

PROSPECTS FOR THE USING OF BLOCKCHAIN TECHNOLOGY IN THE EXISTING BUSINESS AND STARTUP PROJECTS

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Davydov D. S., Riabovol D. A. Prospects for the using of blockchain technology in the existing business and startup projects

The aim of the article is to research the prospects and opportunities for using blockchain technology in entrepreneurship, as well as international payments and banking operations. On the basis of current and up-to-date data and opinions of authoritative English-language publications on business, the problems concerning the relevance of technology of a distributed ledger have been comprehensively examined, and the results of many startups – young companies working on blockchain-solutions in various spheres, have been evaluated. As a result of the research, the main directions of work of startups in the field of application of blockchain technology were identified: smart contracts; cloud data storage; production processes; sphere of remuneration of employees; electronic voting with protection against breaking; "sharing economy". Prospects for further research in this direction are specific justification of the applicability of distributed ledger technology and the concept of decentralization in developing sectors (the "sharing economy", "Internet of Things"), as well as a deeper analysis of the impact of new solutions in relation to the traditional sectors of the economy, including Ukraine.

Keywords: blockchain technology, new technologies in business, cryptocurrencies, startups in the field of blockchain, decentralization.

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Давидов Д. С., Рябовол Д. А. Перспективи застосування технології блокчейн у діючому бізнесі та стартап-проектах

Метою статті є дослідження перспектив і можливостей застосування технології блокчейн у підприємстві, а також міжнародних платежах і банківських операціях. На основі актуальних і сучасних даних, а також думок авторитетних англоязычних видань про бізнес, всебічно розглянуто проблеми, що стосуються актуальності технології розподіленого реєстру, а також дана оцінка результатам діяльності багатьох стартапів – молодих компаній, що працюють над блокчейн-рішеннями в різних сферах. Виділено основні напрямки роботи стартапів у сфері застосування технології блокчейн: смарт-контракти; хмарне зберігання даних; виробничі процеси; сфера оплати праці найманих працівників; електронне голосування із захистом від злому; «економіка спільної участі» (sharing economy). Перспективами подальших досліджень у даному напрямку є конкретне обґрунтування застосовності технології розподіленого реєстру та концепції децентралізації в секторах, що розвиваються («економіка спільної участі», «Інтернет речей»), а також більш глибокий аналіз впливу нових рішень стосовно традиційної банківської системи та інших галузей економіки, у тому числі і в Україні.

Ключові слова: технологія блокчейн, нові технології в підприємстві, криптовалюта, стартапи у сфері блокчейн, децентралізація.

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Давыдов Д. С., Рябовол Д. А. Перспективы применения технологии блокчейн в действующем бизнесе и стартап-проектах

Целью статьи является исследование перспектив и возможностей применения технологии блокчейн в предпринимательстве, а также международных платежах и банковских операциях. На основе актуальных и современных данных, а также мнений авторитетных англоязычных изданий о бизнесе, всесторонне рассмотрены проблемы, касающиеся актуальности технологии распределенного реестра, а также дана оценка результатам деятельности многих стартапов – молодых компаний, работающих над блокчейн-решениями в различных сферах. Выделены основные направления работы стартапов в сфере применения технологии блокчейн: смарт-контракты; облачное хранение данных; производственные процессы; сфера оплаты труда наемных работников; электронное голосование с защитой от взлома; «долевая экономика» (sharing economy). Перспективами дальнейших исследований в данном направлении является конкретное обоснование применимости технологии распределенного реестра и концепции децентрализации в развивающихся секторах («долевая экономика», «Интернет вещей»), а также более глубокий анализ влияния новых решений применительно к традиционной банковской системе и другим отраслям экономики, в том числе и в Украине.

Ключевые слова: технология блокчейн, новые технологии в предпринимательстве, криптовалюта, стартапы в сфере блокчейн, децентрализация.

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The main goal of the article is to review and analyze the prospects for using blockchain technology, which is gaining popularity, possibilities of its application in entrepreneurship, creation and development of startups in various spheres of the economy.

The most relevant in the context of the research topic of the article is the question of what the scale of impact on the world economy and its most important sectors by the new technology that is gaining momentum will be. Right now, according to numerous studies,

more and more people, even without knowing about the existence of cryptocurrency and blockchain technology, are beginning to realize the need for cheap and fast cross-border remittances, not to mention protection of personal data.

