MASTERARBEIT | MASTER'S THESIS

Titel | Title

Impact of Blockchain on Decision Making in Organizations: A Case Study Analysis

verfasst von | submitted by

Maksymilian Edgar Scholz

angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien | Vienna, 2025

Studienkennzahl lt. Studienblatt | Degree programme code as it appears on the student record sheet:	UA 066 915
Studienrichtung lt. Studienblatt | Degree programme as it appears on the student record sheet:	Masterstudium Betriebswirtschaft
Betreut von | Supervisor:	ao. Univ.-Prof. i.R. Mag. Dr. Josef Windsperger

Abstract: English

Blockchain technology is often associated with cryptocurrencies and investments with its underestimated transformative potential in global industries, such as for instance supply chain management. Despite its potential benefits, blockchain's impact on decision-making processes and authority distribution still remains unexplored. This thesis aims to provide more insights addressing the question of *'How did the implementation of blockchain technology influence the distribution of decision-making authority in an international logistics corporation?'.*

In order to answer this question, a qualitative single case study analysis method has been applied. The data was gathered with a semi-structured interview and complemented by company materials and press releases.

The study revealed that blockchain did not significantly alter existing decision-making processes or impacted the distribution of authority rights in an organization. Its influence was hugely impacted and limited by external factors. Instead of a decentralization or decision-making tool, blockchain served as a tool to execute existing authority specified in company policies.

The thesis concludes that organizational context, existing policies and adoption challenges are the main factors shaping the distribution of decision-making rights, prevailing over the inherent features of blockchain technology.

Abstract: German

Die Blockchain-Technologie wird häufig mit Kryptowährungen und Investitionen in Verbindung gebracht, wobei ihr transformatives Potenzial in globalen Branchen, wie z. B. dem Lieferkettenmanagement, unterschätzt wird. Trotz ihrer potenziellen Vorteile sind die Auswirkungen der Blockchain auf Entscheidungsprozesse und die Verteilung von Befugnissen noch unerforscht. Die vorliegende Arbeit zielt darauf ab, mehr Erkenntnisse über die Frage „Wie hat die Implementierung der Blockchain-Technologie die Verteilung von Entscheidungsbefugnissen in einem internationalen Logistikunternehmen beeinflusst?“ zu gewinnen.

Um diese Frage zu beantworten, wurde eine qualitative Einzelfallstudie als Analysemethode angewandt. Die Daten wurden mittels eines halbstrukturierten Interviews erhoben und durch Firmenmaterialien und Pressemitteilungen ergänzt.

Die Studie ergab, dass Blockchain weder die bestehenden Entscheidungsprozesse noch die Verteilung von Entscheidungsrechten in einer Organisation wesentlich verändert. Ihr Einfluss wurde durch externe Faktoren stark beeinflusst und begrenzt. Anstelle eines Dezentralisierungs- oder Entscheidungsinstrument diente die Blockchain als Werkzeug zur Ausführung bestehender, in den Unternehmensrichtlinien festgelegter Befugnisse.

Die Dissertation kommt zu dem Schluss, dass der organisatorische Kontext, die bestehenden Richtlinien und die Herausforderungen bei der Einführung die wichtigsten Faktoren sind, die die Verteilung der Entscheidungsbefugnisse beeinflussen, und dass sie die inhärenten Merkmale der Blockchain-Technologie überwiegen.

1. Introduction

Blockchain technology gained recognition primarily thanks to its foundational role in cryptocurrencies, with Bitcoin serving as the most prominent example. Its core principles - immutability of data, transparency, decentralization, and automation - pose a transformative potential for many business cases (Oriekhoe et al., 2024; Balcıoğlu et al., 2024). The developments in the technological sphere and blockchain's inherent features led to its wider adoption in various industries, with supply chain management among others (Maroun et al., 2019; Chang et al., 2022).

The technology developed from simple peer-to-peer payments into sophisticated platforms and apps allowing for more efficient communication, and implementation of smart contracts among various network participants, offering benefits such as real-time tracking, fraud reduction and decision-making process optimization (Dutta et al., 2020; Xia et al., 2023).

Regardless of these theoretical benefits, the adoption of blockchain technology is still very limited, particularly in supply chain management, where the technology might make it possible to address long standing issues such as lack of transparency, ineffective and delayed communication between vendors and difficulties in tracking the origins and journey of a product (Dutta et al., 2020; Xia et al., 2023; Balcıoğlu et al., 2024; Zhang et al., 2024)

Moreover, there is still a gap between theory and praxis, mostly due to the very low adoption of technology, which makes the research and analysis of case studies both difficult, and invaluable, providing a glimpse into the real-life challenges (Xia et al., 2023; Oriekhoe et al., 2024).

The integration of blockchain technology into daily business poses significant challenges. It requires high organizational awareness, reorganization of current processes and vital technical knowledge, which more often than not discourages organizations from the implementation (Balcıoğlu et al., 2024; Zhang et al., 2024). Additional factors, such as development costs, technical expertise and know-how or scalability issues also constitute barriers for wider adoption (Theodorakopoulos et al., 2024).

The key motivation for the study is the fact that it offers a unique insight into the reasons for implementation of the technology by a large international corporation in the field of supply chain. Understanding how technology transformed the operations and how it influenced decision-making processes and distribution of authority in the organization will be critical.

The purpose of this thesis is to analyze implications of blockchain technology with regard to decision-making processes within an organization. Aspects such as decentralization and centralization of decision-making rights, automation of decision-making processes through smart contracts and innovative approaches to decision-making will be analyzed. Additionally, the research will address some of the issues regarding discontinuation of the project and the rationale behind such a decision, despite potential benefits, presenting real-life implementation challenges.

The central research question guiding this thesis is:

'How did the implementation of blockchain technology influence the distribution of decision-making authority in an international logistics corporation?'

In order to answer this question, a qualitative case study approach will be used. Given the constraints when it comes to the number of interviews and the fact that the company discontinued the project some time ago, an additional analysis of public sources will be conducted.

By combining the qualitative case study approach, semi-structured interviews and online primary sources such as press releases and news articles, the research will offer a unique perspective on the role of blockchain in supply chain management and contribute to the broader discussion on technology adoption and the evolution of decision-making processes in business.

2. Theoretical Framework

2.1 Blockchain Technology Fundamentals

2.1.1 Evolution and Core Principles

Blockchain technology is a form of distributed ledger technology. Transactions on the network are recorded simultaneously across various locations and users, which allows network participants to observe changes and updates in real time (Schmitz and Leoni, 2019).

It was introduced to the wider world with the publication of the Bitcoin white paper by Satoshi Nakamoto in 2008 (Nakamoto, 2008). However, the concept of cryptography and secure storage of information had already existed before that (Haber and Stornetta, 1991). Nonetheless, it was the launch of Bitcoin that not only established a new form of money that nowadays is of interest to many investors but also set in motion a new path in the development of technology, where security, transparency of actions, immutability and anonymity became core principles.

While Bitcoin introduced blockchain as a financial tool, the introduction of Ethereum by Vitalik Buterin in 2014 (Buterin, 2014) expanded its capabilities beyond currency transactions. Ethereum blockchain developed capabilities of the technology by implementing smart contracts and decentralized applications (DApps). Thanks to that, blockchain gained functionalities expanding far beyond peer-to-peer transactions to support a variety of innovative solutions across industries.

The development of technology also drove business adoption. It created an opportunity for a few market players to offer tailor-made blockchain solutions, with the same underlying technology and principles, but suitable for businesses that might not want to share their transaction data with other public participants. These solutions are known as permissioned blockchains, where the information workflow is restricted to one or a few selected companies while retaining the inherent features of blockchain technology.

Blockchain technology itself consists of a few key components that encompass records of transactions, nodes, blocks, ledgers, and hashes (Centobelli et al., 2022). The record of transactions is the basic data unit in blockchain technology that registers a single transaction on the blockchain. It can be either a payment or a transfer of information (Treiblmaier, 2018). Nodes are blockchain network participants, where each node stores a copy of the blockchain ledger (register of all transactions), and they all participate in the process of validation of transactions and reaching a consensus. The nodes communicate with each other without the need for a centralized entity coordinating all the processes (Dutta et al., 2020). Validated transactions are then grouped into blocks, where each block contains a list of transactions, unique identifier and a hash that links the blocks together and ensures immutability of the record of transactions (Oriekhoe et al., 2024).

This technological setup ensures that there are four main characteristics of blockchain technology. They encompass decentralization, anonymity, transparency, and immutability (Theodorakopoulos et al., 2024).

Decentralization refers to the operation of blockchain without the need for a central governing body or supervision (Theodorakopoulos et al., 2024). Traditional transactional systems used to rely on a third-party agency for validation and authentication of the transaction. Blockchain solves this problem by applying consensus mechanisms such as Proof of Work or Proof of Stake.

Transparency means that each transaction or information sent to the blockchain network has a specific digital timestamp (Theodorakopoulos et al., 2024). This allows for exact tracking of the information. Since access to blockchain registers can be obtained by anyone, this means that the information can also be verified by anyone and is visible to anyone (Theodorakopoulos et al., 2024), potentially impacting the relations between parties and decision-making processes.

Another core feature of blockchain is anonymity. Blockchain users can transact and exchange information with the use of randomly generated addresses. There is no need for them to set up any accounts in central registers whatsoever (Theodorakopoulos et al., 2024). They operate purely with the use of special addresses that can be referred to as wallets with which users interact with each other. The wallets usually consist of a series of alphanumeric characters. Nevertheless, the anonymity feature is often criticized, especially with regard to transparency that allows tracking of transactions and might lead to transaction pattern recognition, which compromises at least part of the anonymity feature (Chang et al., 2022).

