

Decentralized Social and Economic Network as an Alternative Economic Relations Development In Society



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ABSTRACT

The existing global economic system shows its insolvency and inability to cope with the challenges of modernity. We suggest considering the decentralized social and economic network as alternative of economic development. This network's purpose is the achievement stable equilibrium by means of creation free economic space based on the peer-to-peer technology. The main idea consists in creation of virtual space for interaction and cooperation on the Internet to provide the global opportunities using Human knowledge, resources and technologies with the simultaneous analysis of probable events and calculation of the most optimum actions for solution of tasks of any scales and directions. It is proposed to use the referral links to register in the network, and the systems of bonuses to encourage users improve the network. It is considered the possibility to use internal digital currency for financial transactions in the network. All events occurring in the network is proposed to record for the control financial transactions and accumulation knowledge, technologies and useful information.

Keywords - Social And Economic Network, Crypto-Currency, Blockchain, Bitcoin, Colored Coins, Peer-To-Peer Technology, Information Society

1. INTRODUCTION

The existing global economic system more and more often shows its insolvency and inability to cope with the challenges, which society sets up and nature presents with a fait accompli. As Jo Confino [1] notes, modern economic model, in virtue of development in a spiral in search of continuous growth, more and more accumulates repeating errors, becomes destructive

force, stimulates the growth of inequality, climate change, resource shortage and losses of biodiversity on a world-wide basis. In return, domination of information technologies in all spheres of human activity and increase of role of information and knowledge in the life of society leads to increase in the number of freelancers, engaged with information technologies, communications and production of information products and services, it also leads to the growth of their share in the total volume of employed and in gross domestic product. Even today freelancers of the whole world annually generate about 1 trillion dollars, and their number is equal to 15% of general labor force of all countries. In EU countries the combined share of nonwage labor is equal to 16-17% of the total workforce in the region. There are 34% of freelancers in USA. These, in return, are prerequisites for creation of the global informational space, which will provide the effective information interaction between people, will aid in their access to the world information resources and satisfaction of their needs concerning the information products and services. Disclosing the prospects for development of information and communication systems, T. Sakaya, the Head of Economic Planning Agency of Japan, calls the modern «society, where knowledge becomes the primary source of economic growth and corporate profit» as the new economy and considers its formation as the dominant of information development [2]. Priority spheres of society development by the information model are [3]:

- creation of political, legislative, and network providing;
- improvement of communication, enhancement of access and reduction of its value;
- buildup of human potential;
- stimulation of global e-trading in network.

The special phenomenon of the last years is „online social networks”. It formed on the basis of service, that aids in creation and maintenance of social circles and networks by Internet means. One the future society models is the idea society network intelligence as the variant of model of intellectual assets mobilization [4]. Manuel Castels noted that social structures formed in the Internet community have network character [5]. A stable network of information relationships and interactions at all levels social organization is the dominant idea of these concepts. Moreover, such a society acquires global in nature because of the absolute universalization and standardization communication systems and information technology. Social and economic network is the object of study American and European scientists [6, 7, 8]. The "open source" principle in the IT sector is rapidly implemented in practice and is the sign of time. This principle suggests that the original architecture of the product is opened for editing by anyone. So, everyone can make their own improvements or changes and progress moves much faster. As the experience the world-famous company IBM, the open architecture principle allowed its computer assembly technology gets most part the hardware market. This principle, already widely tested in the development of software (Linux, OpenOffice, Firefox, MySQL), or social web projects (Facebook, YouTube, and MySpace), is also beginning to be used in the new technologies and business organization.

Don Tapscott [4] shows, the "open source" principle, or "public resources" lead to the formation an "open" forms business organization. This approach forms a global sourcing network, or resource support. The "open window" principle also perfectly works in developed countries. For example, Sweden economy is developed on the "open window" principle. Thus, we are talking about the economy, that is capable to self-organization and resourcing, and involving potential both professional vendors and consumers alike.

