THE RECENT TREND OF ORGANIZATION DEVELOPMENT INFLUENCED BY BLOCKCHAIN TECHNOLOGY

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ABSTRACT. *The development of Blockchain with smart contract feature brings, not only for cryptocurrency, a new world of Blockchain technology. The Blockchain technology is inevitably in influencing an organization. As predicted by Gartner, an organization that adopts Blockchain smart contract technology will increase data quality by fifty percent in 2023. In this part, it will reduce thirty percent of data availability. Therefore, this bibliography study tries to explore the recent trend of organization development influenced by Blockchain technology, the benefits, and challenges of the impact of Blockchain technology in the organization. In this frame, this study is essential for any industry who adopts Blockchain technology into the organization. Technically, Publish and Perish tools facilitate the study to search recent high-quality paper in the Scopus database. In this line, the study found 31 papers related to Blockchain technology and organization. The 31 papers are then processed by using VosViewer tools to visualize the recent development of organization influenced by Blockchain technology contribution. Finally, the study found the benefits and challenges of implementation of Blockchain technology in organization. The study shows that the Blockchain technology of smart contract system and organization development are spotted research.*
Keywords: Organization Blockchain, Smart contract, VosViewer, Publish and Perish, Trend development

1. **Introduction.** Blockchain is a disruptive technology that has been transformed from the first form that is only used for cryptocurrency [1] to become emerging technology that can be used in any business aspect including the organization. In this part, the smart contract feature enables some potential aspects. Specifically, an organization is an interdependent activity among resources of information, technology and people [2], and any industry or company. However, the contemporary organization lacks transparency and demonstrates low response due to bureaucracy [3], data quality problem [4], and threat to the security of the organization [5]. Blockchain technology with the smart contract feature believes that it brings a new era in the organization leading to more efficiency, less friction, and facilitates human or machine collaborative interaction [6]. Gartner predicted the industry will start to adopt Blockchain smart contract technology into the organization. The adoption of Blockchain smart contract into the organization will increase data quality around 50% by 2023 and reduce 30% of data availability [7]. By adopting the Blockchain smart contract technology into the organization, it stimulates the changes.

This bibliography study aims to identify trend development, benefits, challenges and the influence or impact of Blockchain smart contract technology to organizations. Publish

and Perish applications are used [8] to look for high-quality paper from Scopus database from year 2014 until 2020. The 31 papers are selected and then processed by using VosViewer tools to visualize the trend development and relationship between organization and Blockchain technology [9], and by reading the paper in detail to find the benefits and challenges of implementation of Blockchain Technology in organization. The study found an organization with Blockchain smart contract technology in contemporary research (exhibit in Figure 5) and identified essential items. It was confirmed that the research plots are organized with an introduction, literature review, research methodology and source background, result & discussion, research limitation and implication, conclusion, and future research eventually.
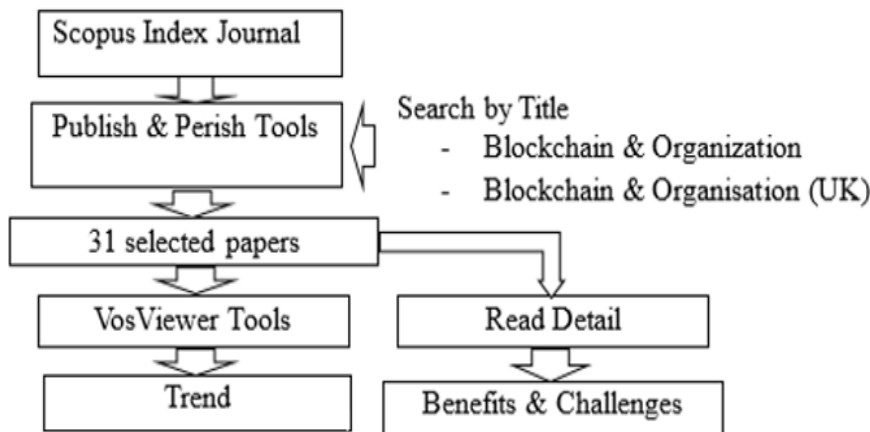

FIGURE 1. Research stages

2. **Literature Review.** This section explains several relevant literature studies.

