2528-9705

Örgütsel Davranış Araştırmaları Dergisi
Journal Of Organizational Behavior Research
Cilt / Vol.: 5, Sayı / Is.: 2, Yıl/Year: 2020, Sayfa/Pages: 129-134

COLLECTIVE INTELLIGENCE, SCIENCE, AND TECHNOLOGY

Openkov MIKHAIL YURYEVICH*, Tetenkov NIKOLAI BORISOVICH

Northern (Arctic) Federal University named after M.V. Lomonosov, Arkhangelsk, Russian Federation.

***Corresponding Author:**
Email: kotobarz@ gmail.com

ABSTRACT

The object of the study is collective intelligence and blockchain. The aim of the study is to consider the common properties of collective intelligence and blockchain. The relevance and novelty lie in the fact that the possibility to use blockchain in scientific activity is considered for the first time in terms of its manifestation in collective intelligence. The theoretical basis of the article has been formed by the works of W.Wheeler, P. Wohlleben, V.E. Kipyatkov, A.A. Zakharov, Huberman, D. Shurovieski, K, Kelly, who studied the features of collective intelligence among insects and people, as well as by the works of M. Swan, J. Chopra, A.I. Smirnov devoted to the blockchain technology. The article hypothesizes that collective intelligence and blockchain have common properties. The methodological basis of the article is the concepts analysis of "collective intelligence" and "blockchain." Blockchain is considered as collective intelligence functioning.

Keywords: *collective intelligence, blockchain, superorganism, swarm-like system*

INTRODUCTION

Currently, the question as to how and where collective intelligence functions are becoming increasingly more relevant. In an attempt to answer this question, we proceeded from the fact that collective intelligence originates from and is used in biological and artificial systems, while blockchain (Swan, 2015; Chopra; Smirnov, 2017, etc.) is one of the ways of collective intelligence functioning. Such a perspective is on-trend and innovative in terms of collective intelligence theories related to insects and people considered by such prominent authors as K. Kelly, W.Wheeler, P. Wohlleben, V.E. Kipyatkov, A.A. Zakharov, Huberman, D. Shurovieski, etc.

The aim of the article is to consider properties common to both collective intelligence, and blockchain. The provisional hypothesis of the article is that collective intelligence and blockchain have properties in common.

METHODOLOGY

The methodological basis of the article involves analyzing the concepts of "collective intelligence", "blockchain", and "artificial intelligence" "Collective intelligence" concept analysis enabled detecting common collective intelligence properties in biological systems, "blockchain" concept analysis shows that artificial systems also have the properties of collective intelligence. A comparison of biological and artificial systems reveals the commonality of these properties.

Geliş tarihi/Recieved: 23.06.2020 – Kabul tarihi/Accepted: 25.11.2020 – Yayın tarihi/Published: 21.12.2020

In addition, blockchain analysis shows that blockchain is a way of collective intelligence functions.

RESULTS AND DISCUSSION

Regarding collective intelligence among insects, P. Wohlleben pointed out: "Insects leaving a social life show labor differentiation. Scientists have long applied such a concept as "superorganism", according to which each specimen is only part of something bigger. In the woods, red ants are the representatives"(Wohlleben, 2018:77).

The idea of a superorganism was first introduced by W. Wheeler in his article "The Ant Colony as an Organism" (1911). From his point of view, a colony of animals living in a community is comparable with an organism in its composition, organization, vital functions. Communication enables uniting superorganism into a whole, maintaining its stability.

V. E. Kipyatkov pointed out that "a superorganism is able to respond to external impacts quite reasonably and behave as a single organism" (Kipyatkov, 2009: 379-380).

K. Kelly believed that the W. Wheeler's theory lies in the basis of the theories on sporadic emergent properties: W. Wheeler, considered the ability to solve problems that can't be solved by an individual to be one of the superorganism properties. Emergence allows a superorganism to be more successful in opposing external adverse effects, reproduction, and food supply.

In the course of development, ant colonies are united: a spectacular example is the unification of northern ants. Such unification occurs as a result of overpopulation and insufficient hunting areas. Colonies preserve their structure, with the maternal anthill prevailed; otherwise, only one colony comprising numerous anthills would occur. A.A. Zakharov points out: "The more nests in the colony, the more ephemeral it is" (Zakharov, 2018: 120-121).

Biological and artificial systems have the property of a "swarm system" characterized by:

1. decentralization,
2. self-sufficiency of elements,
3. inclusion of elements,
4. nonlinear impact of elements on each other

S. Johnson showed that biological network patterns can be applied to both cities and the recommender Amazon.com (Johnson, 2011).

The emerging city intelligence is similar to the collective anthill intelligence, although an individual is prospectively conscious.

According to B.A. Huberman, collective intelligence develops in insect colonies, and social and economic community behavior. A large number of insects and people are able to successfully solve problems that are beyond what an individual or a specimen can manage, and it can be interpreted as computation. When a large number of individuals or specimens process symbolic information and interact, new quantitative patterns appear enabling verification (Huberman, 1995:250).