Economic bases of modern society and the nearest future society, according to many authors are concluded in the new principles self-organization and transformation of the role of the company and the crucial role of the individual as the active subject of the online economy; virtualization and further growth the intellectual work value [9, 10, 11]. The traditional role the company as the main institutions in the market economy is changing in such circumstances.

Expenses for attracting manufacture resources fundamentally transformed, and can be minimized in a completely permeable information network economy. A well-known example minimize is outsourcing. This is transfer of certain functions of the organization to service to another company with an appropriate specialization, mainly concerning the professional support to the smooth functioning individual systems and infrastructure through long-term contracts [12, 13].

Thus, the existing global economic system more and more often shows its insolvency and inability to cope with the challenges, which society sets up and nature presents with a fait accompli. At the same time, global informatization with extraordinary speed brings humanity closer to the information society.

The purpose of this research is justification of the topicality of development of decentralized social and economic interactions on the Internet on the basis of models of mass cooperation with the application of principle of "open source". This paper proceeds as follows. In Section 2 we provide the main ideas of the decentralized social and economic network. We formally define its principle, structure and model. Decentralized social and economic network based on the peer-to-peer (p2p) technology. In Section 3 we describe decentralized crypto-currency. It will be used for ease interaction and mutual in the network. In Section 4 we describe technology for record of events, which are happening in the network and their grouping by the types of decisions. In Section 5 we discuss social and economic network opportunity. In Section 6 we conclude, pose questions and issues for further consideration.

2. DECENTRALIZED SOCIAL AND ECONOMIC NETWORK

Decentralized social and economic network (Network) is an alternative to development of economic relations in society. The main idea consists in creation of virtual space for interaction and cooperation on the Internet based on the peer-to-peer (p2p) technology to provide the global opportunities using the talents of people, resources of the Planet and available knowledge with the simultaneous analysis of probable events and calculation of the most optimum actions for solution of tasks of any scales and directions.

The main decentralized social and economic network principle is achievement of stable equilibrium, which will appear in the following:

- Free transactions;
 - Fair payment for work;
 - Easy to attract investments;
 - The level system with rewards for tasks execution;
 - Rights equality of all participants in access to the system resources, equal conditions for development and conduction of business without regard to their scale.
 - Independent rating system for creation of reliable and fair social environment. That is, each member of the network must leave comments and estimate each other by the rating scale.
 - Obligatory system openness for editing, resources, information and technologies exchange with the world.
- Network will be as universal alternative for all, who uses:
- Trading platforms (Amazon, Olx, eBay, Alibaba);
 - Freelance marketplaces (Upwork, Freelance, fl.ru);
 - Systems of money transfer and payments (PayPal, Webmoney, Payoneer, Skrill, etc.);
 - Services for reviews (Google Reviews, Otvovik);
 - Search systems (Google, Bing, Yandex);
 - Social networks (vkontakte, facebook, linkedin) and many other web services.

Decentralized social and economic network is the universal ideology. It can be used at any level starting with the personality and original idea and joining forces with the other person, getting partnership according to the interaction rules. After, it is possible to coordinate and plan the joint efforts.

The main decentralized social and economic network principles should be: no advertising; Free transactions; fair payment for work; easy to attract investments; the level system with rewards for tasks execution; independent rating system for creation reliable and fair social environment.

Then there added the third person and emerges the group - full-fledged production unit, which can accomplish particular task. There happens harmonious group development, if it correctly performed. New specialists added to the collective, directions and spheres of activities are expanding. The next is the optimization stage, which comes down to the necessity to organize the infrastructure and to optimize the working process.

When various organizations are united, formed the layer of society, where the needs of subjects of all levels are completely satisfied and equilibrium state achieved.

Social and economic network is a model of economic system, where the choice freedom is the foundation of business relationships. First, must operate a social network for like-minded people or business partners.