The last fundamental blockchain characteristic is its immutability. Transactions once sent to blockchain are recorded there forever, with no possibility to delete or alter them (Theodorakopoulos et al., 2024). Each block in the network contains a unique hash code, which has all the data regarding the transaction and the previous block in the chain/network making the register immune to alterations.

As mentioned previously, blockchain transactions rely on consensus mechanisms. They constitute key components to the technology as they allow for confirmation and verification of transactions happening in the network. One of the most popular mechanisms is Proof of Work (PoW), where the network participants, often referred to as miners, compete against each other to solve complex mathematical puzzles. The first one to provide a correct solution earns the right to add a new block to the chain and is rewarded for it. Other network participants then verify this solution and if it is correct, a new block is confirmed and permanently added to the chain (Petrusenko, 2022).

Another popular consensus mechanism is called Proof of Stake (PoS), which was developed as an alternative to PoW to limit energy consumption. In PoS validators, known as stakers, instead of solving a mathematical puzzle, are required to ‘stake’ tokens that they possess as collateral to prove their trustworthiness. Acting with malicious intentions would mean losing the tokens, which, in turn, acts as a financial motivation for operating honestly (Petrusenko, 2022).

Apart from these mechanisms, there exist other variations such as Delegated Proof of Stake (DPoS) or mechanisms that are based on algorithms, for instance, Byzantine Fault Tolerance (BFT) that offer various compromises between speed, decentralization and security (Swan, 2015; Catalini & Gans, 2020), however, are not a subject of this thesis.

These fundamental characteristics of blockchain technology stand in contrast to traditional centralized systems that rely on a single point of control and governance. Blockchain relies on a decentralized network offering higher transparency, better security, and resistance to tampering of data (Catalini & Gans, 2020). This unique decentralized design creates a completely different environment in which decisions are made, potentially impacting on organizational structures and the distribution of authority within the hierarchy - topics that will be covered in the subsequent sections.

2.1.2 Technological Trends and Applications

Blockchain technology is evolving constantly, adapting to the security, scalability, efficiency and, especially, business landscape. The development of blockchain technology from simple peer-to-peer payment networks to platforms that allow for creation of DApps opened possibilities for innovation and application of the solution in various business and life areas.

Han et al. (2022) presents a division of blockchain into four distinct categories, depending on the application area and its capabilities:

- Blockchain 1.0 that serves the purpose of cryptocurrencies,
- Blockchain 2.0 that enables smart contracts and DApps,
- Blockchain 3.0 that focuses on specific use-cases,
- Blockchain 4.0 that relates to artificial intelligence.

This thesis focuses mostly on the combination of blockchain 2.0 and 3.0 with its application in supply chain management through automation of decision-making processes via smart contracts.

Recent years have also been focused on improving the efficiency of blockchain networks. One solution to increase the number of transactions per second and at the same time decrease the energy consumption of the networks is Layer 2 solutions. These solutions allow for conducting transactions outside of the main blockchain network, bundling all the transactions into a single record, and then adding this record to a blockchain network (Balcıoğlu et al., 2024). In addition to that, in order to increase interoperability of different networks, there is an emergence of side chains and protocols that allow for efficient communication between various blockchains increasing the integration and data exchange (Theodorakopoulos et al., 2024).

These efforts and developments allowed blockchain to expand its applications. Even if they operate only in the back end, blockchain solutions can be found in nearly every industry. In the healthcare industry blockchain is gaining importance with its application for handling patients' data. In education it allows for issuance and verification of digital credentials for students (Theodorakopoulos et al., 2024). In banking and financial systems, it provides an additional level of security and efficiency, for instance, in liquidity management (Theodorakopoulos et al., 2024). It is worth noting that blockchain is used not only by private enterprises, but also by public authorities in data management (Maroun et al., 2019).

The use of blockchain in various sectors demonstrates its possibilities and transformative potential. Its core values constitute a foundation for solutions reaching beyond cryptocurrencies and open up new possibilities for organizations to operate in an increasingly digitized world, where the information and data are the primary drivers of decision-making processes. However, in order to fully grasp how decisions are being made, and how adoption of technology might change them, it is necessary to revisit the classical decision-making models.

2.2 Decision-Making Processes in Organizations

Decision-making processes in organizations play a crucial role in shaping the effectiveness, innovativeness, and adaptability of the organization in the fast-developing business landscapes. A decision-making process encompasses a variety of actions, beginning with analysis of the available information, identification of possible strategies and actions and finishing with choosing the optimal solution that is aligned with strategic goals of the organization.

In order to stay nimble and keep the competitive advantage, modern organizations must keep up with technological developments, such as artificial intelligence, advanced data analysis or blockchain (Adams et al., 2017; Zhao et al., 2022). These advancements not only offer improvements in terms of automation of decision-making processes, minimizing human errors and boosting efficiency, but can also constitute part of a unique company strategy to stay competitive. The following section will present traditional decision-making processes in organizations and what is the impact of technology on these processes.

2.2.1 Traditional Decision-Making Models

Organizations have long relied on structured processes in order to be able to navigate through the complexities of decision-making. One of the most traditional and prominent examples is the Rational Decision-Making Model (Eisenhardt and Zbaracki, 1992).

It assumes that people and organizations make decisions in a logical and rational way, trying to achieve set goals and objectives. The key to this model is to clearly set objectives that allow agents to act in the optimal way. It is assumed that decision-makers possess complete access to all necessary and essential information needed for a decision (March and Simon, 1958). It also implies that decision-makers are able to evaluate all possible alternatives systematically. The process describes clear steps, such as problem identification, goal setting, collection of information, analysis and evaluation based on specific predefined criteria and in the end selection of the optimal solution (March and Simon, 1958; Allison, 1972).

In an ideal scenario, organizations would operate according to the principles of this model. However, one can notice that in the modern world such assumptions rarely hold true and clash with real-world organization reality. Constraints with regard to access to data, limited resources or simple time-pressure make the assumptions of the model rarely applicable in real life scenarios.

Therefore, building on the Rational Decision-Making Model Simon (1956) introduced the Bounded Rationality Model, which addresses the above limitations. Simon recognizes human cognitive limitations and environmental limitations. Bounded rationality assumes that humans have limited cognitive capacity that influences how they make decisions (Simon, 1956). It also acknowledges the fact that there is incomplete information and that it is rare when decision-makers have full access to information upon which they can act. Environmental factors such as organizational culture, availability of resources and time determine how decision-makers approach decision-making (Simon, 1956).

Simon argued that instead of finding an optimal solution, agents can 'satisfice', so find a solution that is good enough instead of optimal. They rely on heuristic and specified processes to simplify and speed up the decision-making processes (Simon, 1956).

In order to address the human limitations and managerial inefficiencies, organizations opt for solutions and operations according to specified rules and policies (Simon, 1947). The policies are a formalized set of rules and procedures that are typically created by top level managers and executives. Their purpose is to simplify the complex organizational reality for employees. By providing pre-determined rules to guide how employees should act in which situations, they effectively reduce the number of variables workers need to consider in order to achieve a rational outcome (March and Simon, 1958). Through those, the organizations can minimize the effects of bounded rationality and aim to achieve decision consistency across its structures.

Setting up policies is a form of turning organizational tacit knowledge into explicit one. In this context, new technologies, and especially blockchain with smart contracts, seem to be a tool that can take it a step further. In order to fully understand the mechanism of functioning of policies and the allocation of decision-making rights, it is necessary to introduce the notion of Property Rights Theory and Knowledge Codification, which will be described in the following section.

2.2.2 Codification of Knowledge and Property Rights Theory

Knowledge codification in the context of organization refers to the process of transferring the knowledge, often tacit, into formalized, transferable, and codifiable form (von Hippel, 1994; Nonaka, 1994). It is a necessary step to be able to implement contractual knowledge and program smart contracts properly (Grant, 1996; Sreckovic and Windsperger, 2023).

Organizations engage in the process of codification of knowledge to set up policies, rules, and responsibilities within the organization (Morris, 2001). The better and more advanced the codification is, the easier it is for the organization to implement blockchain- and smart contract-based solutions.

The Property Rights Theory focuses on the allocation of property rights within the organizational hierarchy (Hart and Moore, 1990). It is directly connected with the knowledge codification as the allocation of decision-making rights is ultimately determined by the ones that possess necessary knowledge, experience, and resources (Hart, 1995; Baker et al., 2008).

In terms of decision-making rights, according to the Property Rights Theory, one can distinguish specific decision-making rights, and residual decision-making rights. Specific decision-making rights refer to concrete decisive actions that were set based on the codified knowledge (Hendrikse et al., 2015; Sreckovic and

Windsperger, 2023; Windsperger et al., 2023). It means that these rights can be formalized in the form of contracts, such as traditional contracts or blockchain-based smart contracts. A franchise business may serve as an example where a franchise agreement determines exactly what franchisee and franchisor are responsible for. The higher the proportion of codifiable knowledge that can transform specific decision-making into algorithms and smart contracts, the higher the possibility and tendency to make use of automation in decision-making processes (Mumdziev and Windsperger, 2011; Sreckovic and Windsperger, 2023; Windsperger et al., 2023).

On the other hand, residual decision-making rights are the actions that were not codified in any way and stem from the non-codifiable knowledge (Sreckovic and Windsperger, 2023). In other words, the residual decision-making rights determine the authority to make decisions in situations not foreseen by contracts but based on experience and know-how. Following the same franchise business example, residual decision-making rights may refer to a situation where a franchisee might be able to act on his marketing activities on the local market that the franchisor does not know well enough (Mumdziev and Windsperger, 2011; Sreckovic and Windsperger, 2023).