Definition 2.1. *Traditional organization structure.*
    The word organization can be described as collectives processes focused on the pursuit of specific aims and exhibiting the relative highly formalized social structures [10] as shown in Figure 2 as the example of traditional organization structure with top down or bottom up information flows.
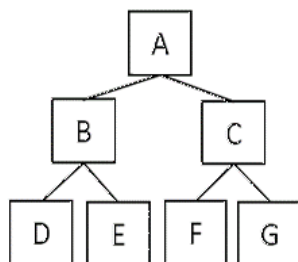

FIGURE 2. Traditional organization structure

Definition 2.2. *Decentralized Autonomous Organization (DAO).*
    Decentralized autonomous organization is a complex application code (Distributed Applications/DApps) [6]. However, Blockchain distributed organization applied the characteristics of Blockchain itself. Figure 3 describes the transformation of a traditional organization into Blockchain organization. It applies the peer-to-peer, distributed Blockchain characteristics with distributed and transparent information flows.
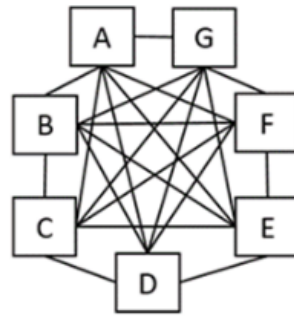
FIGURE 3. Blockchain distributed organization structure

Definition 2.3. *Smart contract.*

Smart contract is a Blockchain application code and feature that is defined and executed automatically without human interaction and discretion [3,6,11]. The feature of smart contract can be adopted into many areas including in organization.

3. **Research Methodology and Source Background.** This is a bibliography study that is facilitated by Publish and Perish tools [6] to find the high quality papers from Scopus index database. The selected papers are based on years of publications between 2014 and June 2020. The searching technique is filtered on the keyword "Blockchain AND Organization" and "Blockchain AND Organisation" searched in paper publication title. The research topic collected from 35 papers found 31 selected papers in this study (4 papers are removed due to duplicate, not English language and access limitation). The detail of the papers is exhibited in Table 1. The first publication year is found in 2017 and the study of Blockchain technology implication to the organization is just started in 2017.

TABLE 1. Source types of selected papers

No	Year	Journal	Conference	Others	Total (%)
1	2017	[12]	[13-15]	[16]	5 (16.13%)
2	2018	[17]	[5,18-25]	[10,26]	12 (38.71%)
3	2019	[3,27-29]	[2,4,30,31]	[32]	9 (29.03%)
4	2020	[11,33,34]	[35]	[36]	5 (16.13%)
		9 (29.03%)	17 (54.84%)	5 (16.13%)	31 (100%)

Table 1 exhibits the year of the publication paper with the details of 5 papers (16.13%) in 2017, 12 papers (38.71%) in 2018, 9 papers (29.03%) in 2019, and 5 papers (16.13%) on June 2020. The type of publication consists of 9 journals (29.03%), 17 conference papers (54.84%), and 5 other types (16.13%).

Figure 4 exhibits the authors' paper background of the country (region), that are mostly from the USA with 7 papers, Canada and Russia 3 papers, Australia, Germany, Netherlands, India and UK 2 papers and the others represent 12 countries for 1 paper each.

4. **Result & Discussion.** The abstracts of 31 selected papers are then processed using VosViewer tools to visualize the trend of Blockchain technology development influencing the organization as shown in Figure 5. The study involves 31 selected papers to find benefits and challenges.