Also, should be established knowledge base, technology and other useful information for users support. Each network user has to be able to create own account and e-wallet to carry out transactions using the local currency in the network. Thus, we have a huge range of all kinds of events that need to implemented, recorded and archived in the network with the possibility of further analysis to make decisions. It should include four basic components (Figure 1): Social network, Info network, Web platform, Neural network.

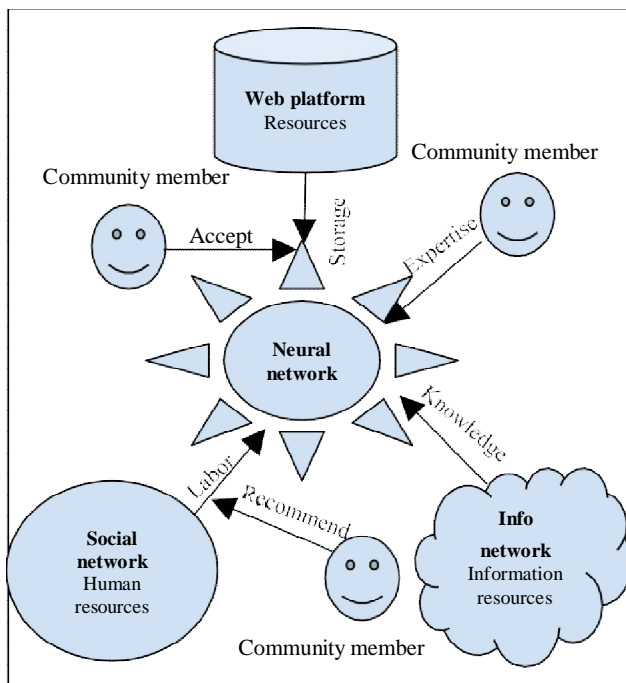


Figure 1: Model of social and economic network

Social network for people, teams and organizations is an online resource for the to unite people. It can help build a

platform for discussion, news, suggestions and feedback between users, community and organizations members and states. Info network is a digital library of all sorts of ideas, technologies, recipes, literature, music, art and other products of the human mind. Information about every action of each user will remain in a single database, and will be there in the form of recorded events without the possibility to remove it, which will allow accumulating experience and technology, and continuously optimizing their activities. Solutions to specific requests will generated based on previous experience, while improving the way of solving a problem by means of innovative technologies.

Web platform consisting of separate modules, components, distributed database. The user can configure it using the interface for managing all aspects of life. Furthermore, the modular structure allows creating a single workspace with the ability to build a unique application, as a designer, using a variety of functional modules and components, which can be written even in different programming languages.

Neural network is a tool to record all the events in the network, grouped by solutions that allow to train the neural network. So that it can decide itself all the existing and the potential problems in the future, including monitoring the state of production, user analysis, assistance in solving any question. It is a versatile layer of interaction to be able to connect different servers, databases and Blockchain. In addition, the network will be able to adapt to any environment hardware platforms with the possibility of building an interface for each of them.

The key issue of interaction on peer-to-peer technology is trust between users. There are questions how to determine the quality of provided goods at a distance, and how to trust each other now of transactions? Reliability of mutual settlements in the network will determined by independent system of assessment by users of each other. The combination of rating system and estimation of time, spent on creation of goods and services, will provide the opportunity to build the fair remuneration system and to solve the key problems of existing economic system, such as: unemployment, dumping, corruption, financial insolvency, exchange inflation.

The referral links to register in the network should be is one of the conditions for participation in the network (that provides the ability to access network resources). The purpose of the referral link is to attract friends, suppliers and service providers and experts to create social and economic relations based on quality, trust and responsibility both for themselves and for referrals actions. Based on the referral system in the network will be used by the bonuses system for encourage participants to improve the network and quality of social and economic interaction.

3. CRYPTO-CURRENCY IN THE NETWORK

In order to implement the bonus incentive system, as well as for ease interaction and settlement in the network is necessary to create a unified crypto currency. It can be used as a universal means in the Network. A cryptocurrency is a type of digital token that relies on cryptography for chaining together

digital signatures of token transfers, peer-to-peer networking and decentralization. Decentralized money in theory is more fair means of users' mutual settlements.