The issue of using blockchain technology and solutions based on it is actively developed, and in the context of globalization acceleration of the process of introducing scientific and technical achievements into various spheres, and to a large extent into entrepreneurial activity, is of great practical interest.

The object of the research presented in the article is a global phenomenon of the spreading of blockchain technology, prospects and problems of its use in the world economy and entrepreneurial activity.

Under modern conditions of the world economy, such issues as speed and simplicity of money transfers, protection of personal data, Internet privacy are becoming more and more relevant. The recent scandal involving the world's largest social network, has once again impressively demonstrated the vulnerability of personal data in centralized systems owned by one person (even if it is a large company) that is not capable of, in one way or another, preventing a possible data leakage [1].

It should be borne in mind that even at the level of leading organizations, such as the American Red Cross, there are sometimes such "mistakes" as misuse of funds. And after considering some examples, the whole scale of the problem of centralized organization and lack of full transparency becomes evident. For example, "the American Red Cross spent a quarter of the money people donated after the 2010 Haiti earthquake — or almost USD125 million — on its own internal expenses" [2].

Another worldwide problem that can be solved by using blockchain technology is the struggle against counterfeit goods, where we can see a significant number of negative examples. According to the authoritative blog on entrepreneurship and marketing BrandonGaille.com, "about 7 % of the world trade is made up of counterfeit goods" [3]! The same source informs that only American companies lose an average of about 200 billion US dollars due to piracy of intellectual property. However, the solutions that are being developed by some startups right now can help fight counterfeit products in the near future. For example, the startup VeChain is actively working on mechanisms to ensure protection from counterfeiting. Authentication will occur by scanning a smart chip embedded in the product (for example, a Louis Vuitton bag).

Speaking about personal and marketing information, according to Harvard Business Review, up to 94 % of online merchants do not have the data accurate enough to make a proposal suitable for a particular user [4]. "This problem manifests itself when you see that same display ad following you from one website to another, even though you have already made a booking for that hotel

two days ago" [4]. The same goes for too frequent and annoying ads.

Moreover, in the long term, with all of the advantages of blockchain technology (which will be described later), the user will be able to determine who would use the data generated by his/her activity on the Internet (including the availability of the features of selection or prohibition, depending on the rating of the company or organization) [4].

One of the sources of distribution, as well as one of the first cases of using blockchain technology, is Bitcoin, which is the invention of an anonymous programmer under the pseudonym of Satoshi Nakamoto. This cryptocurrency was created in 2008, but it was preceded by many unsuccessful attempts to make an inexpensive and secure payment instrument, e.g., DigiCash (1989), E-Gold (1996), B-Money and Bit-Gold (1998). However, all these projects and companies organized on their basis, one way or another had to leave the market, despite the introduction of some useful functions, including encryption. They lacked what the creator of Bitcoin suggested, namely, the consensus algorithm "proof-of-work", which has allowed the entire decentralized network "unanimously" recognize a particular transaction as valid [5].

In October 2008, just after the "Emergency Economic Stabilization Act" prevented the deepest crisis in the US economy, one programmer presented his description of a peer-to-peer system of electronic payments, where trust of users to each other was replaced by a cryptographic "consensus", which automatically leads away from the need to trust each other.

As for the blockchain, it is an electronic register of all transactions formed into "blocks", which are added there in a strict sequence, excluding their further modification. In fact, this is an electronic version of the ledger, but thanks to encryption and storage on thousands of computers (so-called nodes) around the globe, it becomes possible to achieve a much higher level of security than in traditional centralized storage systems but without a single control center.

Despite the fact that the participants are just ordinary users and not special institutions (as, for example, in the banking sector), the very absence of the need to trust each other already makes the system largely safe and competitive compared to traditional tools. This becomes possible because encryption does not provide the ability to identify another user.

Undoubtedly, like many new inventions related to anonymity and bearing the task of making new in the sphere of payments, Bitcoin has its numerous ups and downs. For example, at the first stages of development, its relative anonymity interested users of the so-called "DarkNet" — in fact, a market for things that are illegal. "Relative" because it is impossible to identify the user only until it becomes known for sure that behind

some “public address” a certain person stands. As for the DarkNet and the use of Bitcoin for illegal purposes, this is mentioned in the book of the well-known blockchain experts Don and Alex Tapscott “Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World”. “Money is a technology, after all. When someone robs a bank, we do not blame the money that sits in the vault for the robbery” [6, p. 356].

