Key Factor Adoption Blockchain Technology In Smart Supply Management: Literature Review

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Abstract— The Smart supply chain Management (SSCM) in its development is influenced by the implementation of IT governance. Currently, adopters of blockchain technology are beginning to emerge in the supply chain to support IT governance. The researchers want to know the key factors that make companies want to adopt this blockchain technology. This research will be conducted with a literature review approach with a meta-analysis approach. The literature search will be done in reliable databases, that is, google scholar, science direct, emerald insight, IEEE explore, Wiley online library. The results of the search made in the finding are 8 the most dominant factors that can lead to the adoption of blockchain technology in the supply chain, among others, transparency, security, traceability, decentralization, trust, automation, immutability, reliability. It is expected that the adoption of blockchain technology in IT governance in SSCM will be more effective and efficient in all activities of the supply chain, thus influencing the supply chain within the organization. For the organization to be a field or not, a field can be more competitive to meet the demand of customers that are currently smarter.

Keywords— Smart supply chain Management, Blockchain technology, IT governance, literature review

I. INTRODUCTION

The supply chain is a special supply chain of another, where the material process is carried out during manufacturing, delivery and until the customer consumes it [1]. Many organizations or industries apply the strategic supply chain as a means to create and maintain a competitive advantage in competition in the era of globalization [2], [3]. The application of the supply chain is also considered complicated especially in each process that requires considerable time and cost [4], [5]. Therefore, the challenge presented in the supply chain in the process of traceability and transparency is one of the foundations of the distribution of the supply chain [6]. It also includes making payments between manufacturers and suppliers, or customers and suppliers, the product tracking process.

The complexity of a supply chain allows stakeholders to start looking for solutions that address the problems. The complexity has been really helped by a well-managed information technology [7]. Also up to the supply chain management in an intelligent system called Smart Supply Chain Management (SSCM). With the development of SSCM adopting blockchain technology is very effective and efficient for process business in company or organization

According to Rodrigues [8], the blockchain technology has been used a lot, so the growth is very fast at this moment. Blockchain technology is used in a reliable and decentralized data supply capacity, which makes processes faster, making transactional records stronger and more reliable and publicly available or anyone connected to the network of the chain [9] Other very interesting things that can affect the organization or industry can increase the speed of the business, as well as reduce the costs incurred [6], [8], [10]. Blockchain also offers a process of registering transactions in shared accounting that are updated and validated in real time with each participant in the network [6]. The process allows visibility of the same activity and reveals where the asset is at any time, who owns it and the conditions it contains. With a blockchain platform developed within the supply chain. Researchers are interested in describing and identifying what key problems are developing in the supply chain by adopting blockchain technology. In it in order to optimize business transactions and strong business relationships with good and safe.

II. BACKGROUND

The supply chain began to emerge in the mid-1990s and was found in many articles at that time. At the beginning of their supply chain, chains mean activities that include the flow and transformation of products, from raw materials to distribution to end users, and the accommodation of existing information [11]. According to Cooper and Lambert [12], [13], the success of the supply chain requires the interfunctional integration of the system into business

processes through the business network and the continuous flow of information within the network system. The development of the supply chain is also not separate from the development of information technology, so its function is to maximize the system. Until now, in the current era of optimization of IT functions, such as information management, IT infrastructure, process automation, advanced analysis and supply chain integration, you can create intelligent management of the supply chain (SSCM) [14]. The development of this SSCM requires the application of blockchain technology in it.

The blockchain is created with a growing list of records that will be in the form of blocks that are connected to each other in your network and protected by the use of a cryptographic algorithm in each block [15]. The concept of blockchain was introduced for the first time in 2008 by a person or group of people they named and knew as Satoshi Nakamoto [16]. In the beginning, Satoshi Nakamoto uses this concept in the central component of the bitcoin cryptocurrency, which uses the general ledger in network transactions [17]. With the advent of blockchain technology today it is expected to change and revolutionize all the performance within the existing system. All this is due to blockchain technology focused on a point-to-point network, which allows collaboration between several parties, a service system selected as unit analysis to examine its potential contribution quickly [14].

In the supply chain, the basic material is processed until distribution to the last customer where it is registered in the system. With the development of IT, everything has been really better. But in a few decades, this process feels heavier, longer and more expensive [18]. With the advent of this blockchain technology makes the difference, because blockchain offers something different. Where this blockchain says to have speed, transparency, accessibility and more [9], to overcome the obstacles that occur within the supply chain.

III. METHOD

This study conducted a review of the literature with a meta-analysis approach. The meta-analytic approach is a review of systematic research results [19], [20]. The first process carried out by the authors compiled articles related to the implementation of blockchain research in the supply chain using google scholar, science direct, emerald insight, IEEE explore, Wiley. Search articles narrowed with blockchain in the supply chain. Based on the results obtained by 50 articles. The following process the author examines the summary of each article and finds 10 articles. Then do an article exam to identify the factors used by researchers and identify factors that are more widely used by researchers.

The process that is carried out after searching for the article found is to do the selection by looking at the title of the article found 50 articels, then the selection process is done by reading the abstract found 30 articles, and the final stage of reading the introduction to the conclusion to find out that the article is really in accordance with the theme found 10 articles.

The final selection results from the article found 10 articles used in finding the factors that became the focus of this article. After finding factors, factor mapping is done according to the article.

IV. DISCUSSION

The development of research that occurred in information technology had an impact on several areas of the special supply chain. These supply chains reach the adoption of blockchain technology. This development can be seen in the study of the literature that has made this research. Table 1 shows the results of the research identification associated with the adoption of blockchain technology in the supply chain.