Allocation of the residual decision-making rights in an organization depends on the distribution of knowledge that could not be codified (Sreckovic and Windsperger, 2023). An effective organizational structure requires that people who possess knowledge and know-how vital for decision-making should also be allocated residual decision-making rights. Such allocation creates more centralization within the organizational networks, which can be defined as “the extent that decisions are made at relatively high levels in the organization, and persons at lower levels have relatively little discretion” (Simon et al., 1954). Decentralization would constitute the opposite, allocating more decision-making power to lower levels in the organizational hierarchy.

If upper-level management possesses higher non-codifiable knowledge than the frontline workers, residual decision-making rights tend to be more centralized. Whereas, if it is frontline workers that have this knowledge, these rights tend to be more decentralized in the organization (Sreckovic and Windsperger, 2023).

It is important to consider these notions across all levels of the organizational value chain activities, such as operations, coordination and innovation as each activity will be characterized by a different level of codifiable and non-codifiable knowledge (Sreckovic and Windsperger, 2023), and thus each might influence the centralization and decentralization of residual and specific decision-making rights differently.

2.3 Overview of Current Supply Chain Management Activities

To fully comprehend how technology influences decision-making processes in the supply chain, one also needs to be aware of what supply chain management activities encompass. Currently supply chain management consists of five distinct phases that include planning, sourcing of raw materials, manufacturing, delivery and returns (Maroun et al., 2019). The goods travel from raw materials suppliers through manufacturers and distribution centers until they reach the final customer (can be both business one and a retail one). At the same time, alongside the goods, there is constant flow of information and funds between participants of the supply chain (Deloitte - Using Blockchain to Drive Supply Chain Transparency, 2023).

Often this simple looking process includes as many as 30 different parties that influence each other, sometimes even indirectly, therefore the role of coordination is of the utmost importance to ensure smooth flow of goods and functioning of the supply chain (Bartsch and Winkler, 2020; Oriekhoe et al., 2024).

Decisions are made on three distinct levels: strategic, tactical, and operational (Lainez et al., 2008). Strategic level encompasses long-term planning including matters such as, for instance, technology adoption, sustainability initiatives or geographical placements of distribution centers. Tactical level focuses on medium-term goals bridging the gap between strategic and operational level. On this level frameworks and policies are designed, and resources are allocated. The operational level concerns day-to-day operations of supply chain management such as order processing, inventory control or customer service activities (Lainez et al., 2008; Pires et al., 2016). All three levels complement each other, nevertheless, it is the higher-level managers and C-Level executives that are particularly responsible for the design of the system (Ghosh et al., 2021).

Despite the fact that every day multiple tons of goods are being transported, the processes are becoming increasingly outdated in the era of technological developments (Jovanovic et al., 2022). When considering the fact that so many parties can be involved in a shipment with each one operating under its own framework and policy, distinct informational silos emerge with little cross-functional collaboration (The World Economic Forum, 2019). Access to such silos is usually not straightforward and more often than not available only to selected parties (Oriekhoe et al., 2024). Communication between these parties also mostly relies on various communication channels that might not always be efficient (such as paper-based), especially when operating in different time zones with different data standardization processes (Jovanovic et al., 2022). In addition to that, trust among supply chain participants mostly stems from business and personal relations that take time and effort to be established.

The traditional model suffers from communication inefficiencies, lack of transparency and lack of real-time access to data, as well as asymmetry of information and vulnerability for fraudulent activities (Longo et al., 2019). Additionally, low digitalization across the industry makes the parties rely heavily on manual tasks including order processing or inventory tracking (The World Economic Forum, 2019). Methods that are prone to human error and are outdated in modern markets.

2.4 Technology and Decision-Making in Supply Chain

The inefficiencies present in the logistics industry lead to increased costs and delays of shipments, as well as decreased trust between stakeholders caused by lack of transparency, which in turn weakens the industry-wide collaboration (Lan, 2024; Oriekhoe et al., 2024). In addition to that, relying on traditional methods regarding handling data, such as manual entry of data or paper-based documentation, increases the risk of fraudulent activities hindering the smooth flow of goods (Xia et al., 2023). Even the best designed policies might not tackle all the issues and inefficiencies, thus a growing interest in technologies such as blockchain, that can address these inefficiencies, can be observed within the logistics industry (Jovanovic et al., 2022).

2.4.1 Blockchain's Benefits: Transparency, Traceability, and Efficiency

In the context of supply chain management, introducing blockchain seems to yield enormous benefits, not only in terms of efficiency, but also in the operational terms (Chang et al., 2022). Its decentralized structure ensures that no party has full control over the data, which increases trust among participants and decreases the risk of data manipulation (Treiblmaier, 2018). The immutability of blockchain data ensures overall data integrity among network participants and creates a trustable history of the journey of the product (Oriekhoe et al., 2024).

While the majority of blockchains are accessible by anybody (public), there are also enterprise solutions with blockchains being completely private (permissioned) and accessible only for selected members/participants, for instance, to all the different parties participating in supply chain processes (Maroun et al., 2019).

Blockchain also has the possibility to eliminate data silos as it creates one trustable and verified source of information, where each party possesses the same copy of the ledger (Oriekhoe et al., 2024). Commonly shared and updated in real-time data allows for better coordination and decision-making processes.

The technology can also contribute to a decrease in informational asymmetry among parties along the supply chain. While some parties might have better access to specific information and use it to their advantage, it might have a negative impact upon building trust and business relations among participants, which might significantly impact communication between them in a traditional form (Treiblmaier, 2018). While these advantages stem primarily from blockchain's core features, smart contracts constitute an additional source of efficiency in the form of automation of various processes that, in turn, contribute significantly to decision-making processes in companies (Treiblmaier, 2018).

2.4.2 The Mechanism for Change: Smart Contracts and Automation

Smart contracts are self-executing programs that have some predefined conditions that are programmed directly into the code and stored on the blockchain (Singh et al., 2023). As Werbach and Cornell (2017) describe, they are “agent-generated mechanisms to shift rights and obligations”. Smart contracts execute the terms only after certain, prespecified conditions are fulfilled. Once implemented on the network, they operate freely without any need for human involvement or supervision (Theodorakopoulos et al., 2024).

Similarly to every blockchain transaction, smart contracts are also validated by consensus mechanisms, which ensure that the contract is added to the network in a proper way and that it is accepted by the network participants (Zhang et al., 2024).

Key function of smart contracts is their ability to automate the execution of certain actions upon fulfillment of specified conditions. These conditions may be based on various triggers, such as receiving payment or information that a product was delivered or simply after a certain time (Buterin, 2014).

Since everything is coded before the contract is deployed and there is no need for human oversight when and whether the contract will be executed, smart contracts are regarded as trustless. The parties do not even need to trust each other or rely on any intermediaries in order for the contract to be fulfilled. They only need to agree on specific terms and conditions, and the rest will be done automatically. The trust factor is contained in the code itself and in the blockchain architecture (Oriekhoe et al., 2024; Singh et al., 2023; Zhang et al., 2024).

Once the conditions for the contract have been specified and the contract has been deployed on the network, it also becomes immutable, so neither of the parties can change the conditions or the contract. The fact that the smart contract’s code is transparent and can be audited by every network participant adds to the transparency and increased trust among members, as well as decreases the risk of fraudulent activities (Buterin, 2014; Baliga, 2017; Murray et al., 2021).

Smart contracts are the foundation for DApps that allow them for operation according to predefined logic. Nevertheless, implementation of smart contracts has its limitations, especially in terms of technical requirements. The abundance of various blockchain solutions creates the need for interoperability and efficient data validation, especially when it is spread across different parties in different formats (Petrusenko, 2022).

Additionally, the immutability feature of the contracts could also be its disadvantage, as it significantly prevents the possibility to correct mistakes after deployment. Any errors or inaccuracies during the design phase, or any kind of event that has not been foreseen during the planning and therefore not considered in the contract, may trigger the contract execution in an unwanted situation (Balcıoğlu et al., 2024). Similarly, for any security holes in the code, there is a threat of third parties taking advantage of it, which in case of supply chain management data might cause significant financial and reputational losses (Petrusenko, 2022; Balcıoğlu et al., 2024).

Considering how advanced these programs are, and how difficult coding might be, there is also a human factor that needs to be taken into consideration. Programming smart contracts requires skilled personnel with specific experience (Balcıoğlu et al., 2024), which might be problematic due to the supply of such skilled workers on the market. Additionally, regulatory uncertainty and lack of standardized laws with regard to smart contracts might also constitute a barrier that is worth noting, especially when operating across various countries and jurisdictions.

Regardless of potential interoperability issues or considerations for businesses to introduce blockchain and smart contracts, the fact that it is possible to automate various decisions along the value chain and do so with no intermediaries, places smart contracts as a perfect tool to boost efficiency and facilitate decision-making processes.

In supply chain management automation can be introduced based on certain conditions specified by a specific party at each stage of the process. For instance, payments can be automated upon the delivery of goods. With smart contracts it is no longer a person that has to physically verify that a good reached its destination and then notify another person to release the payment (Jovanovic et al., 2022). Smart contracts can easily be programmed in such a way that the process becomes fully automated (Petrusenko, 2022; Balcıoğlu et al., 2024). They can also automatically enforce conditions of the agreements and improve administrative processes along the value chain such as document handling or verification and signing (Oriekhoe et al., 2024). Through that, smart contracts contribute to an increased operational efficiency, reduction of human errors and better relations between transacting parties (Balcıoğlu et al., 2024).

The above-mentioned features have a significant impact upon decision-making processes. By automating repetitive tasks, they eradicate the need for many manual and routine tasks, speeding up the processes and overall management (Balcıoğlu et al., 2024). Automation may also contribute to a decrease in traditional interdependencies based on relations between business parties and might eradicate the issue of informational asymmetry. The influence on effectiveness and predictability of business processes might lead to a change in how decisions are made in organizations.