Figure 5 showed the study trend development as indicated in highlight/bold line (between organization and blockchain) and started in 2019 which is a smart contract and system that is related to the organization. The smart contract is a computer code as
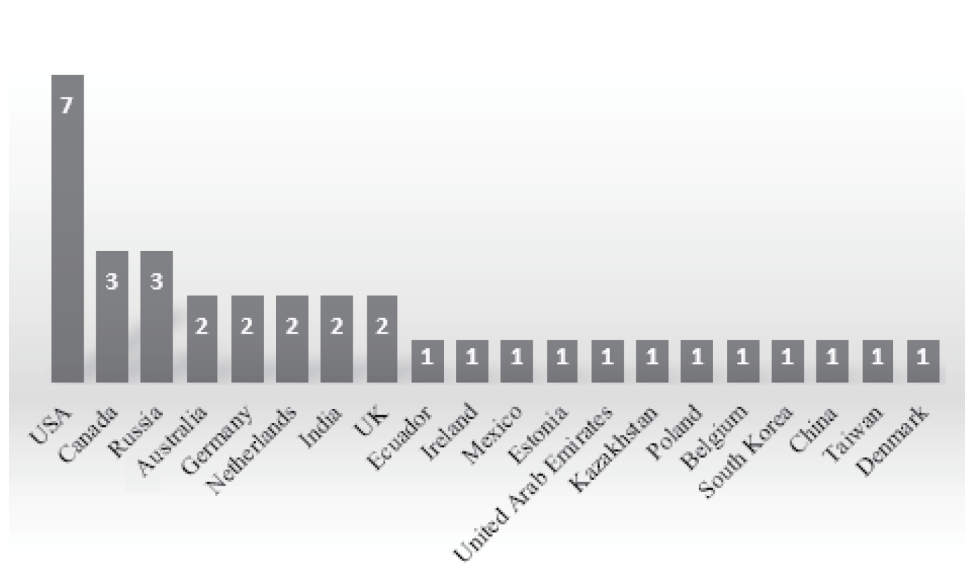
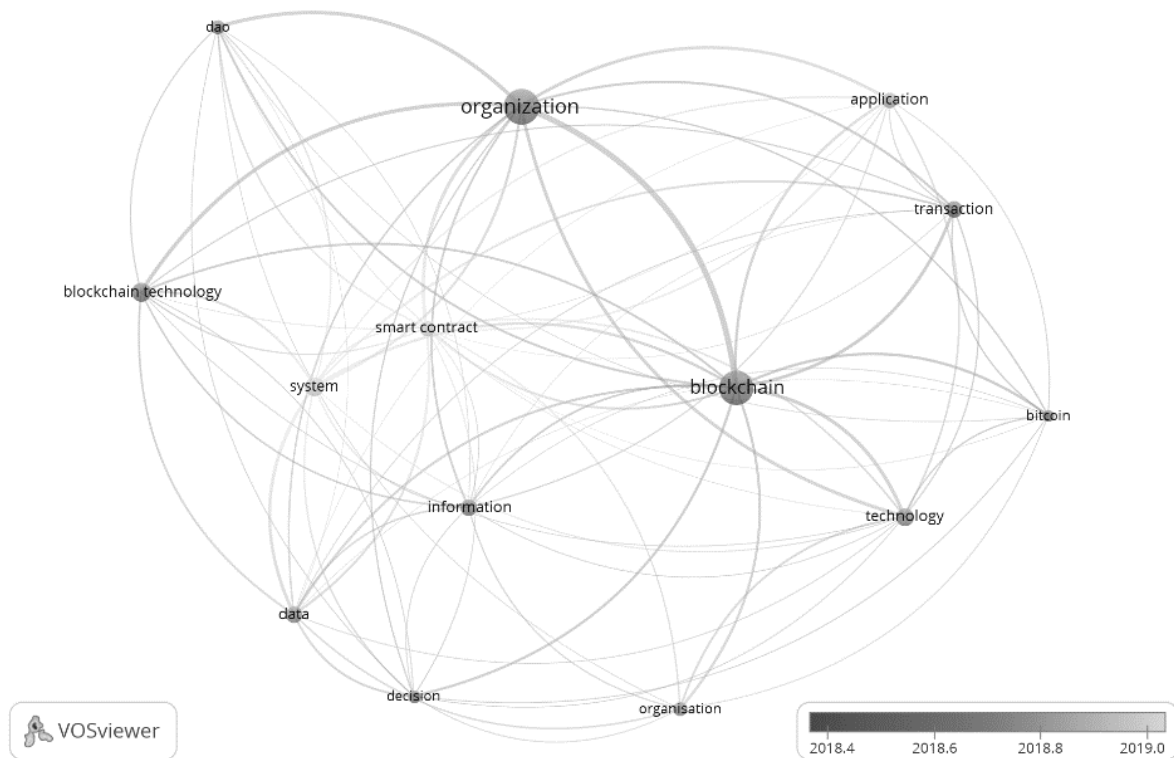FIGURE 4. Authors' country (region) distribution