However, one should understand that Bitcoin is just one of a huge number of possible options for using blockchain technology. Among other things, blockchain technology can be used for solving problems related to the vulnerability and inconvenience of centralized services, especially in the field of cross-border payments.

Such a large and significant for many countries sector, as the transfer of earnings by labor migrants to their homeland (e.g., as for Ukraine, in 2016 this amount was USD5.4 billion, or 20 % of all revenues of the state budget), needs cardinal new solutions even in the era of a developed banking system [7, p. 234–235]. To send USD100 from Puerto Rico, a migrant worker can spend up to 12 % of the amount in the form of a commission to an intermediary in the person of Western Union or another company. Moreover, we should take into account the costs of traveling to the physical office of this company (there are more than 550 thousand of them in the world), which often occurs through socially-deprived districts. Furthermore, in many countries, such as Turkmenistan, the Central African Republic, Yemen, the Republic of the Niger, Guinea, Burundi, Madagascar, and Afghanistan, the proportion of the population that has its own bank account does not exceed 10 % [8]!

For example, the Stellar project aims at solving this problem. The advantages of the platform of this project are high speed of payments, small commissions and ease of use (because there is a feature of transferring not only cryptocurrency but conventional money in the equivalent of USD, GBP, etc.).

Blockchain is also applicable to other spheres of economy and business, except for money transfers.

It is necessary to focus on the most advanced directions for the solutions of startup projects that are closely involved in their development and implementation:

1. *Smart contracts.* Despite the fact that Nick Szabo put the term into circulation for the first time in 1994, it became widespread only in 2013 [9]. This is because another blockchain project called Ethereum set a goal to create a special platform based on which so-called smart contracts can operate. They are special self-executing computer programs that allow their operation without third parties, as well as performing the function of protecting the process from hacking and any other interference.

In fact, this term refers to a computer code (without delving into extensive scientific details), which can (like a real paper contract) perform numerous functions set by developers: register ownership rights (without the pos-

sibility of a subsequent change), transfer some amount of ether (the project’s cryptocurrency), and do many other useful things based on its key properties (autonomous nature and immutability).

2. *Using blockchain technology in cloud storage.* The projects like Storj and Sia offer to create secure cloud storage using the distributed ledger principle to protect data. For example, the founder of Storj, Shawn Wilkinson, in an interview with Venture Beat (a blog about new technologies) said that even if you just use extra space on the hard drives of users, you can eventually get just a huge space of cloud storage [10]. By analogy with the house you rent, you can rent out space on your hard drive, getting a small fee for it in the crypto currency, while remaining anonymous. “Considering the world spends USD22 billion + on cloud storage alone, this could open a revenue stream for average users, while significantly reducing the cost to store data for companies and personal users”, says Wilkinson.

3. *The production process* of almost every product involves many suppliers of materials and components that are then assembled within the production facilities of the company representing, for example, the Faber-Castell brand. Such a powerful corporation, of course, has quite reliable suppliers, but in theory, there is always possibility of inconsistencies in the delivery of materials, or failure (bankruptcy) of partner companies in the course of the production cycle.

Blockchain technology can help to solve the problem of insufficient transparency of processes (on the basis of anonymity, though this might sound contradictory) that occur up to the level of each specific unit of production for the management of the company and its shareholders.

Several startups, such as Provenance and Sku-Chain, are currently working on this problem, and transparency of origin of goods is of interest to many researchers and attracts attention of some large corporations such as IBM [11].

4. *The sphere of labor remuneration.* Here the field of research becomes even more extensive. Geoff Weiss, one of the authors of the magazine about entrepreneurship “Entrepreneur”, says that “If your company regularly pays wages to international workers, then incorporating Bitcoin into the payroll process could be a major cost saver” [12].

One of the projects working on this problem – Bitwage, says that the introduction of such a system of labor remuneration will make this process not only less expensive financially but also relatively quick in time as well as more transparent. Besides, such projects as Circle and Abra working in this sphere are already beginning to compete with such players as Venmo (part of the centralized payment service PayPal).