An example is Bitcoin - the decentralized and the most widely used cryptocurrency [14, 15, 16]. Decentralization adds an extra layer of robustness because the Bitcoin network has no single point of failure. All Bitcoin transactions are publicly available on a ledger known as the Blockchain and quickly become practically immutable. Bitcoin supports a limited scripting language that can be used to store metadata on the Blockchain [17, 18].

While originally designed to be a currency, Bitcoin supports a limited scripting language that can be used to store metadata on the Blockchain. Colored Coins is a concept that allows attaching metadata to Bitcoin transactions and leveraging the Bitcoin infrastructure for issuing and trading immutable digital assets that can represent real world value [19, 20]. The value of such digital assets is tied to a real-world promise by the asset issuers that they are willing to redeem those digital tokens for something of value in the real world [21, 22, 23, 24].

Digital assets on top of the Bitcoin Blockchain can be used to issue Financial assets (securities like shares, commodities like Gold or new currencies), prove ownership (A digital key to a house or a car, a concert ticket), store information (Documents, Certificates) or create smart contracts [25, 26, 27]. The advantage given by using the Blockchain as the backbone for such asset manipulation is that one can rely on the Blockchain transparency, immutability, ease of transfer and non-counterfeit ability to transfer and trade such digital tokens with unprecedented security and ease. By hashing the metadata for every transaction, Colored Coins actually expands dramatically the basic Bitcoin functionality by allowing inserting rules that exist outside the Blockchain and can be publicly accessed via torrents and verified against a specific transaction thus creating a rule engine with basic smart contract functionality [28, 29].

Thus, cryptocurrency created for all kinds of economic interactions in the network can run on Colored Coins protocol. All transacting digital assets will be on base of the Bitcoin Blockchain. Moreover, this will be the universal means for exchange between participants. The crypto-currency holders need always have an opportunity to exchange it for the services or goods in the Network and outside. Crypto-currency obtaining should be possible by execution useful work or resources provision. Thus, the total crypto-currency quantity will reflect all efforts, material and energetic resources, which were made for Network creation. In other words - it is the digital asset, which may serve as the payment instrument for goods and services, as the measure of value, and it also provides opportunities for investment.

Crypto-currency generation should happen by participants based on provision of services and execution of useful works in the network.

Crypto-currency will generate in case of: execution of works or services; execution of expertise and testing of executed works; provision of recommendations concerning the execution of works and for entrance to the network; provision

of useful information; knowledge transfer; provision of material resources for lease or for permanent use.

4. TECHNOLOGY IN THE NETWORK

As already mentioned, all operations related to crypto currency will be recorded on Blockchain technology that is sequence of transactions, grouped in blocks, one transaction in one block. However, it will be take place also many non-economic events in the network as the exchange of information, technology, knowledge, and so on. Therefore, there is need for recording all events committed in the network by technology similar but at the same time different from Blockchain. For example, call this technology Freechain. This technology will be essentially differs from the Blockchain, which is used in the majority of other cryptocurrencies. Literally, Blockchain means the chain of blocks [30, 31]. Block is the sequence of transactions. Transaction is exclusively financial mechanism of cash accounting. There is also an account - the identifier, which accepts and sends transactions.

Transactions are the subject matters of Accounting that means maintaining of accounts of transactions systematically. Events treated as transactions recorded in the books of accounting. Events other than transactions will not recorded in the books of accounts. Therefore, transactions are events that:

- cause an immediate change in the financial resources or obligations of the business;
- can be measured objectively in monetary terms.

Freechain is the sequence of events grouped by the decisions of one event in the set of solutions.

Thus, it is a higher level of abstraction - we can quickly add an entry transaction free from the Blockchain to Freechain, as an event. However, we cannot write down all events from the Freechain to Blockchain, because it is a long, expensive and difficult. Freechain technology has four main structural elements: object, communication, event, solution (Figure 2).