A smart mob effect is an emergent property of our world, which appears when a large number of people start using mobile phones, computers to communicate, to determine location, to create new social practices (Sangi et al., 2020). Social networks and communities had already existed before their online successors appear, being born and dying with the genesis and civilization deaths since people are characterized by a similar interaction mode. G. Rheingold

specifies one of the features peculiar to these networks: "Human social networks have an interesting feature - all of them are absolutely unique" (Rheingold, 2002: 252-254).

Whatever the supporters of hierarchies say, social networks are invincible: today, they form the basis of the so-called civil science, that is, an association of experts and amateurs to solve a certain problem (Samir et al., 2019).

It is common for people to represent science as a sphere where "lone geniuses" or "bench scientists" are engaged in, but modern researchers and experimenters work in large groups all the time. A classic example was the discovery of a "true quark" in 1994, which 450 physicists were credited with.

An example of joint efforts by scientists was the discovery of coronavirus in 2003-2004 when severe acute respiratory syndrome (SARS) cases were studied in South Asia (Lestari et al., 2020). The virus discovery was a significant achievement, but it did not secure humanity against the subsequent epidemics (Eltayeb, 2020).

A single laboratory would spend years studying the etiologic agents causing a dangerous disease, while the joint work of laboratories solved the issue in a few weeks. Scientists around the world were able to organize themselves, and the collective project made them focus on the most perspective areas of finding a solution to the problem and use the results of all the laboratories involved in the project.

As science becomes more complex, it is no longer possible for one scientist to know everything, and cooperation enables consolidating the knowledge of all scientists working on the project, spending less time searching for the required information, and thereby achieving maximum efficiency.

The latest technologies make global cooperation more productive, while the rejection of cooperation leads to self-isolation in science and, ultimately, to failure.

Initially, science is inherent in collectivism, since it needs an open exchange of information and any scientist depends on the results of the teamwork. Scientists, like all people, are inherent in selfhood because they long for fame and honors, but the genius of science is that it uses the selfishness of scientists for the benefit of all mankind: for the sake of selfish glory, they have to create a scientific community, and the results of their research push humanity to take a step forward in the world cognition.

Science is simultaneously characterized by competition and cooperation. A longing for recognition gives rise to new, original ideas, and originality makes scientists think in a non-trivial way. The competition gives rise to criticism and identifies erroneous ideas, one of the ways to make a name for yourself in science is to identify errors, in this context, a scientist turns into a negative result expert.

Theoretically, like education, science should be formed based on the Potlatch, excessive gift, logic instead of goods-money relations: scientists introduce their ideas into the world, hoping that the most worthy ideas will be viable, which cardinally contradicts market operation principles. D. Shurovieski pointed out: "At the heart of the process to accept new ideas in the general fund of knowledge is a unique indescribable belief in the collective wisdom of scientists" (Shurovieski, 2007:169). Cooperation makes scientists be more effective and productive.

When several groups of scientists make the same discovery, the Matthew effect arises: "For to everyone who has, more shall be given, and he will have an abundance; but from the

one who does not have, even what he does have shall be taken away" (Matthew, 25:29), namely, more famous scientists get the credits of discoverers. This effect enables drawing attention to the works that could be still unnoticed.

Universal explanatory patterns are a group product of thinking. In this context, an individual does not think but moves in thinking ahead of people before, since he uses the existing thinking patterns and tries to improve the development of the inherited thinking ways in order to adequately respond to new current challenges. The universal patterns themselves are the result of diffusion between philosophy, sociology of knowledge, etc., including artificial intelligence.

To solve the mysteries of our time: quantum gravity, dark matter, etc. - another type of intelligence may be required - artificial intelligence, which can help us create a more complex intelligence capable to think differently from a person, to solve problems that go beyond the ability of a person to manage. Today, many discoveries in science require intellectual efforts made by scientific teams, different types of intelligence may be required in the future.

While the mathematical computer arguments are still profoundly mistrusted: humans are unable to understand them, so, to expand the boundaries of human perception, they have to trust the computer, which requires their new skills to understand. It turns out to be a psychological problem for a person to learn how to trust alternative intelligence. Science, being the way of knowing, is based on the mechanisms inherent in a man, while introducing alternative intelligence will require scientific development. K. Kelly believes: "After a new type of intelligence is introduced to this method, science will have to be based on and develop in accordance with the new intelligence criteria" (Kelly, 2017: 62-64). In this regard, it should be started now: learn to understand other living being intelligence and other ways of thinking, this is the goal of the cognitive science.

Another drive for modern civilization is blockchain, which marked a new era of the internet. A.I. Smirnov specifies "The idea of blockchain is as simple as possible - it is a huge public database that operates with no centralized leadership" (Smirnov, 2017:40), which unites swarm-like collective intelligence and blockchain.