2.5 Impact of Technology on Decision-Making Processes in Supply Chain Management

The advent of innovative technologies impacted the decision-making processes in a significant way. Above all, the overall development of Information and Communication Technologies (ICT) as well as the Internet, has contributed to the decentralization of information (Singh et al., 2023).

Building on ICT's digitization and decentralization of information, organizations have increasingly embraced a data-driven approach to business decisions. Technological developments allowed for better data gathering and management, which became a main driver in today's business landscape (Chen et al., 2021). Big Data and Internet of Things (IoT) allow for integration and processing of vast amounts of data, which supports decision-making and resource allocation by expanding human cognitive capabilities. Beyond gathering data, artificial intelligence and machine learning also contribute to these processes. Previously, focused more on predictive analysis, and recently on generative aspects and capabilities.

Alongside Big Data, IoT and AI, Blockchain technology also supports the trend of changing how decisions are being made in organizations (Sreckovic and Windsperger, 2023). A primary example can be observed in the functioning of the Decentralized Autonomous Organizations (DAOs), where governance rules and decision-making processes are coded in smart contracts and algorithms and executed according to their specific terms (Treiblmaier, 2018; Theodorakopoulos et al., 2024), which effectively addresses shortcomings of the Rational Decision-Making Model and constitutes an adaptation of the bounded rationality to modern standards. Such a system allows an organization to function with no central governing body. It may lead to a decrease in time of making a decision and increase trust among organization members (Roeck et al., 2019).

In terms of blockchain technology and smart contracts, Sreckovic and Windsperger

(2023) argue that it effectively impacts the distribution of decision-making authority within an organization. First, in order for an organization to adopt blockchain, a certain level of codification of value chain activities is needed (Hendrikse et al., 2015). This can be done in the form of policies, company rules or handbooks containing specific knowledge and instructions.

Sreckovic and Windsperger (2023) claim that blockchain technology will “facilitate a shift toward centralization or decentralization of rDR (residual decision rights) depending on the change of codifiability of the knowledge assets regarding the different value chain activities (operations, coordination, innovation).”

Following that, a hypothetical example of a supply chain management company that adopted blockchain is introduced. Considering blockchain technology at operation level, it can influence decision-making across two dimensions - it might lead to centralization of residual decision rights within the internal hierarchy and at the same time to decentralization of organizational design “by increasing the fraction of automated decision-making compared to manual decision-making” (Sreckovic and Windsperger, 2023).

It means that introduction of blockchain might lead to limitations of decision-making authority on mid and lower hierarchical levels, leading, in turn, to a centralization of the authority on the upper levels of the organizational hierarchy (Sreckovic and Windsperger, 2023). On the other hand, improved and more efficient codification on the coordination level might lead to more decentralization, i.e., distribution of decision-making power among the lower levels in the organizational hierarchy (Sreckovic and Windsperger, 2023).

It is worth noting that knowledge aggregation, transfer, and codification are the key aspects here, as they ultimately determine where the knowledge is concentrated within the hierarchy (Grant, 1996; Sreckovic and Windsperger, 2023). Nevertheless, this codification of activities might differ from industry to industry, and even from company to company.

The digital transformation, and especially blockchain technology, influences the centralization vs. decentralization of decision-making authority within an organization in a complex way. It can lead to a more decentralized structure through automation of easily codifiable tasks, where frontline workers could act upon information verified by the system (Sreckovic and Windsperger, 2023). Then, decentralization happens in terms of the operational/administrative tasks. However, at the same time, such a development may lead to more centralization of decision-making authority on the upper levels of the hierarchy.

Moreover, the inherent features of blockchain, such as transparency and/or immutability, might decrease the need for trust in the frontline worker, and allow for new, more decentralized organizational models (Theodorakopoulos et al., 2024).

Overall, the integration of blockchain technology with data analysis and artificial intelligence could additionally enhance the potential for conscious and effective decision-making by processing data in real-time.

Considering that with addition to potential benefits introduction of technology might offer, the nowadays' organizations must conduct a thorough analysis of their current states in terms of architecture, infrastructure, business models and processes, before introducing significant changes in their operational models (Dutta et al., 2020).

Nevertheless, the use of technology in business should also be approached mindfully, as technology might pose significant challenges and risks if implemented recklessly. The generative AI's output or insights from the data analysis can be only as good as the data itself. Poor data quality might lead to biased algorithms, lack of understanding of the actual position of the company and dilemmas during decision-making processes. No matter what the technology is, the understanding of the processes behind it is crucial for the company to fully benefit from digital transformations.

2.6 Identification of Research Gaps

Current literature reveals growing interest in the integration of blockchain technology into business processes, especially in the supply chain management (Treiblmaier, 2018; Theodorakopoulos et al., 2024; Dutta et al., 2020). Improvement of transparency and efficiency are the most named reasons for the adoption in a variety of fields (Maroun et al., 2019; Balcıoğlu et al. 2024; Lan, 2024).

Research shows that there are benefits in the use of blockchain technology, especially for efficiency, security, and sustainability (Dutta et al., 2020; Balcıoğlu et al., 2024; Xia et al., 2023). Despite the fact that there are many potential benefits and applications of blockchain technology, the literature also presents challenges that are connected to it. Scalability, cost of implementation and even regulatory uncertainty are some of them, which shows that the implementation of the technology is still at initial stages (Dutta et al., 2020; Oriekhoe et al., 2024; Balcıoğlu et al., 2024).

In terms of decision-making processes, the inherent features of technology constitute a basis for the introduction of automation, especially when it comes to operational/administrative tasks (Xia et al., 2023; Zhang et al., 2024). Current research analyses how blockchain can facilitate decision-making processes through the implementation of smart contracts and how it might affect the centralization and decentralization of authority within the organization (Sreckovic and Windsperger, 2023).

Emphasis is put on the blockchain potential to increase the transparency of communication, which significantly alters the principal-agent relation and the need for trust between the parties. In turn, the decision-making processes in uncertain situations that require human-judgement are influenced (Treiblmaier, 2018).

Additionally, the literature examines how immutability of records and transparency of data affect the collaboration between parties in the supply chain (Treiblmaier, 2018; Xia et al., 2023). Some researchers also focus on the concepts of blockchain based decision-making systems that facilitate decision-making processes (Honegger, 2021).

Nevertheless, practical implications of the introduction of blockchain technology, especially in the context of actual implementation and its impact on distribution of authority within an organization still remain under-researched. Studies focus mostly on the implementation aspects or the potential benefits without considering the changes blockchain technology may make in the decision-making processes (Ge et al., 2023; Çodur & Erkayman, 2025).

The challenge mostly lies in the fact that the overall adoption of the technology is low and not widespread, as well as lack of adaptation of traditional decision-making and management theories to the technological developments (Vendette & Thundiyil, 2023).

This thesis aims to at least close the current research gap, shading more light on how an organization that introduced blockchain technology approached decision-making processes and managed tasks and responsibilities between upper-level management and frontline workers.

It seeks to investigate how blockchain impacts the centralization and decentralization of decision-making rights in an organization. Questions driving the main research question focus on the allocation of residual and specific decision-making rights across the organizational hierarchy. Sreckovic and Windsperger (2023) proposed that blockchain technology might lead to more centralization when more operational tasks (compared to coordination and innovation tasks) are codified on blockchain, and conversely - should fewer operational tasks be encoded, the decision-making authority would be more decentralized across organization.

3. Research Methodology

3.1 Research Design

For this study, an explorative qualitative approach has been chosen. The explorative nature of this approach is dictated by the current research gap that this study aims to address. The goal of the research is to discover and understand in detail how blockchain technology implementation impacted the decision-making processes in a global logistics company. As Yin (2017) suggests, questions such as ‘how’ and ‘why’ indicate a case study analysis to be the suitable method. Moreover, the fact that it is quite complex to measure innovation (such as the introduction of blockchain technology) and its impact, adds to the argumentation for the case study approach.

Due to the current developments in the supply chain management space there is a limited number of companies that introduced blockchain-based solutions, as well as due to constraints regarding the availability of data, this research will be based on a single case study approach. Such an approach offers a possibility of gathering unique and detailed insights. In the process of choosing the right method for the study, a qualitative study approach based on statistical data was considered. However, this method is more suitable for larger data sets (Hartley, 2004), therefore due to lack of specific data addressing the research question precluded the possibility to capture the depth and complexity of decision-making processes and were thus discarded as suitable analysis methods for this study, which is in line with the argumentation of Strauss and Corbin (1990).

Theoretical foundations for this method result from the literature regarding qualitative methods that highlight the benefits of a detailed analysis and flexibility in data gathering that, in this case, is offered through a semi-structured interview (Yin, 2017). Additionally, to address the limitations of the semi-structured interview, a document analysis will be conducted to increase the reliability of the study (Yin, 2017).

This thesis is based on a case study of A.P. Moller - Maersk (Maersk), Danish logistics company, and its implementation of blockchain-based project for supply chain management - TradeLens. The main reason for choosing Maersk as the subject of the case study is the fact that the project was implemented and run in a genuine business environment, not as proof of concept. Additionally, Maersk was the only subject that responded to an enquiry about conducting such a study, however, with limitations that will be addressed in the subsequent parts of this chapter.

3.2 Case Selection

Selecting a company that would constitute a basis for the research involved extensive research. At the beginning it was necessary to investigate which companies that introduced blockchain-based solutions exist in the supply chain/logistics industry. A few companies were identified; however, the response rate was low. The only company that agreed to an interview, although one, was Maersk, which determined the selection of this company.

Maersk is a global shipping and logistics operator. Its innovation with the introduction of the TradeLens project, a blockchain-enabled global trade platform developed together with IBM, sparked global interest not only in the businesses, but also in researchers.