5. *E-voting based on distributed ledger technology.* At the moment, the Swiss project Agora is actively working on solving this problem. Under the control and with the help of the technology developed by this project, in

March 2018 the first blockchain elections took place (in Sierra Leone) [13]. The blockchain of this project was used to confirm the result of the presidential election, which already means a big breakthrough in the practical application of distributed ledger technology under real-life conditions (even if only 400,000 votes were entered into the system, which is only one region of Sierra Leone).

A new electronic voting system based on blockchain technology in general (not only the solution proposed by Agora) can be used both in public administration and for commercial purposes.

6. In addition, it is also worthwhile to consider the use of blockchain and its capabilities within the framework of a new trend – *the so-called “sharing economy”*, which opens up a vast field of research for economists, technical experts, entrepreneurs, and founders of startups. Modern leaders of the sharing economy, such as Uber (in the sphere of ride-sharing) and Airbnb (in the sphere of home-sharing), today are considered by millions of users as faster and cheaper alternatives to traditional taxi services and hotels. But, just as we moved from Web 1.0. (users only visit sites) to Web 2.0. (there is the possibility of communication, commenting and putting likes) and move to Web 3.0. (the desire to decentralize, protect data and create peer-to-peer networks with equal rights of all users), there is an active development of companies in the sharing economy. And according to studies of authoritative publications and experts, it is possible to assume that the next breakthrough will be with blockchain technology.

Such companies as Uber and Airbnb are centralized, and the growing sharing economy is increasingly focusing on P2P (Person to Person) to buy services directly, without intermediaries. In his article on Medium, the founder of the Origin platform (which works on this problem) Josh Fraser notes that such companies (Uber and Airbnb), despite the considerable spread, have been banned in many cities or heavily regulated [14].

Considering the fact that businesses worldwide send out USD150-300 trillion in international payments annually, the niche for creating tools in this sphere looks more than attractive for startups. Of this volume, about USD200 billion is revenue in the form of 10% commissions (on average), with a payment time of 2 to 5 working days [15]. Payment cards generate about the same amount of revenue, but at the same time, both tools are not so convenient for the modern world and also expensive for businesses. As for the dynamics of the interest of large companies and organizations in making investments in projects of the blockchain sector, here it is enough to cite the following data. During the period of 2015–2017, such companies and organizations as Citigroup, Nasdaq, Visa, Wells Fargo, J. P. Morgan, Deloitte, American Express, and many others expressed their desire to work in this direction or have already invested into startups [16].

The sphere of international settlements between importers, exporters, banks and insurance companies is also mostly based on paper, physical documents (letters of credit, international shipping bills) sent by mail all over the world and with the required stamp on them.

In this context, it is worth noting that a great benefit from using blockchain will not be achieved until the joint, rather than individual, initiatives of banks become a reality. As for real examples of the use of blockchain solutions in the sphere of international trade, on May 14, 2018, HSBC Holdings Plc reported on the performance of the world's first trade finance transaction using a single blockchain platform [17].

The introduction of blockchain technology and instruments based on it will allow in the future to accelerate the processes that occur during the exchange of goods between regions and significantly increase the pace of development of both world and developing economies. In particular, such startups as Wave (Israel), EssDocs (Malta) and Bolero (Great Britain) are engaged in this problem, but significant progress in the practical implementation of proposals within this problem was not achieved at the time of writing this article.

Within the framework of the study presented in the article, it is also necessary to highlight and analyze trends in the development of blockchain technology and tools on its basis in relation to the banking sector. According to many publications and interviews with leading bankers, it can be concluded that the use of distributed ledger technology can be beneficial to both commercial and central banks enabling them to achieve savings in the future by billions of dollars. Many bankers see great prospects in blockchain technology. Thus, James Disney, global head of software investment banking at Credit Suisse, says: “Blockchain technology can reduce the time to settle a leveraged buyout from 20 to 30 days to a matter of minutes” [18].

According to the consulting company Accenture, the world's largest investment banks can win up to USD10 billion a year, due to lower costs in the process of clearing and settlement operations [19]. Moreover, according to another study, in partnership with Santander (the largest financial and credit company in Spain), the banking system as a whole can save up to USD20 billion, because the potential for development of blockchain-based solutions (including in the form of computer applications for banks) affects any transactions that must occur quickly, safely and with the data protected [20]. “Blockchain has a powerful ally – the need to reduce costs now facing all banks” [21, p. 156].