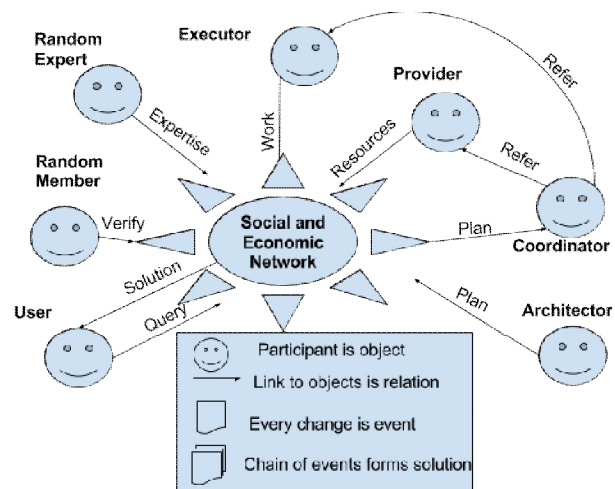


Figure 2: Model events sequence grouped by decisions in Freechain

Object is a person, resource, project, organization, and any structure, to which maybe given the characteristic and which may allocated from environment.

Communication is relation of object to another object, which also has its own parameters.

Event is appearance of new object or link. Event may be not only financial - transaction, but also social, scientific, and any other. Thus, we receive the bigger level of abstraction.

Solution is specific sequence of events, which leads to the specific solution of any task. Each object - the person, resource, organization, etc., has its own chain - all events, which happened with it, grouped by decisions, and arranged chronologically.

Freechain allows you to work with many different Blockchain.

The logic is - have a common repository (Freechain) with many branches (Blockchain), each containing a unique sequence of commits (Block), which in turn contains many code changes (Event) (Figure 3).

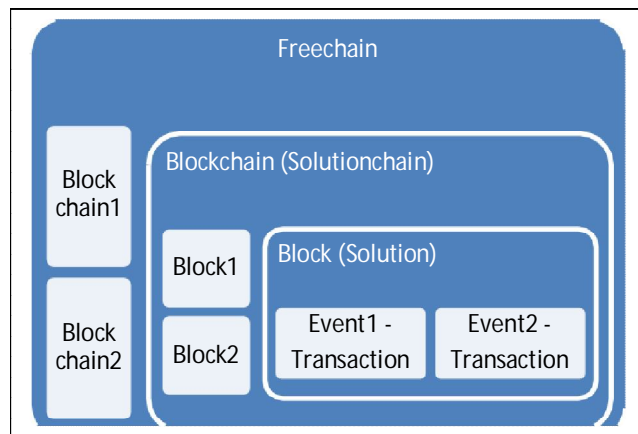


Figure 3: Model Freechain structure

In fact, Freechain is the working chain of all other chains. In addition, Blockchain is the strict sequence of blocks. Freechain has no strict sequence of chains. There can be also parallel ones, because in decentralized social and economic network is happening the record of all events in the world - whether it is the new block in Bitcoin, appearance of new person or creation of organization. Therefore, there is the Freechain, which includes all set of possible individual chains. This technology will allow creating the neural network from the single continuous chain of all events in the world. Thus, the neural network will have access to all knowledge of humanity, and it will have a set of different solutions, with implementation of selection of the most optimum method in each specific situation.

Of course, network can study by analogy with the person - the more events occur, the more system learns to find the solution. Each event is a part of the set of solutions, as, for example, invention of the wheel gave impulse to the automotive, shipbuilding, machine-building industry.

The right ways, that is solutions, are found based on parameters. By analogy with cerebrum of the person, each neuron - in our case the top - it is individual and processes

specific spectrum of information, because it is the specimen of some specific class. For example, the top, specimen of the user class with parameters of ID, name, surname, etc. It connected through its shoot with the other top, the specimen of project class. The shoot - in our case it is the link - the specimen of participant class.