FIGURE 5. Trend development of Blockchain in organization

a predefined procedure that is translated into the computer program. The early study tries to convert from the operational organization into the computer code or system that minimizes the human interaction when running the system and no intervention of the process is allowed when using Blockchain [3].

The items that have a direct relation with the organization and based on the colour/cluster are exhibited in Figure 6. The items group is divided into 3 clusters and Table 2 exhibits the items detail.
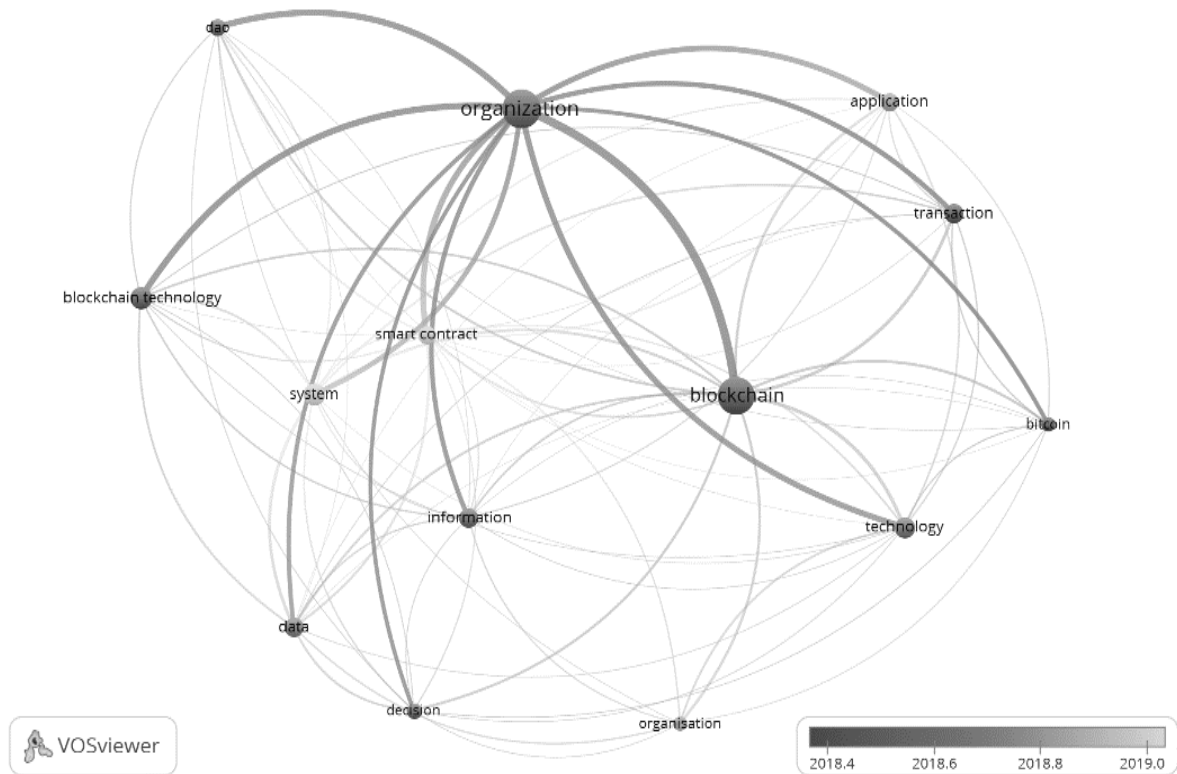
FIGURE 6. Relationship item organization