Richard Lumb, head of financial services at Accenture's Financial Services, says that, first of all, we will see the effect of using the new technology by clearing houses (Deutsche Börse, Australian Stock Exchange). After all, today they carry out their activities for the most part by countless reports and verification by hand [22].

Moreover, according to Stuart Graham, chief executive of Autonomous Research LLP, a ready-made tool will be developed over the next few years, and it will be used by the whole industry, because “it is none of their interests to keep all the bureaucracy and inefficiencies...” [22]. The relevance of such a tool is once again confirmed by the fact that according to PricewaterhouseCoopers, 81 % of CEOs of banking sector companies are concerned about the rapid development of technologies [23].

The use of blockchain in bank payments (both commercial and central banks) will make this procedure more effective. For today there is the SWIFT system, or the Society for Worldwide Interbank Financial Telecommunications. It is successfully used to transfer trillions of dollars in the form of messages between banks around the world, but an increasing number of firms intend to use blockchain technology to optimize this process in the future.

The leader in the field of bank payments and applications for banks is the Ripple project. For example, SAP (a large manufacturer of corporate software) in cooperation with ATB Financial (a state financial institution that provides services to Alberta residents with revenues of over USD1.5 billion), and Ripple, send the first international blockchain payment from Alberta to ReiseBank AG (Germany) [24]. The bank used special software – SAPHANA Cloud Platform and SAP Payment Engine. CAD1000 (EUR667) were transferred in about 20 seconds, whereas normally it would take two to six working days to complete such an operation [25].

Another promising direction of introducing distributed ledger technology is safe and reliable proof of identity by storing personal data in blockchain (which is a very important factor, including in the banking sector). Over the years, banks have attempted to create a register with shared access (for banks) to customer data, but they failed to find the right solution that would suit all players of this specific market and not cause additional problems with legal liability.

The scope of the blockchain application in the form of solutions for KYC (know your customer) and AML (anti-money laundering), for which banks are willing to pay, attracts dozens of startups, among which are Cambridge Blockchain, Tradle, Credits and Blockstack.

According to the Harvard Business Review, in 2016, about 20 % of financial institutions considered blockchain as a tool for KYC [26]. Moreover, as reported by Thompson Reuters (2016), financial institutions spend from USD60 million to USD500 million per year to keep up with KYC [27]. The reasons for such expenses are becoming clearer as we present the following figure – in 2015 regulatory alerts that banks have to reckon with occurred on average every 12 minutes [28]!

Thus, due to the anonymity and possibility of sufficiently reliable protection of personal data using tools developed by blockchain projects and distributed ledger technology, it is possible to achieve significant savings in

many areas of the economy, as well as to reduce the possible damage from leaks of personal data. For example, in 2016, the US government spent about USD28 billion on cybersecurity, which is more than the budget of some countries in the world. Moreover, according to research, the world community is likely to lose up to USD600 billion due to global cybercrime (which is about 0.8 % of the world GDP) [29, 30].

CONCLUSION

Thus, blockchain technology goes far beyond not only payment systems but also the world of finance, opening up new opportunities for startups and ordinary users in many areas of the modern development of the world economy. For example: the sharing economy, Internet of Things, transparent decisions during elections (including commercial enterprises), direct financing of campaigns to support socially important issues and initiatives, etc.

Also, the urgency of the technology is confirmed by the fact that it was included in the list of twelve key emerging technologies in the report of the annual meeting of the World Economic Forum in Davos held in January 2018 [31].

As for the degree of interest of the world community in new solutions with different spheres of application, even taking into account many limitations and risks, it is possible to cite positive dynamics of investing in blockchain projects. In the middle of May this year the amount of USD7.3 billion was attracted within the framework of ICO, while for the whole of 2017 it was only USD3.88 billion [32].

Thus, it is possible to conclude that technologies, such as blockchain, are changing and will be changing the situation in the world trade, business, politics, and the economy as a whole – it is just a question of the degree of preparedness of the ground, conditions for their adoption. After all, their implementation in a fairly short time can lead to a significant cost reduction in many areas, as well as contribute to improving the safety and transparency of processes.