Network should have the following opportunities for users:

- To receive the personal wallet and make financial transactions commission-free;
- To buy cryptocurrency by the card of any bank
- To earn cryptocurrency, by recommending Network with of referral link
- The level system with rewards for execution of tasks
- To discuss and make decisions concerning development of Network at the forum
- To generate cryptocurrency, providing resources for Network.

Customizable referral system should implemented for the effective Network promotion.

Additional assortment of opportunities for investors and for organization of conduction of business in the Network is provided in Combined Network opportunities will increase, because when participant will be making contribution in his own future development, it means that his capital investments in Network crypto currency bring him stable dividends.

5. CONCLUSIONS

To release from the endless circle of dependences on financial manipulations of the banking system, pressure of corporations, lobbyism in parliament, society comes to necessity creation the decentralized social and economic system free from the listed shortcomings. Decentralized social and economic network is complex organization. This paper has just made some preliminary observations that will hopefully kick off a discussion.

Social and economic network could be useful for achieving goals and improving life quality; creation and management enterprises or organizations; state tool for the corruption extermination. The Network opportunities should be expansion the spheres activity and creation new innovative productions; increase in capacities and infrastructure development; knowledge acquisition and new technologies; improvement in specialists' average qualification, and their total number.

Thus, the main purpose of decentralized social and economic system is to create free economic space, based on the peer-to-peer technology, provide freedom to the exchange of resources, goods, information and services, based on control by participants in the network and use of intra-system monetary unit, which can converted into fiduciary currency. Customizable referral system could be used for effective Network promotion and for created social and economic relations based on quality, trust and responsibility for their and referrals actions. The combination of rating system and estimation of time, spent on creation of goods, will provide the opportunity to build the fair remuneration system and to solve the key problems of existing economic system, such as:

unemployment, dumping, corruption, financial insolvency, and inflation. All this means the reduction of the value of final goods, increase in quality, customer-oriented approach, and hence the rapid growth of the sales market and spread network on all continents.

However, in spite of all the claimed benefits of decentralized social and economic network, all of them require careful analysis and evidence in our future researches.