TABLE 2. Items occurrences

No.	Items	Frequency	Cluster
1	Organization	62	3
2	Blockchain	59	2
3	Blockchain technology	19	1
4	System	19	1
5	Technology	17	2
6	Data	14	1
7	Information	14	1
8	Transaction	14	2
9	Smart contract	12	1
10	Application	12	2
11	Organisation	11	1
12	DAO	10	3
13	Decision	8	1
14	Bitcoin	7	2

Table 2 describes the most frequent word (occurrence) that appeared and a cluster of items. The first cluster consists of 7 items which are Blockchain technology, data, decision, information, organisation (UK version), smart contract and system. This cluster shows that peer-to-peer and immutable of data are features of Blockchain technology that can speed up the decision process in an organization. This feature can be applied because of a smart contract feature in Blockchain technology. In the second cluster consisting of an application, bitcoin, Blockchain, technology, and the transaction, Blockchain as a technology is used for cryptocurrency or Bitcoin [1] as the first application applying

Blockchain technology. Finally, the last cluster shows DAO and organization. In this line, the organization in this cluster focuses on the transformation of an organization adopting the Blockchain technology smart contract and DAO [17,32]. However, the word organization (US) occurs 62 times and organisation (UK) occurs 11 times. In this frame, Blockchain, which has features like peer-to-peer, immutable data, unchangeable data, information distributed, and smart contract features, will make the organization become reliable, trusted, verified, validated, auditable, transparent, secured, agile, tamper-proof, less cost and responsive organization [3,10,23,24,36]. Blockchain will bring a new model of organization. However, DAO is a predefined program code running peer-to-peer, unstoppable when the program automatically executes as plan and cannot be cancelled. The early research tries to implement DAO for improving e-gov system [22]. Consequently, DAO minimizes human interaction in the process [3].

Blockchain as a new technology and trusted system brings a new era of the organization [15,16]. In this context, the feature and ability of Blockchain system and technology will facilitate the transformation and changes of the process in an organization, integrated process (Blockchain as IoT platform), real-time information, fraudless and no third party required. The smart contract of Blockchain enables the changes of system and technology that will impact an organization that becomes more robust & secured (tamper-proof) organization, reliability of data and information makes a more trusted organization. Moreover, the IoT with Blockchain technology brings integration and improvement to the agility of the organization [29]. Peer-to-Peer and distributed model also accelerates the decision making process and security compared to a traditional organization with complex bureaucracy and lacking transparency [3].

4.1. **Benefits of Blockchain implementation to organization.** Blockchain brings a new model of organization and benefits the industry and organization such as tamper-proof of the data record. In this part, it ensures data authenticity, data transparency, and no third party required [28,32]. An integrated organization improves operation agility, real-time information [29], more decentralized organization, transparency, open or sharing community, creative, security, trust and efficient [14,19,24]. Increase the response directs to faster processes [3,12]. By using Blockchain in the organization, it will be tamper-proof from inside or outside attacks. Due to predefined procedure (smart contract), it reduces process error and human error significantly [5,22], reduces transaction cost [25,35] and governance of organization [14,26].

4.2. **Challenges of implementation of Blockchain to organization.** The challenges of using Blockchain recently pinpoint that no business model or framework is settled [31,35], no operational model-based for DAO (Decentralized Autonomous Organization) [3]. The wide implication of implementation might cause an impact on the production of the organization, and minimum implemented knowledge of experts. It is not easy to transfer from current business process to a new model of Blockchain business model [15]. The other challenges are also related to the cost of implementation [21,31], scalability limitation of Blockchain [18], and data integrity problem in the current organization [5].

5. **Research Limitation, Implication, Conclusion and Future Research.** The limitation of the research is associated with only Scopus-indexed database. All resources are presented in English. Similarly, access to literature is restricted. Recently, the trend of Blockchain research development focuses on smart contract and system that facilitates the transformation from the traditional model of the organization to become a distributed organization. In this vein, the new organization becomes more trustable, integrated, agile, faster in decision making and operational process compared to a traditional organization. In other words, the organizational operation implies a less operational cost, more secure,

reliable data, and information. Future research is looking into organizational behavior that can be done to see the effect of Blockchain technology.

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