Of course, to start the stage of a widespread use of this innovative technology, much remains to be done – both on the part of government agencies and on the part of users and founders of startups. But one thing is obvious now – distributed ledger technology has the highest potential for practical and scientific development, and taking into account the technological progress, the scope of its use will not be unnoticed as soon as in a few years, not to mention how many new opportunities it will bring. ■

LITERATURE

1. Fernando G. Mark Zuckerberg has given an open Q&A on the Facebook scandal. URL: <http://www.news.com.au/technology/online/social/mark-zuckerberg-has-given-an-open-qa-on-the-facebook-scandal/news-story/bd3b8f2b3128be3b-2cf1992dbec5e9b6>

- 2. Sullivan L.** In Search of the Red Cross' \$500 Million In Haiti Relief. URL: <https://www.npr.org/2015/06/03/411524156/in-search-of-the-red-cross-500-million-in-haiti-relief>
- 3. Gaille B.** 25 Remarkable Counterfeit Goods Statistics. URL: <https://brandongaille.com/24-remarkable-counterfeit-goods-statistics/>
- 4. Ghose A.** What Blockchain Could Mean for Marketing. URL: https://hbr.org/2018/05/what-blockchain-could-mean-for-marketing?utm_campaign=hbr&utm_source=facebook&utm_medium=social#comment-section
- 5. Nakamoto S.** Bitcoin whitepaper. URL: <https://bitcoin.org/bitcoin.pdf>
- 6. Тапскотт Д., Тапскотт А.** Технология блокчейн: то, что движет финансовой революцией сегодня. М. : Эксмо, 2017. 448 с.
- 7. Бурачек І. В., Грибовський М. М.** Економічний ефект трудової міграції в Україні. *Східна Європа: економіка, бізнес та управління*. 2017. № 3 (08). С. 233–237.
- 8. Hodgson C.** The world's 2 billion unbanked, in 6 charts. URL: <http://uk.businessinsider.com/the-worlds-unbanked-population-in-6-charts-2017-8/#this-map-shows-the-countries-where-less-than-15-of-the-population-has-a-bank-account-2>
- 9. Szabo N.** Smart contracts. URL: <http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>
- 10. Blatchford G.** 4 ways Blockchain technology will change the world. URL: <https://venturebeat.com/2015/03/28/4-ways-blockchain-technology-will-change-the-world/>
- 11. Stahl E.** Blockchain provenance: Where's my new sweater really from. URL: <https://www.ibm.com/blogs/blockchain/2017/11/blockchain-provenance-wheres-my-new-sweater-really-from/>
- 12. Weiss G.** Why It Might Make Sense to Pay Your Employees in Bitcoin. URL: <https://www.entrepreneur.com/video/246104>
- 13. Francis J.** Sierra Leone becomes first country with blockchain-verified election voting. URL: <http://bitcoinist.com/sierra-leone-first-country-blockchain-verified-election-voting/>
- 14. Fraser J.** 4 reasons why decentralized marketplaces are inevitable. URL: <https://medium.com/originprotocol/4-reasons-why-decentralized-marketplaces-are-inevitable-25b842565e48>
- 15. Silva B.** Blockchain, Banks, and the Innovator's Dilemma. URL: <https://medium.com/tradecraft-traction/blockchain-banks-and-the-innovators-dilemma-7c66d26d52f2>
- 16. Vermeulen C.** Bitcoin Forecast 2018 – Preparing for the Cryptocurrency Black Swan Event. URL: <http://www.marketoracle.co.uk/Article61204.html>
- 17. Chatterjee S.** HSBC says performs first trade finance deal using single blockchain system. URL: <https://uk.reuters.com/article/uk-hsbc-blockchain/hsbc-says-performs-first-trade-finance-transaction-using-blockchain-idUKKCN11F03H>
- 18. LaVito A.** 'The sky is the limit' for blockchain technology in banking: Credit Suisse banker. URL: <https://www.cnbc.com/2017/10/10/the-sky-is-the-limit-for-blockchain-technology-in-banking-credit-suisse-banker.html>
- 19.** Banking on blockchain // Accenture Consulting. URL: https://www.accenture.com/t20170120T074124Z__w_/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Consulting/Accenture-Banking-on-Blockchain.pdf
- 20.** The Fintech 2.0 Paper: rebooting financial services. URL: <https://www.finextra.com/finextra-downloads/news-docs/the%20fintech%20%200%20paper.pdf>
- 21. Генкин А., Михеев А.** Блокчейн: как это работает и что ждет нас завтра. М. : Альпина Паблишер, 2018. 592 с.
- 22. Arnold M.** Five ways banks are using blockchain. URL: <https://www.ft.com/content/615b3bd8-97a9-11e7-a652-cde3f882dd7b>
- 23. Courbe J.** Financial Services Technology 2020 and Beyond: Embracing disruption. URL: <https://www.pwc.com/gx/en/financial-services/assets/pdf/technology2020-and-beyond.pdf>
- 24.** ATB Financial Sends One of the World's First Real-Time Payments From Canada to Germany Using Blockchain Technology Supported by SAP / SAP News. URL: <https://news.sap.com/atb-financial-sends-one-of-the-worlds-first-real-time-payments-from-canada-to-germany-using-blockchain-technology-supported-by-sap/>
- 25.** ATB Financial 2016-17 Business Highlights. URL: <http://www.atb.com/about/ar/Pages/2017.aspx>
- 26. Ito J., Narula N., Ali R.** The Blockchain Will Do to Banks and Law Firms What the Internet Did to Media. URL: <https://hbr.org/2017/03/the-blockchain-will-do-to-banks-and-law-firms-what-the-internet-did-to-media>
- 27.** Thomson Reuters 2016 Know Your Customer Surveys Reveal Escalating Costs and Complexity. URL: <https://www.thomsonreuters.com/en/press-releases/2016/may/thomson-reuters-2016-know-your-customer-surveys.html>
- 28.** Risk Management // Market-leading risk management tools. URL: https://financial.thomsonreuters.com/en/markets-industries/risk-management-tools.html?utm_campaign=e4&utm_medium=social&utm_source=FRblog&utm_content=DCraigPeakRegulatory
- 29. Lewis J.** Economic Impact of Cybercrime – No Slowing Down. URL: <https://www.mcafee.com/us/resources/reports/restricted/economic-impact-cybercrime.pdf>
- 30. Stewart J.** Setting the Cybersecurity Bar Higher – Announcing the Cisco 2018 Annual Cybersecurity Report. URL: <https://blogs.cisco.com/security/cisco-2018-annual-cybersecurity-report>
- 31.** Readiness for the Future of Production Report 2018. URL: http://www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf
- 32.** Cryptocurrency ICO Stats 2018 / Coin Schedule. URL: <https://www.coinschedule.com/stats.html>