An important reason for the decision to focus on Maersk was the fact that introduction of such a solution in a highly complex and crucial area might provide a glimpse into a practical application of blockchain beyond theoretical discussions. Moreover, how blockchain can influence decision-making processes and the authority dynamics in organizations is an under-researched area. Lastly, the fact that the project was discontinued despite its theoretical benefits makes the case even more intriguing, especially for businesses exploring blockchain-based initiatives in complex industries.

3.3 Data

Two main sources of data can be distinguished for this study:

- Primary data - collected through specific methods such as questionnaires, interviews, or experiments,
- Secondary data - derived from already existing sources, such as books, articles, publications, reports, and other similar records. It is worth noting that secondary data is data that was not collected with a purpose of the research (Sidyakin, 2007).

Yin (2018) also notes that it is a viable approach for conducting case study to provide higher reliability and credibility to the study. It ensures cross-examination increases the quality of the research.

3.3.1 Semi-Structured Interview

This research tries to understand in depth the decision-making dynamics in a global organization and therefore it was important to obtain the information from sources that directly worked on or designed the project. However, due to limited accessibility to potential interviewees, only one interview was conducted. The interview was done with a C-Level executive responsible for the technical implementation of the platform.

The criteria for choosing this person were based upon the technical and operational knowledge of this person and their direct decisions influencing and shaping the implemented solution.

The interview was prepared with semi-structured questions with an area for flexibility to explore topics that could come up during the interview based on the interviewee's answers. The main topics covered the transformation of decision-making processes based on how they were functioning before and after implementation of the blockchain-based platform, as well as questions regarding automation of operational decisions and questions about the shift of the decision-making authority within the organizational hierarchy.

The interview allowed quality data collection that provided a means for a deeper analysis of the solution and changes that it initiated. It also made it possible to react to the respondent's answers accordingly, which contributes to a better understanding of the processes and allows for the development of the threads particularly important for the study.

Before the interview began, care was taken to ensure that the necessary consent of the participant was obtained and to ensure the confidentiality of the data obtained. This is crucial from the point of view of the ethics and transparency of qualitative research (Yin, 2017).

3.3.2 Document Analysis

The main source of secondary data was primarily the Internet as access to the company's internal documentation was unavailable due to the company's policies. Selected sources entail information provided on the official company's website, the project website, project briefs, industry portals and scientific journals have been important for this thesis, however, these sources did not provide exact answers and information to the posed research question and served more as means to verify and confirm information.

The criteria for choosing the documents available publicly encompassed authenticity, timeliness, and the relation to blockchain technology or decision-making processes, which allows for a clearer picture and border understanding of the implemented solution. The document analysis is supplementary to the semi-structured interview constituting an element of data triangulation (Patton, 1999).

The information obtained from the public sources will be approached in a thematic way allowing for identification of key insights and patterns that appear in the documents for later comparison of these with data obtained during the interview (Bowen, 2009; Yin, 2017).

3.4 Data Analysis

The thematic analysis was used as the main method of examining the qualitative data. The analysis began with processing the transcription of the semi-structured interview and its detailed evaluation. Initial coding allowed for identification of key moments of the interview concerning the impact of blockchain technology on decision-making processes. The approach to coding was mixed - partially deductive, based on the currently existing literature and research gaps, and partially inductive, allowing for the emergence of new topics and aspects. In the next stage, the themes were grouped and examined in the context of the research question. Data obtained from the secondary sources was used to triangulate the results, allowing for better understanding of how the project operated and completion of the interview data regarding discontinuation factors. The last stage of the analysis encompassed the interpretation of the results with regard to the existing literature on blockchain, decision-making processes in supply chain management companies, as well as the changes in authority dynamics in the organizational hierarchy.

3.5 Limitations

Despite its benefits, the qualitative methodology, as well as this study have their limitations that need to be considered. The analysis is based on a single interview with a C-Level executive, which poses the risk of a one-sided perspective that might lead to bias. The interview was initially scheduled for 60 minutes, however, on the day of the interview it was shortened to only 35 minutes. It delivered detailed information; however, the time was insufficient to extensively analyze the complexities and impact of blockchain technology. Additionally, the respondent's answers were not always related directly to the questions asked, which might have influenced the completeness of the data gathered.

Despite obtaining the consent to record the interview and mention the company by name, due to time constraints, it was impossible to gather more detailed data on the reasons for discontinuation of the project and decision-making processes. It was argued that it was not the primary objective of the company and was not considered thoroughly at the design stage.

Another limitation that is worth considering was the lack of access to internal documents concerning the project, as these could supplement the interview with additional data and allow for better triangulation.

One should also note the fact that TradeLens was discontinued in the first quarter of 2023, whereas the interview was conducted two years later. That might also influence the accuracy of respondent's answers and retrospective interpretation.

The above-mentioned limitations impact the generalizability of the study; however, they do not diminish the value of this case study as it provides insights in the context of implementation of the blockchain-based platform and its impact on decision-making processes.

4. TradeLens - Case Study

4.1 Organizational Context and Background

Maersk was established in 1904 in Denmark as a small, family-owned company. With time, it evolved into a global leader in the logistics industry and currently is active in 130 countries and employs over 100 000 people (Maersk - Our History, 2012). At the time of the initiation of the TradeLens project, the company was “the biggest ocean carrier in the world” (Jovanovic et al., 2022).

Maersk’s supply chain is characterised by a complex, multi-layer network of participants that include terminal/port authorities, suppliers, distributors, retailers and many stakeholders with diverse interests and responsibilities (Chang et al., 2022). Such a setup creates complicated processes resulting in a single shipping container requiring around one hundred different documents and endless communications between parties (Maersk - Manual Control Halts Global Supply Chains, 2022).

Before the TradeLens project, Maersk’s supply chain operations depended mostly on various legacy systems, with some documents still paper based. Such a setup created informational silos between participants, caused inefficiencies and delays, and could lead to fraudulent activities. Additionally, such a system was inefficient with regard to decision-making processes, as each stakeholder could have different policies and frameworks implemented impeding the whole shipping process.

Having acknowledged these inefficiencies and industry challenges, Maersk partnered with IBM to develop an industry-wide platform that would revolutionize the global shipping supply chains.

4.2 Supply Chain Processes in Maersk

As mentioned above, extensive documentation and inefficient processes are omnipresent in the logistics industry. Figure 1 presents a simplified flow of the supply chain logistics process in Maersk in order to better understand and illustrate the complexities of the process. The illustration below does not include parties such as banks or authorities that are also a vital part of the whole flow.

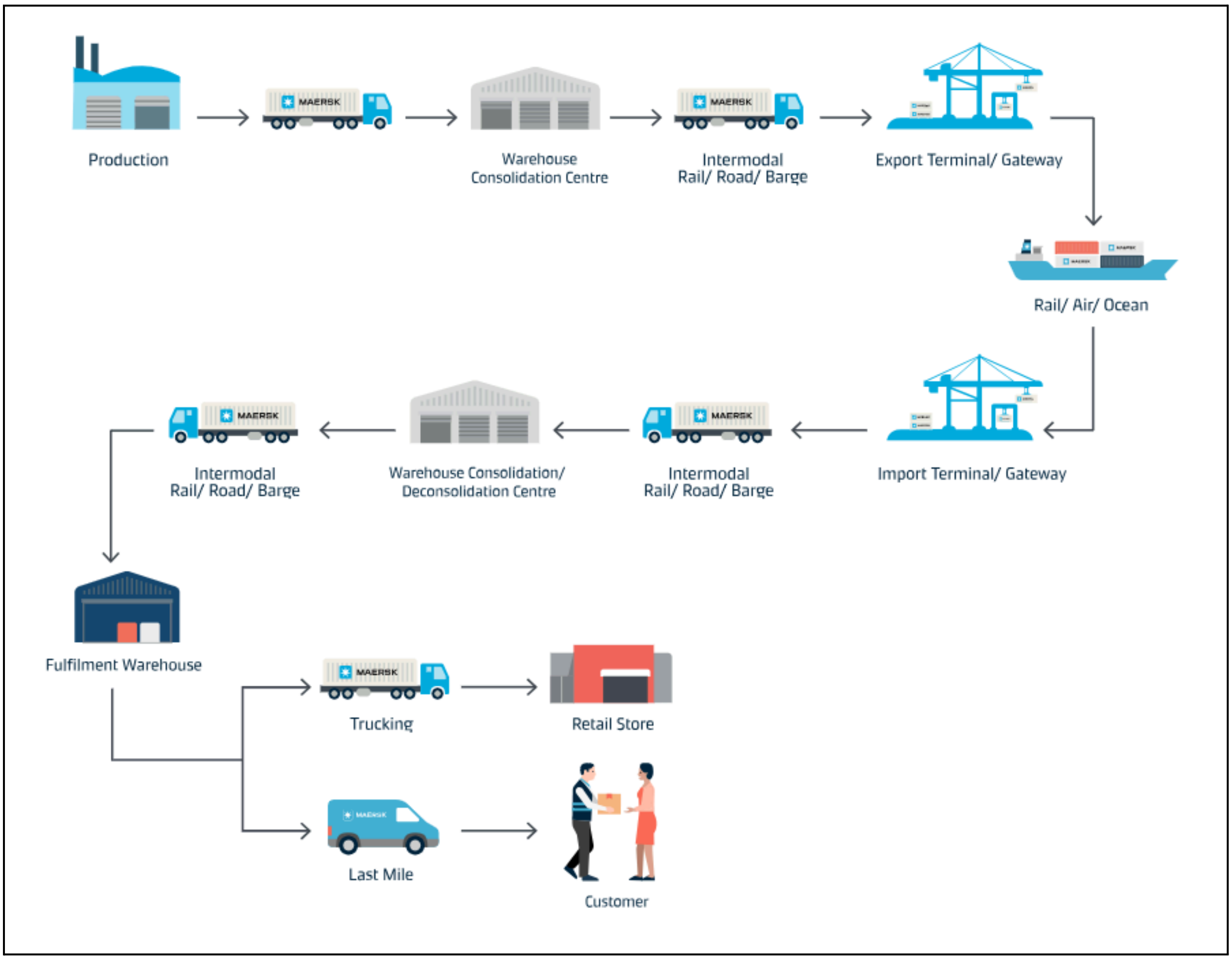

Figure 1. (Maersk Warehousing Services, 2021)

Even before the production process, there is a planning and forecasting step that helps manufacturers and companies such as Maersk determine the demand and plan logistic actions accordingly. In the meantime, the raw goods are sourced from local suppliers. In the next phase, the goods are produced and prepared to be shipped. Then, the logistics and transportation part begins, where logistic operators plan the shipping routes and choose the most suitable forms of transportation. For companies such as Maersk this is the most complicated step as it requires collaboration and communication of around up to thirty different parties, all with different interests, motivations, and processes (Maersk - Manual Control Halts Global Supply Chains, 2022). In addition to that, even though some of the stakeholders might not be collaborating directly, such as banks or authorities, they can influence each other and the whole logistics flow, therefore it is crucial to take into consideration a variety of aspects, for instance legal ones, at the early stages of the planning phase. Once the goods are delivered to the destination terminal/port, they are handled accordingly to their destination point with some goods being forwarded to other destinations, and some simply distributed by the in-land logistics companies (Maersk Warehousing Services, 2021).

