A Systematic Literature Review: Blockchain Technology and Organizational Theories in the Perspective of Supply Chain Management

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Abstract. Due to the numerous benefits of blockchain technology (BCT), firms are eager to adopt blockchain technologies in their businesses for greater information sharing, increasing efficiency, and reducing the cost. But in the field of supply chain management, blockchain technology literature is in its early phase for lacking theoretical foundation. The primary purpose of this research is to determine the organization theory used in the BCT literature from the perspective of operations and supply chain related fields. The findings reveal that six organizational methods used in BCT literature in supply chain-related fields, including resource-based view, network theory, institutional theory, agency theory, information theory, and transaction cost analysis. This article provides a foundation for future researchers who want to use organizational theory and deepen research on BTC in the field of supply chain management, thereby contributing to the BCT discussion.

Keywords. Blockchain technology, Literature review, Organizational theories.

1. Introduction

These years, the businesses adopting of blockchain technology (BCT) in supply chain operations are exponentially growing. But due to disruptive potential attributed to BCT and its associated studies in this field [1-2], several existing research papers show a lack of theoretical foundation to explore BCT and its usage in supply chain management operations [3].

With its very recent emergence, the academic research papers on BCT can be regarded as in its infancy, while most of its research is in the early stages, and still exploratory with highly conceptual models [4], thus lacking theories.

The main purpose of this research is to determine the organization theory used in the BCT literature from the perspective of operations and supply chain related fields. In our best of knowledge, it will be a pioneer study to links organizational theories with blockchain supply chain literature. The critical contribution of the current study is to provide a clear picture as a reference for BCT in supply chain-related fields, which will be encouraged to build organizational theory.

The structure of this article is as follows: section two presents an overview of BCT and their importance—section three covers the design and research methodology. Section fourth includes organizational theories, which can be adopted to explore BCT in the fields of operation and supply chain management. At last, concluding remarks have been provided with a summary of key findings and future research gap.
2. Blockchain Technology and Supply Chain Management

A potential breakthrough in the future supply chain (SC) could be the use of disruptive technologies, such as BCT. It is undeniable that information sharing is the main requirement for SC to make better predictions and plans [5-6]. Information sharing can link stakeholder and increase coordination in the supply chain and reduce cost. However, it is a challenge to track information through a complex SC network. BCT promotes information sharing between supply chain partners and provides real-time data sharing [7].

BCT can benefit SC provenance and sustainability. The technology application connected with IoT (Internet of Things), GPS (Global Position Sensors) and RFID (Radio Frequency Identification Device) may collect real-time and authenticate data to resolve the issues of traceability [8-9]. BCT provides a high level of transparency, immutability, reliability and verifiability (figure 1), which facilitate smooth sharing of information among supply chain partners. The immutability feature comes from the only additional concept of the BCT ledger, under which the recorded transactions cannot be changed without the consensus of the blockchain network [10]. By these characteristics, the reliability of blockchain information is strengthened.

The vital function of BCT is the smart contract, which sometimes reflects the real-world deal digitally. The contract includes the agreement code between the two parties, monitors the conditions and performs embedded functions [12-13]. Smart contracts transfer traditional third-party needs to network consensus. Due to digital records and automatic execution of trigger points, the BCT reduce the transaction cost and increase the efficiency [14].

The technology has the following three key benefits:
1. The parties have free access.
2. Submitted data cannot be changed but by the consensus of all parties.
3. Published data cannot be deleted.

In the implementation of sustainable/green practices in the supply chain, the role of a supplier is very critical [15]. There is no doubt that the selection of the right supplier is the first step to ensure the sustainability of SCs [16]. It is the upstream echelon of the supply chain that significantly influences the end-to-end performance of supply chain sustainability. The selection of supplier and their evaluation in the context of sustainability is a complex problem [17-18]. Generally, the selection of supplier is based on available information, which is not easily accessible and certifiable in sustainability dimensions. However, BCT can effectively overcome this barrier.

Due to strict security of data, the blockchain technology increases the trust of suppliers to share their sustainability data among supply chain partners, which significantly help firms to enhance their vendor selection processes based on sustainability performance [17]. Besides, supply chain partners share their ideas to strengthen their cooperation for better socio-environmental sustainability.

With BCT, the firm can tract the source of products, which helps in addressing environmental concerns. By using BCT in the supply chain, real-time/actual product data can be used to complete
product life cycle analysis [18]. This information makes a revolutionary contribution to BCT in the field of life cycle analysis.