REFERENCES

- Arnold, M. "Five ways banks are using blockchain". <https://www.ft.com/content/615b3bd8-97a9-11e7-a652-cde3f882dd7b>
- "ATB Financial Sends One of the World's First Real-Time Payments From Canada to Germany Using Blockchain Technology Supported by SAP" SAP News. <https://news.sap.com/atb-financial-sends-one-of-the-worlds-first-real-time-payments-from-canada-to-germany-using-blockchain-technology-supported-by-sap/>
- "ATB Financial 2016-17 Business Highlights". <http://www.atb.com/about/ar/Pages/2017.aspx>
- Burachek, I. V., and Hrybovskiy, M. M. "Ekonomichniy efekt trudovoi mihratsii v Ukraini" [The Economic Impact of Labor Migration in Ukraine]. *Skhidna Yevropa: ekonomika, biznes ta upravlinnia*, no. 3 (08) (2017): 233-237.

Blatchford, G. "4 ways Blockchain technology will change the world". <https://venturebeat.com/2015/03/28/4-ways-blockchain-technology-will-change-the-world/>

"Banking on blockchain" Accenture Consulting. https://www.accenture.com/t20170120T074124Z__w_/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Consulting/Accenture-Banking-on-Blockchain.pdf

Chatterjee, S. "HSBC says performs first trade finance deal using single blockchain system". <https://uk.reuters.com/article/uk-hsbc-blockchain/hsbc-says-performs-first-trade-finance-transaction-using-blockchain-idUKKCN1IF03H>

Courbe, J. "Financial Services Technology 2020 and Beyond: Embracing disruption". <https://www.pwc.com/gx/en/financial-services/assets/pdf/technology2020-and-beyond.pdf>

"Cryptocurrency ICO Stats 2018" Coin Schedule. <https://www.coinschedule.com/stats.html>

Fernando, G. "Mark Zuckerberg has given an open Q&A on the Facebook scandal". <http://www.news.com.au/technology/online/social/mark-zuckerberg-has-given-an-open-qa-on-the-facebook-scandal/news-story/bd3b8f2b3128be3b2cf1992dbec5e9b6>