Considering such a complex flow, one can see that it entails many different decisions to be taken at each step of the process, from simple confirmation of the arrival of the goods to realizing payments and handling unexpected situations with different stakeholders. Usually, these decisions follow rigid company's policies and frameworks. These are often designed centrally at the C-Level by managers with frontline workers executing and acting upon them.

4.3 TradeLens - The Blockchain Platform

In order to address the inefficiencies plaguing the logistics industry, such as outdated processes, paper-based documentation, and fraudulent activities (Balci, 2021; Hastig and Sodhi, 2020; Yang, 2019), Maersk and IBM developed the TradeLens project designed to revolutionize the shipping industry.

Figure 2 presents what the traditional coordination between multiple parties such as terminal operators, ocean carriers, authorities, shippers, freight forwarders, banks and others in the logistics industry look like (IBM, 2018).

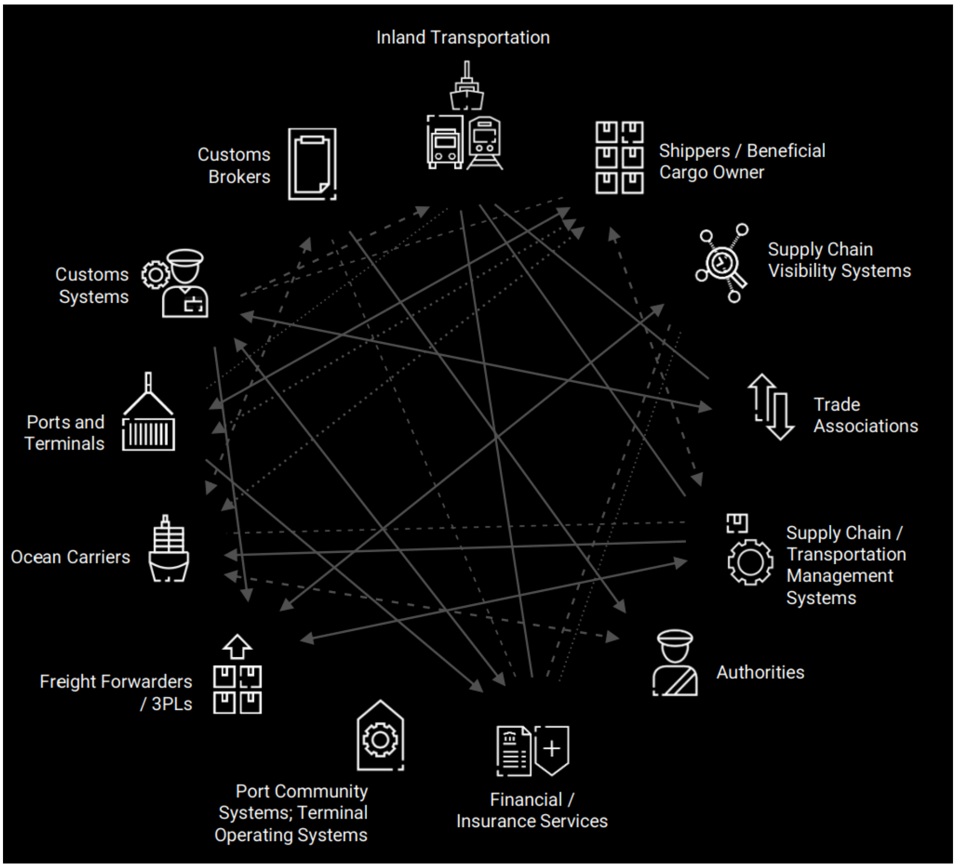

*Figure 2. (*The World Economic Forum, 2019*)*

TradeLens was a blockchain-based technology platform to digitize the supply chain processes. It had four main objectives: connecting the ecosystem, fostering collaboration and trust between stakeholders, driving information sharing and spurring innovation in the industry. These were to be tackled by a secure platform for document and data sharing with automation of manual processes that would be available to all the stakeholders of the logistics process (GTD Solution and IBM, n.d.). The vision was to create an industry-wide platform that would support business partners and lower the costs through higher transparency, trust, and collaboration, as presented in figure 3.

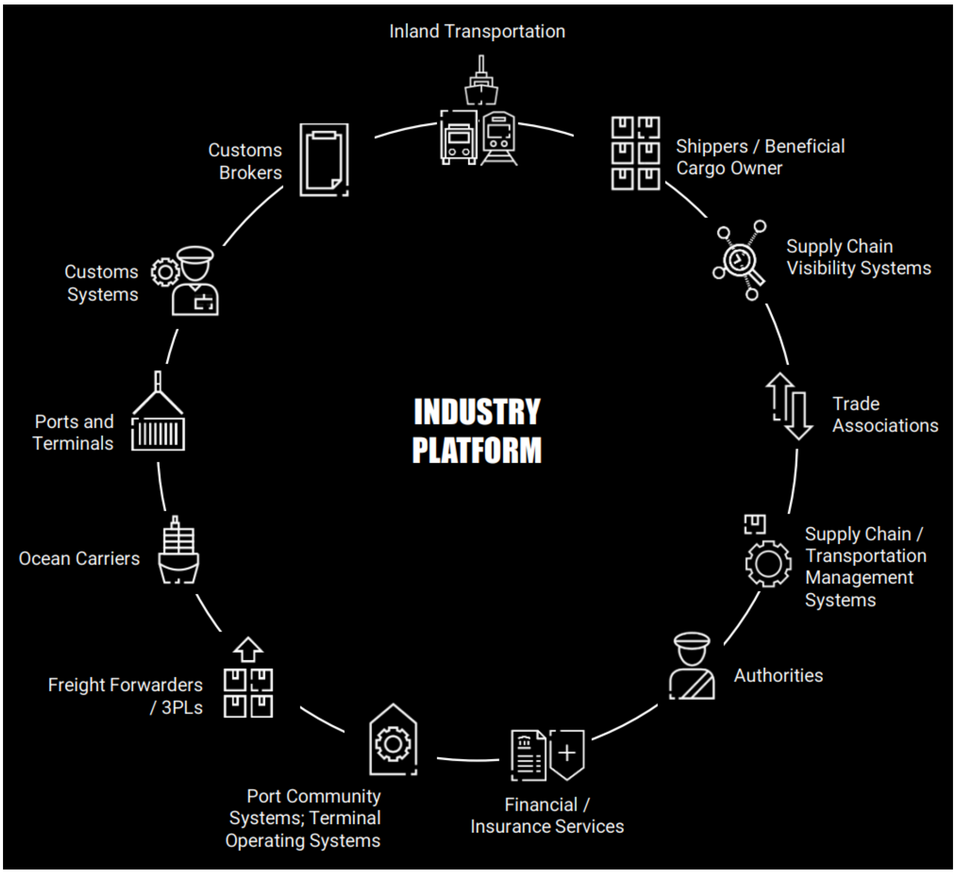

Fig. 3. (The World Economic Forum, 2019)

TradeLens was built on an IBM Blockchain Platform underpinned by Hyperledger Fabric, a permissioned blockchain where network members were known to the network (GTD Solution and IBM, n.d.). Such architecture enabled vital features: tamper-proof records, verifiability of the data, real-time tracking, auditability, and privacy controls, among others. The use of DLT technology on such a scale in the shipping industry was unprecedented and constituted a fundamental change in the approach to transparency and handling data compared to traditional processes in supply chains.

The platform was introduced gradually, with IBM and Maersk realizing in the early days the need for mass adoption. Therefore, they decided on a collaborative approach, inviting other stakeholders to drive the development of the platform.

TradeLens provided a secure method of documentation handling and sharing between the parties with guaranteed immutability and control over the changes in the documents. Each time changes were introduced; an updated version of a document was created eliminating multiple copies and inconsistencies between them.

Additionally, digitization of documents allowed also for automation of various workflows eliminating costly, repetitive, and prone to human errors activities. At the same time, such automation also had an impact on decision-making as few steps and manual actions were needed for the same activity compared to when paper-based documents were used. Figure 4 presents the basic automation workflow.