Blockchain can turn into a coordinator of human and machine operations: Large data enable to predicatively simulate real-life processes, and the blockchain technology enables converting these forecasts into action. Joining of blockchain with bid data can speed up forecasting and tasks automating based on the economic mechanisms.

Blockchain also enables solving the problem of restrictions imposed by geographical jurisdictions: it exempts from state jurisdictions transferring transnational organizations to the global space.

This is what unites swarm-like collective intelligence and blockchain. The blockchain technology can revolutionize scientific research.

Currently, this technology is applied in peer-to-peer computing projects, where volunteers provide their computers to solve various tasks. Of interest are the SETI@home projects, dealing with the search for extraterrestrial intelligence by analyzing space radio signals, and the Folding@home projects, dealing with the simulation of protein clotting, computer protein design, etc.

This model can be developed using a similar blockchain-based resource allocation so that independent researchers could use the computing power in their projects. This is relevant to the civil science area.

M. Swan points out: "Today, blockchain is the first large-scale embodiment of a decentralization model, unfolding at a new, more complex level of human activity" (Swan, 2015: 129-131, 184).

Deepak Chopra refers to blockchain in order to address mental health issues and prevent suicide during a coronavirus epidemic. He reported: "I study emergence thoroughly, which means that when you have a shared vision, when you appreciate people's differences, something happens, when there is real transparency, and when everything is measurable. Blockchain pushes us to move in this direction." Chopra explained his philosophy and his view on the distributed ledger technologies. He believes that all centralized systems are prone to corruption, blockchain eliminates corruption.

Blockchain is a support system for everyone who receives mental health services, this implies the humanistic meaning of blockchain as a form of collective intelligence (Jason, 2020).

CONCLUSION

As a result of the analysis carried out in the article, the authors came to the following conclusion:

1. Collective intelligence, developing in biological and artificial systems, and blockchain have properties in common: decentralization, non-linear impact of elements on each other, etc.
2. Science and technology function on the basis of collective intelligence.
3. Blockchain is typified as collective intelligence functioning.

References

Eltayeb, L. B. (2020). An update about Coronaviruses with Emphasis on Newly Emerged COVID 19. *Journal of Biochemical Technology*, *11*(3),14-20.

Huberman B.A. (1995). «The Social Mind», in Origins of the Human Brain; ed. Jean-Pierre Changeux and Jean Chavaillon, Oxford: Clarendon Press.

Jason B. (2020). Deepak Chopra Leverages Blockchain To Fight Covid-19 Mental Health Crisis. Forbes. https://www.forbes.com/sites/jasonbrett/2020/08/20/deepak-chopra-leverages-blockchain-to-fight-covid-19-mental-health-crisis/#2e77461242c9

Johnson S. (2011). Emergence: The Connected Lives of Ants, Brains, Cities, and Software Scribner, New York.

Kelly K. (2017). The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future. Penguin Books, London.

Kipyatkov V.E. (2009). World of public insects. Book House «Librocom», Moscow.

Lestari, K., Sitorus, T., Instiaty, S. M., & Levita, J. (2020). Molecular Docking of Quinine, Chloroquine and Hydroxychloroquine to Angiotensin Converting Enzyme 2 (ACE2)

Receptor for Discovering New Potential COVID-19 Antidote. *Journal of Advanced Pharmacy Education & Research| Apr-Jun*, *10*(2), 1-4.

Rheingold, R. (2002). Smart Mobs: The Next Social Revolution. Basic Books, New York.

Samir, S. M., Elshinnawy, A. M., Abd Elrazik, R. K., & Battesha, H. H. M. (2019). The long-term effect of smartphone overuse on Cervical Posture and range of motion in asymptomatic sedentary adults. *Journal of Advanced Pharmacy Education & Research| Oct-Dec*, *9*(4), 89-95.

Sangi, S. M. A., Bawadekji, A., Alotaibi, N. M., Aljameeli, A. M., & Soomro, S. (2020). Protective Effects Vitamin E on Mobile Phone Induced Injury in The Brain of Rats. *International Journal of Pharmaceutical and Phytopharmacological Research (eIJPPR)*, *10*(1), 97-104.

Shurovieski, D. (2007). Wisdom of the crowd. Why together we are smarter than alone, and how the collective mind shapes business, economy, society and the state. I.D. Williams LLC, Moscow.

Smirnov, A.I. (2017). Modern information technologies in international relations: monograph. MGIMO-University, Moscow.

Swan, M. (2015). Blockchain: Blueprint of the new economy. O'Reilly Media, Inc., Sebastopol.

Volleben, P. (2018). The spiritual world of animals. Popurri, Minsk.

Wheeler, W. (1911). The ant-colony as an organism. *Journal of Morphology, Band 22* (2), 307-325.

Zakharov, A.A. (2018). Ant. Family. Colony. Fiton, Moscow.