Francis, J. "Sierra Leone becomes first country with blockchain-verified election voting". <http://bitcoinist.com/sierra-leone-first-country-blockchain-verified-election-voting/>

Fraser, J. "4 reasons why decentralized marketplaces are inevitable". <https://medium.com/originprotocol/4-reasons-why-decentralized-marketplaces-are-inevitable-25b842565e48>

Gaille, B. "25 Remarkable Counterfeit Goods Statistics". <https://brandongaille.com/24-remarkable-counterfeit-goods-statistics/>

Genkin, A., and Mikheyev, A. *Blokcheyn: kak eto rabotayet i chto zhdet nas zavtra* [Blockchain: how it works and what awaits us tomorrow]. Moscow: Alpina Pabliher, 2018.

Ghose, A. "What Blockchain Could Mean for Marketing". https://hbr.org/2018/05/what-blockchain-could-mean-for-marketing?utm_campaign=hbr&utm_source=facebook&utm_medium=social#comment-section

Hodgson, C. "The world's 2 billion unbanked, in 6 charts". <http://uk.businessinsider.com/the-worlds-unbanked-population-in-6-charts-2017-8/#this-map-shows-the-countries-where-less-than-15-of-the-population-has-a-bank-account-2>

Ito, J., Narula, N., and Ali, R. "The Blockchain Will Do to Banks and Law Firms What the Internet Did to Media". <https://hbr.org/2017/03/the-blockchain-will-do-to-banks-and-law-firms-what-the-internet-did-to-media>

LaVito, A. ""The sky is the limit" for blockchain technology in banking: Credit Suisse banker". <https://www.cnbc.com/2017/10/10/the-sky-is-the-limit-for-blockchain-technology-in-banking-credit-suisse-banker.html>

com/2017/10/10/the-sky-is-the-limit-for-blockchain-technology-in-banking-credit-suisse-banker.html

Lewis, J. "Economic Impact of Cybercrime – No Slowing Down". <https://www.mcafee.com/us/resources/reports/restricted/economic-impact-cybercrime.pdf>

Nakamoto, S. "Bitcoin whitepaper". <https://bitcoin.org/bitcoin.pdf>

"Readiness for the Future of Production Report 2018". http://www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf

"Risk Management" Market-leading risk management tools. https://financial.thomsonreuters.com/en/markets-industries/risk-management-tools.html?utm_campaign=e4&utm_medium=social&utm_source=FRBlog&utm_content=DCraigPeakRegulatory

Silva, B. "Blockchain, Banks, and the Innovator's Dilemma". <https://medium.com/tradecraft-traction/blockchain-banks-and-the-innovators-dilemma-7c66d26d52f2>

Stahl, E. "Blockchain provenance: Where's my new sweater really from?". <https://www.ibm.com/blogs/blockchain/2017/11/blockchain-provenance-wheres-my-new-sweater-really-from/>

Stewart, J. "Setting the Cybersecurity Bar Higher – Announcing the Cisco 2018 Annual Cybersecurity Report". <https://blogs.cisco.com/security/cisco-2018-annual-cybersecurity-report>

Sullivan, L. "In Search of the Red Cross' \$500 Million In Haiti Relief". <https://www.npr.org/2015/06/03/411524156/in-search-of-the-red-cross-500-million-in-haiti-relief>

Szabo, N. "Smart contracts". <http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>

Tapskott, D., and Tapskott, A. *Tekhnologiya blokcheyn: to, chto dvizhet finansovoy revolyutsiyey segodnya* [Technology of blockchain: what drives the financial revolution today]. Moscow: Eksmo, 2017.

"The Fintech 2.0 Paper: rebooting financial services". <https://www.finextra.com/finextra-downloads/newsdocs/the%20fintech%202%200%20paper.pdf>

"Thomson Reuters 2016 Know Your Customer Surveys Reveal Escalating Costs and Complexity". <https://www.thomsonreuters.com/en/press-releases/2016/may/thomson-reuters-2016-know-your-customer-surveys.html>

Vermeulen, C. "Bitcoin Forecast 2018 – Preparing for the Cryptocurrency Black Swan Event". <http://www.marketoracle.co.uk/Article61204.html>

Weiss, G. "Why It Might Make Sense to Pay Your Employees in Bitcoin". <https://www.entrepreneur.com/video/246104>