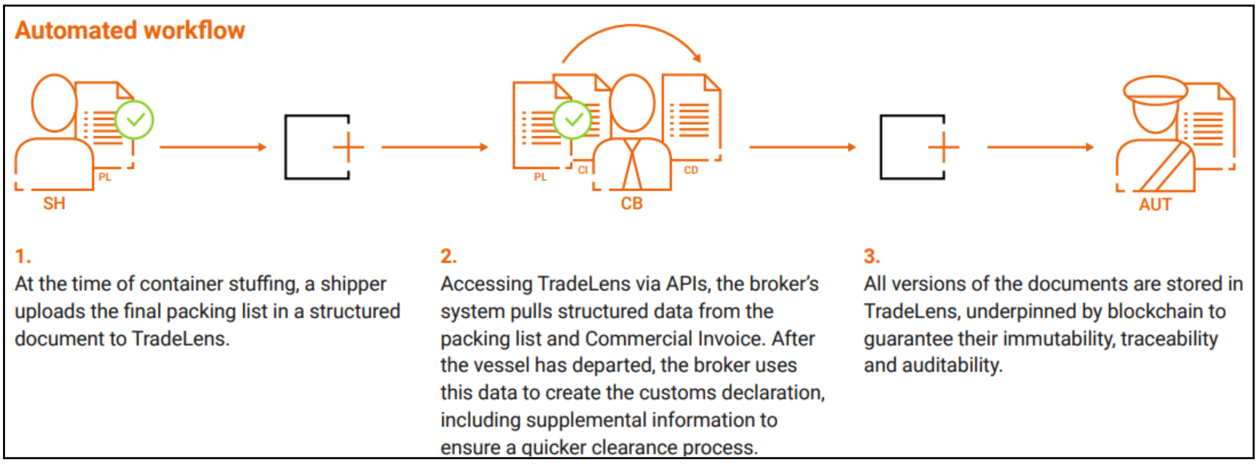

Figure 4. (GTD Solution and IBM, n.d.)

The introduction of a common platform for all participants also meant addressing the problem of inconsistent data across stakeholders. Since each party is responsible for different stages of the shipping process and each one might use different software and data collection methods, at times trying to extract vital data to ensure the security of the process or simply communicating with other partners could have been difficult due to informational silos existing with each partner. TradeLens as a platform also provided a way to adopt higher standards with regard to data and better interoperability of platforms active in the industry.

On top of that, TradeLens also built a marketplace on top of the platform for better interaction between industry participants. Platform clients could publish fit-for-purpose services fostering innovation and value creation in the supply chain industry.

4.4 Project Outcomes and Discontinuation Factors

TradeLens turned out to be a success from a technological perspective as a platform that demonstrated the power of blockchain technology in supply chain management. It offered better transparency, standardized and digitized data and the possibility to automate mundane and repetitive tasks via smart contracts.

At the peak of its operation the project gathered over three hundred members, including other major carriers such as MSC and CMA CGM, Maersk's competitors. The platform was processing ten million events and over 100 000 documents on a weekly basis demonstrating its capabilities. In addition to that, participants reported measurable benefits such as improved cargo planning, reduced processing times and faster resolution of disputes over cargo ownership (Why Maersk and IBM's

Blockchain Platform TradeLens Is Closing Down, 2023; Blockchain in the Maritime Industry: TradeLens Case Analysis | Kaiko Systems, n.d.).

Nevertheless, despite its technological advancements and initial industry enthusiasm, the platform faced significant challenges in the industry that led to the announcement of its discontinuation in Q4 of 2022 and shutting down the platform in Q1 2023.

The fundamental part of TradeLens was its business network so all the supply chain industry stakeholders and entities. For the platform to function, it was vital to bring all the parties on board, as the lack of adoption by some players in the process would reduce the benefits for all others due to interconnectedness and complexity of processes between parties.

Unfortunately, the platform failed to achieve critical mass facing resistance and skepticism from freight forwarders and shippers that did not see any added value to their business or viewed the platform as a threat to their core business. In addition to that, other industry players perceived TradeLens as Maersk-dominated, questioning the neutrality of the platform and the security of sharing data (Why Maersk and IBM's Blockchain Platform TradeLens Is Closing Down, 2023). Additional factors that contributed to the discontinuation of the project encompassed high operating costs and fragmented data standards across industry players effectively slowing down the adoption process and increasing the technical difficulties of implementation.

5. Analysis and Findings

This chapter aims to present and analyse empirical findings concerning the Maersk case study with relation to the proposed research question as well as the suggested theoretical propositions. Based on the semi-structured interview and document analysis, this section demonstrates what the assumptions, objectives and outcomes of the project in terms of decision-making processes were.

5.1 Pre-Implementation Decision-Making Context

As mentioned in the previous chapters, making decisions along the supply chain is a complex activity with multiple variables and stakeholders to consider. Prior to the implementation of the platform, decisions were made “on bilateral [or trilateral or more] agreements with all the parties” with human oversight to coordinate and orchestrate these processes. These included not only tasks on the operational level, but also in the coordination and innovation area.

In Maersk the general structure of decision-making authority relied on policies designed primarily by the upper management - at the director level or above, involving only a small percentage of top management. These policies “delegated decision authority within a policy framework,” allowing frontline workers to make decisions on their own only in the scope specified in the policy.

Exceptions and cases outside of policy frameworks were also accounted for. In such events, Maersk had designed decision matrices depending on the materiality of the impact. During the interview it was described “usually as a financial impact of the decision.” Should the decision fall out of the designed framework, it required escalation and approval by a manager or other person with the appropriate authority.

One can conclude that before TradeLens introduction, decision-making processes in the supply chain were dispersed among many people and often coordinated manually. The organization operated within codified rules determining how, by whom and in which cases decisions should be taken. These policies and frameworks were typically “designed and approved by this 1% of people in the company,” which indicated the centralization of residual decision-making rights on the higher management levels within the organization.

5.2 Intended Impact and Objectives of TradeLens

In order to fully grasp the innovation behind TradeLens, it is vital to depict what the impact and results the project was supposed to deliver. According to project briefs and press releases TradeLens’ primary objective was to promote collaboration, efficiency and security in global trade, which held the promise of significant changes to current processes (The World Economic Forum, 2019; Why Maersk and IBM’s Blockchain Platform TradeLens Is Closing Down, 2023; Blockchain in the Maritime Industry: TradeLens Case Analysis | Kaiko Systems, n.d.; Maersk and IBM Introduce TradeLens Blockchain Solution, n.d.). The platform was supposed to accelerate the digitalization of the global logistics industry by establishing a shared digital platform based on blockchain technology.

According to the interview, the main hypothesis behind the blockchain technology was that it allowed for more automation and streamlined various processes along the value chain activities by utilizing smart contacts. Besides automation, the platform was also supposed to introduce common data standards and “help with the reusability of data between different parties,” which was addressing the longstanding issues in the logistics industry.

The intended smart contract use-cases within the project focused on automation of operational and transactional processes, such as managing escrow accounts and claims against insurance companies and enforcement of booking orders. Despite the fact that during the interview the stakeholder mentioned also the potential to automate execution of commercial orders and agreements, the project primarily focused on repetitive tasks and operational aspects of the value chain, which are characterized by a high degree of codifiability and are based on clearly defined rules. Besides smart contracts, TradeLens was also supposed to support automatization of workflows, such as, for instance, purchase order (PO) planning and managing PO visibility. The objective here was to standardize data, which could have had an impact on the operational processes, especially for customers using services of multiple carriers along one route.

Summing up, TradeLens was designed in order to simplify the processes present in global trade that up to date are manual and inefficient. By introducing a common platform, Maersk hoped to increase efficiency and transparency among participants of the supply chain. The potential impact on decision-making processes was expected to come from the unification and standardization of data, as well as the ability of smart contracts to automate repetitive processes, which ultimately led to streamlined decision-making processes in the operational area.

5.3 Implementation Reality - Level of Codification and Ecosystem Adoption

This section focuses on the actual extent to which blockchain features, such as codification, automation and execution of smart contracts, were implemented across the global trade ecosystem. Since the data from secondary sources did not provide significant insights about these areas, the interview data is the primary source of information about these aspects.

The interview revealed that the company already had all the policies and processes designed and codified, even before the implementation of blockchain technology. This is a significant piece of information as codified rules constitute a basis for adoption and later implementation of smart contracts.

Nevertheless, despite the initial hypotheses, mapped processes, codified rules and general assumptions of application of the blockchain technology, the project stakeholder admitted that the project "did not have smart contracts implemented at scale" when the project closed. It means that there were experiments and proof-of-concepts with regard to implementation of smart contracts, however, in the end they did not constitute an extensive part of the project and were looked at more as an experiment and additional function.

This lack of their implementation at scale was caused by the lack of full adoption among supply chain participants. As mentioned before, in order for the project to work, it required all parties to be on board, which ultimately was not achieved. It indicates that the technical and operational readiness does not translate into maturity of the ecosystem as a whole. Difficulties in adopting the critical mass were due to the complexity of processes and coordination among multiple partners with varying levels of digital and operational maturity, also in terms of codifiability. Additional obstacle was the lack of engagement from key process participants, such as financial institutions, which "were not on the platform at that time."

As mentioned before, despite lack of widespread implementation, some aspects of automatization were introduced, especially in the areas of order management and visibility. An electronic bill of lading with a component to track the visibility of the shipment might serve as an example here. However, these improvements concerned data standardization much more than the codification of decision-making processes in the ecosystem.

Regrettably, the reality of implementation of TradeLens was quite different from its initial assumptions and far from realization of its full potential. The main limitations stemmed not from the technology itself, but rather from lack of wider adoption and engagement of all the necessary parties in the value chain activities. This had direct implications on the influence of the platform on any decision-making processes along the logistics process.

5.4 Observed Influence on Decision-Making Authority Distribution

The following section directly addresses the question of if and how decision-making authority changed in the TradeLens project. Based on the interview with the project's stakeholder, the decision-making processes "did not change significantly" and did not influence the distribution of authority to a great extent within the logistics ecosystem.