TABLE I. STUDY OF THE IDENTIFICATION FACTOR OF THE BLOCKCHAIN ADOPTION FACTOR IN THE SUPPLY CHAIN

No	Year	Author	Factor
1	2018	Kristoffer Francisco and David Swanson	Traceability, Transparency
2	2017	I. Britchenko, t. Cherniavska b. Cherniavskyi	Transparency, Decentralization, Anonymity, Equality, Security
3	2017	Feng Tian	Openness, Transparency, Neutrality, Reliability, And Security
4	2017	Mitsuaki Nakasumi	Trust, Security, Ability
5	2018	Miguel Pincheira Caro, Muhammad Salek Ali , Massimo Vecchio And Raffaele Giaffreda	Fault-tolerance, immutability, transparency, traceability, Reliable, auditable
6	2016	Saveen a. Abeyratne, radmehr p. Monfared	Decentralized, Transparent, Traceability, Durability, Immutability Process, Integrity
7	2017	Yaghoob omrana, Michael henkeb, roger heinesc, Erik hofmannd	Transparency, Automation, And Trust
8	2018	Alexander Kharlamov And Glenn Parry	Visibility, Automated And Decentralized
9	2017	Daniel Tse, Bowen Zhang, Yuchen Yang, Chenli Cheng, Haoran Mu	Suitable, Trust, Decentralized, Authenticity, Efficiency, Traceability
10	2017	Kamanashis Biswas, Vallipuram Muthukkumarasamy, Wee Lum Tan	Transparency, Provenance, Safety, And Security

In the supply chain was not saved from the development of information technology, especially with the advent of blockchain technology. Where in the literature, the blockchain technology research began to be adopted in the supply chain with the opinions of the development research. The adoption of the blockchain technology provides an innovative update in the supply chain system with the ability to transform into a more transparent collaborative system [21] - [26], insurance [22], [23], [26] , [27], traceability [21]], [23], [24], [28], decentralization [21], [24], [28], [29], confidence [7], [25], automation [25], [29], immutability [24], reliability [23], [27], efficacy [28], authenticity [28], adequate [28], visibility [29], integrity of the process [24], durability [24], auditable [23], fault tolerance [23], ability [7], openness [27], neutrality [21], anonymity [21]. All these innovations will have an excellent impact on their application to the supply chain. By competing with the times as the organization progresses, companies and industries rush to apply it to maintain their dominance in global competition.

TABLE II. MAPPING FACTORS USED BY THE AUTHOR

Factor	Author										Total
	1	2	3	4	5	6	7	8	9	10	
Transparency	√	√	√		√	√	√			√	7
Safety		√	√	√						√	4
Provenance										√	1
Traceability	√				√	√			√		4
Efficiency									√		1
Authenticity									√		1
Decentralized		√				√		√	√		4
Trust				√			√				2
Suitable									√		1
Automated							√	√			2
Visibility								√			1
Process integrity						√					1
Durability						√					1
Immutability					√	√					2
Reliable			√		√						2
Auditable					√						1
Fault-tolerance					√						1
Ability				√							1
Openness			√								1
Neutrality			√								1
Anonymity	√										1
Equality	√										1
Number of factors	**4**	**3**	**5**	**3**	**6**	**6**	**3**	**3**	**5**	**3**	

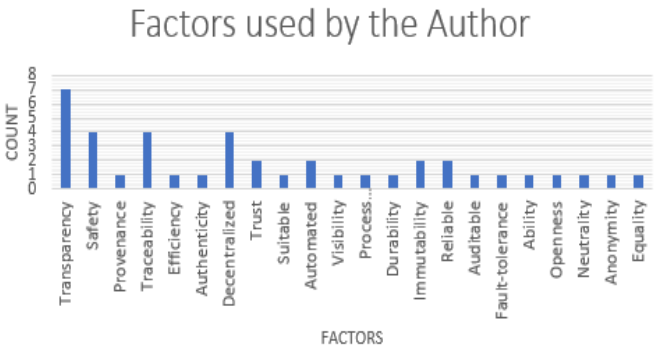

Fig. 1. Sum of the factor used by the Author

From the bibliographic search shown in Figure 1, there are 22 factors that are found in the adoption of blockchain in the supply chain. Of the 22 factors found, there are 8 dominant factors that are transparent, safe, traceability, decentralization, confidence, automation, immutability, reliable. The implementation of blockchain technology is really possible since it is also the expected use of supply chains in organizations.

V. CONCLUSION

In searches conducted in the literature carried out by researchers have many organizations that have applied in the strategy of the supply chain in their business processes [5], [30], [31]. Along with the development of information technology, many also adopted blockchain technology in the supply chain [22], [32]. Adoption is closely linked to the role of factors in the improvement of business processes that occur within the organization. With searches conducted by researchers in the literature, there are 8 of the most dominant factor that can cause blockchain technology adopted in the supply chain, among others, transparent and secure, traceability, decentralization, trust, automation, immutability and reliable. There was also a factor that contributes or supports, among others, efficiency, authenticity, appropriateness, visibility, the integrity of the process, durability, auditability, fault tolerance, capacity, openness, neutrality, anonymity. With the adoption of the coplanar blockchain technology of the company or can not be more competitive in the demand of the meeting client who are getting smarters. The limitation in this research uses small dataset paper. The future research can be analysis factor in implementation SCM in some specific industry and add mostly data sets of articles as the basis of the literature review.

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