Brand and Consumerism?: Digital Trust, Cultural Meaning, and the Quest for Connection in the Sharing Economy Journal Of Marketing 83(5) 32-5
[3] Campbell-Verduyn M and Goguen M 2019 Blockchains, trust and action nets: extending the pathologies of financial globalization Global Networks-A Journal Of Transnational Affairs 19(3) 308-28
[4] Rodima-Taylor D and Grimes W W 2019 Virtualizing diaspora: new digital technologies in the emerging transnational space Global Networks-A Journal Of Transnational Affairs 19(3) 349-70
[5] Rubaiyat I, Yoshi F and Shinya K 2019 Analyzing outliers’ activity from the time-series transaction pattern of bitcoin blockchain Evolutionary And Institutional Economics Review 16(1) 239-57
[6] Li J, Greenwood D and Kassem M 2019 Blockchain in the built environment and construction industry: A systematic review, conceptual models and practical use cases Automation In Construction 102 288-307
[7] Kundu D 2019 Blockchain and Trust in a Smart City Environment And Urbanization Asia 10(1) 31-43
[8] Bordel B, Lebigot P and Alcarria R 2018 Digital Food Product Traceability: Using Blockchain in the International Commerce Book Series: Advances in Intelligent Systems and Computing 850 224-31
[9] Lawrenz S, Sharma P and Rausch A 2019 Blockchain Technology as an Approach for Data Marketplaces *International Conference On Blockchain Technology* (ICBCT) pp 55-9

[10] Andronova I V, Belova I N and Yakimovich E A 2019 Digital technology in the fishing sector: international and Russian experience *Book Series: AEBMR-Advances in Economics Business and Management Research* **81** 277-80

[11] Dyatlov S A, Bulavko O A and Nikitina N V 2018 The Blockchain As A Digital Technological Platform For Electronic Government Development *European Proceedings of Social and Behavioural Sciences* **57** 1396-407