In a sustainable supply chain, green design of a product is much more critical, which helps firms to recycle and/or remanufacture their products with zero or minimum harmful effect on the environmental sustainability [17]. BCT helps to easily disseminate information to multiple companies involved, collect, classify, verify, decompose, crush and control the environmental quality of materials and coordinate participants.

3. Research Methodology
This research adopts a systematic literature review approach to identify organizational theories, which can be taken to investigate BCT literature in the perspective of sustainable supply chain management. For these years, research published on blockchain technology has been growing, but unfortunately, there is a lack of theoretical foundation. The critical contribution of the current study is to provide a clear picture as a reference for blockchain technology in sustainable supply chain fields, which will encourage organizational theory building. However, since the last couple of the years, a handsome quantity of the studies published in the area of supply chain management [11-18] but very few studies conducted on the topic of BCT applications in the field of the supply chain. This research follows the main SLR steps, following Denyer and Transfield [19], the procedure of SLR adopted in this study is displayed in figure 2.

![Diagram of SLR procedure](image)

**Figure 2.** The procedure of SLR.

4. Organizational Theories to Link with Blockchain Literature
Finally, these 19 research papers were analyzed to recognize relevant organizational theories to offer an in-depth survey about the BCT papers in the perspective of operations and supply chain related fields. After the full-length reading of these 19 articles, we found six organizational theories (table 1).
Table 1. Organizational theories.

| Theory                      | Citations                                                                 |
|-----------------------------|---------------------------------------------------------------------------|
| Agency Theory               | Cole et al. [21]; Derbali et al. [22]; Murray et al. [23]; Chang et al.  |
|                             | [24]; Treiblmaier [25]                                                    |
| Institutional Theory        | Ahl et al. [26]                                                           |
| Informational Theory        | Saberi et al. [7]; Martinez et al. [27]; Montecchi et al. [28]            |
| Resource-Based View         | Martinez et al. [27]; Treiblmaier [25]                                    |
| Network Theory              | McCallig et al. [29]; Zalan [30]; Queiroz and Wamba [31]; Buth et         |
|                             | al. [32]; Treiblmaier [25]; Treiblmaier [33]                              |
| Transaction Cost Analysis   | Ahluwalia et al. [34]; Chang et al. [24]; Murray et al. [22];             |
|                             | Treiblmaier [25]; Schmidt and Wagner [35]                                 |

During the analysis of the 19 research papers, we identified only six organizational theories, which used in BCT literature in the perspective of supply chain and/or sustainability value. Surprisingly, game theory, stakeholder theory, and dependency theory were not used in the literature of blockchain supply chain. Table 2 provides the identified theories in the literature.

Table 2. Organizational theories in blockchain literature.

| Theory                      | Existing BCT Literature and Application of Theories                                      |
|-----------------------------|--------------------------------------------------------------------------------------------|
| Agency Theory               | 1. The theory adopted to explore opportunistic behavior in the distribution of information [22]. |
|                             | 2. BCT can help to improve trade contract efficiency [24].                                 |
| Information Theory          | 1. BCT offers wide access to the customers [28].                                            |
|                             | 2. The theory emphasizes the need to assess information processing capabilities [27].       |
| Institutional Theory        | 1. The theory used to establish the P2P system analysis framework [26].                      |
|                             | 2. BCT also required institutional environment for public legitimacy [36].                   |
| Network Theory              | 1. The network effect also seems to promote the rapid internationalization of blockchain startups [30]. |
|                             | 2. The theory used to construct and design a blockchain-based accounting information system [29]. |
| Transaction cost analysis   | 1. BCT has capability to minimize the cost through transparency, trust and disintermediation [37]. |
|                             | 2. BCT remove transaction costs by smart contracts [23, 36].                               |
| Resource-Based View         | 1. BCT can help improve the efficiency of the customer order management process [27].       |
|                             | 2. BCT offers the smart contract, which lead to an increase competencies [38].               |

5. Conclusion
This article reviews the BCT literature within the scope of operation and supply chain management, focusing on existing organizational theories that be used to expand the knowledge of blockchain literature in related areas. We examined that scholars discussed different topics in their papers, including sustainability value, integration of BCT for information sharing, adoption of BCT in the supplier selection procedure, and improvement of supply chain efficiency. But unfortunately, many articles have no theoretical basis, which limits the possibility of further strengthening the theory in the field of supply chain management. This article contributes to the BCT discourse by offering a foundation to future
researchers who want to use organizational theories and deepen research in the field of supply chain management. This article will significantly contribute to the literature and will encourage researchers to use organizational theories in their studies for the advancement of the field.

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