REFERENCES

- [1] Jo Confino, Rethinking prosperity: exploring alternatives to the economic system, theguardian. [online] Available at: <https://www.theguardian.com/sustainable-business/2014/sep/15/rethinking-prosperity-credible-alternatives-economic-system>
- [2] V. M. Skalatskiy, The conceptual and practical model building Information Society / Humanities Journal, 4, 2012, pp. 62-69.
- [3] A. M. Kisilevych-Chornoyvan, *International information law*. Kyiv, Publishing House Personnel, 2011.
- [4] D. Tapscott, *Electronic digital society: the advantages and disadvantages of the era of network intelligence*. – Kyiv, INTPress, 1999.
- [5] M. Castells, The Rise of the Network Society. The Information Age: Economy, Society and Culture. Volume 1. - Malden : Blackwell. Second Edition, 2000.
- [6] Muller-Prothmann, Tobias Leveraging, *Knowledge Communication for Innovation*. Framework, Methods and Applications of Social Network Analysis in Research and Development. Frankfurt a. M. et al. : Peter Lang, 2006.
- [7] Duncan J. Watts, Six Degrees : *The Science of a Connected Age*. W. W. Norton & Company, 2004.
- [8] Matthew O. Jackson, A Strategic Model of Social and Economic Networks. *Journal of Economic Theory*, 71, 2003, pp. 44-74.
- [9] Christian Fuchs, *Internet and Society : Social Theory in the Information Age*. New York : Routledge, 2008.
- [10] Christian Fuchs, The Antagonistic Self-Organization of Modern Society. *Studies in Political Economy*, 73, 2004, pp. 183-209. <https://doi.org/10.1080/19187033.2004.11675157>
- [11] Nico Stehr, A World Made of Knowledge. Lecture at the Conference „New Knowledge and New Consciousness in the Era of the Knowledge Society”, Budapest, January 31st., 2002. [online] Available at: <http://www.crsi.mq.edu.au/documents/worldknowledge.pdf>
- [12] S.V. Fedonyuk, The value of open forms of cooperation for outsourcing *Scientific. Bulletin Volyn National University of Lesya Ukrainka*, 3, 2009, pp.161-166.
- [13] J. Brian Heywood, *Outsourcing Dilemma: The Search for Competitiveness*. Moscow. : Williams, 2004.
- [14] Harvey R. Campbell, Cryptofinance, 2016. [online] Available at SSRN: <https://ssrn.com/abstract=2438299> or <http://dx.doi.org/10.2139/ssrn.2438299>
- [15] David S. Evans , Economic Aspects of Bitcoin and Other Decentralized Public-Ledger Currency Platforms. University of Chicago Coase-Sandor Institute for Law & Economics Research Paper No. 685, 2014. [online] Available at SSRN: <https://ssrn.com/abstract=2424516>
- [16] A. Atlas, Bitcoin: Getting down to real business with virtual currency. *E-Commerce Law & Policy*, volume 16, number 4, 2014, pp. 5–6.
- [17] M. Pilkington, 2015. Blockchain Technology: Principles and Applications. Research Handbook on Digital Transformations, edited by F. Xavier Olleros and Majlinda Zhegu. Edward Elgar, 2016. [online] Available at SSRN: <https://ssrn.com/abstract=2662660>
- [18] I. Allison, "If Banks Want Benefits Of Blockchains, They Must Go Permissionless". NewsBTC, 2015.
- [19] J. Wilmoth, "What is an Altcoin?", 2015. [online] Available at: cryptocoinsnews.com.
- [20] Matthew Green, "ZeroCoin: Anonymous Distributed E-Cash from Bitcoin" (pdf). Johns Hopkins University, 2013.
- [21] M. Lambooi, "Retailers directly accepting Bitcoins: Tricky tax issues?" *Derivatives & Financial Instruments*, volume 16, number 3, 2014, pp. 138–144.
- [22] H. Nemecek and C. Schies, "German Ministry clarifies where Bitcoin falls under German law," *E-Finance & Payments Law & Policy*, volume 7, number 11, 2013, pp. 10–11;
- [23] A. Ostroukh, "Russia softens stance on Bitcoin: Central bank will allow use of virtual currency," *Wall Street Journal* (2 July), 2014. [online] Available at: <http://on.wsj.com/1J1baNE>.
- [24] P. Tasca, "Digital Currencies: Principles, Trends, Opportunities, and Risks". Social Science Research Network, 2015. [online] Available at SSRN: <https://ssrn.com/abstract=2657598> or <http://dx.doi.org/10.2139/ssrn.2657598>
- [25] P. McDonnell, "PK", "What Is The Difference Between Bitcoin, Forex, and Gold". NewsBTC, 2015.
- [26] D. Bradbury, "Bitcoin's successors: from Litecoin to Freicoin and onwards", *The Guardian*. Guardian News and Media Limited, 2013.
- [27] R. Sidel, "Banks Mostly Avoid Providing Bitcoin Services. Lenders Don't Share Investors' Enthusiasm for the Virtual-Currency Craze", 2013. [online] Available at: wsj.com.
- [28] David Z. Morris, "Beyond bitcoin: Inside the cryptocurrency ecosystem". CNNMoney, a service of CNN, *Fortune & Money*. Cable News Network, 2013.
- [29] K. Chayka, "What Comes After Bitcoin?". Pacific Standard, 2013.
- [30] M. Iwamura, Y. Kitamura, T. Matsumoto, Is Bitcoin the Only Cryptocurrency in the Town? Economics of Cryptocurrency And Friedrich A. Hayek, 2014. [online] Available at SSRN: <https://ssrn.com/abstract=2405790>
- [31] A. Guadamuz, C. Marsden, "Blockchains and Bitcoin: Regulatory responses to cryptocurrencies". *First Monday*. 20 (12), 2015. doi:10.5210/fm.v20i12.6198.