The most compelling argument stems from the direct quote that "It cannot change it. It did not change it because you need to drive significant adoption in order to do that." This part suggests that lack of critical mass adoption was the main reason why there was no significant impact on the decision-making processes and authority distribution. Lack of all parties on board made it impossible to implement the system in full and observe how decision-making changed over time.

Moreover, even in terms of implementation of smart contracts and automation of operational processes, the stakeholder explained that smart contracts were programmed in a way to "not be allowed to take a discretionary decision." They were programmed and executed in terms of decisions that were previously determined by existing and codified policies and practices, alike specific decision-making rights. The authority still remained within human decision-makers on the highest level of the organizational hierarchy.

The interviewee also admitted that blockchain “might not necessarily change how the decisions are being made, but maybe only facilitate that or maybe make the whole process faster and more efficient.” In other words, the main impact blockchain might have on the decision-making processes and distribution of authority might be in terms of speed and efficiency rather than shift in authority distribution.

Automation was mentioned as an area where decision-making authority could be more decentralized across organizational hierarchy and allow for more discretion and quicker decisions among frontline employees. Once a previously manual decision has been automated, frontline workers would not have to spend time on checking in person and entering the data, but rather would be supervising whether a smart contract was executed properly. This would grant him additional authority leading to more decentralization of decision-making authority. However, this would be dependent on the company and its readiness to accept higher risk, both financial and operational.

Lastly, exceptions to the standard policies and rules remained in force. The interviewee explained that in such cases the frontline workers and even lower-level managers will “cover themselves and they will go to their manager” indicating that blockchain might not have influenced previously set rules and chain of command in terms of decision-making authority.

5.5 Synthesis of the Findings in Relation to Research Question/Discussion

The following chapter aims to examine the research question guiding this thesis: *How did the implementation of blockchain technology influence the distribution of decision-making authority in an international logistics corporation?* Having the basis built up on the TradeLens project analysis, this section will synthesise the findings in order to address the research question.

The thesis was guided by two proposals. Firstly, that blockchain technology might lead to higher degree of centralization of decision-making authority when a higher degree of operational tasks can be codified on blockchain; and conversely, when there is a lower degree of operational tasks codified on blockchain, the distribution of authority of decision-making rights will be more decentralized within the organizational hierarchy.

Before the implementation of the TradeLens project, the supply chain activities landscape was characterized by established, yet very complex processes. The workflows were slow and prone to errors. The companies usually worked on the basis of mutual agreements that determined the flow of goods and information between the parties. The decision-making authority, especially in large logistics corporations, were determined within policies set up at the very top of the organizational hierarchy with lower-level managers and frontline workers acting within the power given by policy, for instance, checking and confirming the arrival of a shipment. However, exceptions and cases falling out of the policies still required the approvals of higher-level managers, which indicated a hierarchical approach.

TradeLens was introduced in order to digitize global trade with the use of blockchain technology. Its primary goal was not to revolutionize decision-making processes, but the concept of smart-contracts and automation of routine tasks meant that a byproduct of these innovations was the change in distribution of authority within organizational hierarchy.

Due to the fact that the project was shut down before the full implementation of smart contract features creates significant limitations in the assessment of the exact impact of the technology on decision-making authority shifts. One can assume that in a case of full adoption of blockchain technology with its capabilities and with all the necessary parties on board, it *could* have a significant impact on authority distribution within the hierarchy, especially with a high degree of codification of operational tasks. Instead of radical transformation, the impact of the technology was mostly shaped by already existing policies and operated within them.

One of the main technological features of blockchain technology is its automation and programmability of smart contracts. The interview revealed that the potential for automation and streamlining of operational tasks was there. One must not forget that everything was programmed upon already agreed rules. These were set up at the highest hierarchical levels, which centralizes the authority. Therefore, blockchain in this context is used more as a tool or a vehicle to execute central policy rather than a tool for decentralization and/or distribution of authority across various organizational levels. Although automation might add up to the efficiency of frontline workers or less supervision when the whole process is algorithmically verified, it does not introduce changes within the policies and rules. Frontline workers still execute tasks according to policies and not according to their inherent knowledge.

Geneally, TradeLens as a tool to streamline operations in the supply chain was successful. It digitized documents and eradicated manual processes alongside increased transparency and traceability allowing the clients to track the flow of goods and information. This indicates a certain level of delegation of control and access to this previously difficult to obtain information over to the client. Nevertheless, it did not indicate any fundamental shifts within the internal hierarchies in terms of decisions requiring more knowledge and experience that still remained to be made by the specified higher-level managers/executives. The platform served more as a tool to improve the process rather than to redistribute decision-making rights across organizations.

Additionally, the ability of an organization to deal with exceptions and unexpected cases is a key component that shows how decisions are being made. The interview data suggests that TradeLens did not influence the company's approach to solving exceptional issues. Decisions and cases were escalated up the hierarchical tree according to their impact with the most important ones reaching the executive levels. This ensures that exceptions to the policy were managed by people with respective authority and responsibilities, and blockchain was not prepared nor introduced in order to change them.

Nonetheless, the analysis of TradeLens case allows for an initial assessment of the research propositions. The first one, stating that blockchain might lead to more centralization of residual decision-making rights when more operational tasks (in comparison to coordination tasks) are codified on blockchain, can partially be proven. The codified rules pertaining to operational tasks are indeed prepared by the higher-level managers. If these are later codified on blockchain, their execution is more rigid and monitored, but also automated. This leads to lower-level managers and frontline workers having less or streamlined operational tasks with authority being shifted towards the policy makers within the company.

At the same time, for the second proposal there is less direct evidence. When less operational tasks are codified and programmed into blockchain (compared to coordination tasks), the more decentralized the residual decision-making rights are across the company. However, the interview suggests that even then frontline workers were acting according to the policies and responsibilities specified there. It might have been also due to the fact that TradeLens did not adopt and launch fully smart contracts, and therefore effects could not have been observed.

Summing up, TradeLens case shows that blockchain's role in the distribution of decision-making rights within the organization might not be the only force shaping this. Policies and internal rules seem to be a vital determinant of how authority is distributed across companies. In TradeLens blockchain acted as a tool for efficiency and speed rather than a catalyst for redistribution of decision-making rights. The mass adoption that could cause significant shifts in the allocation of decision-making rights was not achieved, leaving hierarchies and policies intact.

Addressing the research question directly, the TradeLens blockchain based platform did not significantly influence the distribution of decision-making rights. The authority over establishing policies, dealing with exceptions and defining collaboration rules largely remained centralized in the organizational hierarchy. Despite blockchain offering significant improvements in terms of efficiency of operations and coordination, it did not change who held the authority to make key decisions.

At this point one must also acknowledge the limitations of this study. The early termination of the project made it impossible to observe changes in the long-term and lack of full-scale adoption of smart contracts to assess the extent of possibilities of programmability of different tasks, both operational and coordination tasks.

Nevertheless, the results of this single case study, especially considering the limitations of the study, method and the platform itself, indicate the transformative potential of the technology. More cases of adoption of blockchain technology are needed in order to further examine the topic in terms of distribution of authority. Research focused on companies successfully utilizing blockchain technology in their operations might shed additional light onto the complex interaction between technology and dynamics of the redistribution of decision-making rights within companies.

6. Conclusion

The aim of the thesis was to shed more light on how new technologies can change how decisions are being made in organizations. The main objective was to investigate the phenomenon of impact of blockchain on distribution of authority within an organization based on Maersk's TradeLens project. To investigate this, the study was approached from an exploratory perspective of a single case study. The foundation was built on a semi-structured interview with a project's key stakeholder and complemented by press releases and publications.This question was approached from the perspective of shifts in distribution of residual and specific decision-making rights in organizations.

The main findings indicate that the influence of technology on authority distribution and decision-making processes was limited by organizational and ecosystem-related factors. The theoretical potential of the technology was not fully realized. This is due to several reasons, which include lack of adoption of smart contracts at full scale, as well as the overall lack of critical mass adoption among industry participants. These obstacles effectively precluded the possibility to observe how blockchain would influence authority distribution in the long term.

The direct answer to the research question of '*How did the implementation of blockchain technology influence the distribution of decision-making authority in an international logistics corporation?'* is that it did not significantly influence the authority distribution and how decisions are made across organizations.

The authority to set policies and handle exceptions remained centralized within the responsibilities of the top management. Blockchain was used primarily for efficiency, transparency and automation, however, its operation was still within company policies and structures, which are the organizational answer to bounded rationality (Simon, 1947). The platform did not become an autonomous decision-making tool, but rather a means to execute existing policies determined according to the Property Rights Theory (Hart and Moore, 1990; Sreckovic and Windspeger, 2023).

The thesis contributes to the current literature and research on blockchain technology in terms of decision-making as it is still scarce. There are not many companies and projects existing that allow researchers for a deeper investigation of the phenomenon. This can be caused by the fact that blockchain technology is still underestimated and/or companies do not see the transformative potential.

Nonetheless, the study also has its limitations. First of all, it is based on a single case study, which limits the possibility to generalize its findings. Moreover, the fact that the TradeLens platform was discontinued before it reached its maturity also indicates that potential long-term impact of smart-contracts could not have been observed. Lastly, the source of the information was a single semi-structured interview, which complements the document analysis, but also constitutes a subjective perspective.

The conclusions and limitations of the thesis also constitute a basis for future research directions. The thesis presents insights that are at least partially aligned with propositions suggested by Sreckovic and Windspeger (2023). Further research could focus on investigating further these aspects across different industries or by analyzing and comparing multiple cases, should there be more companies utilizing blockchain technology for their operations and coordination tasks in the future. Additionally, one could also focus on smart contract analysis, as they seem to be the main driver behind the potential shifts in authority distribution within companies.

References

Adams, R., Parry, G., Godsiff, P., & Ward, P. (2017). The future of money and further applications of the blockchain. *Strategic Change*, *26*(5), 417–422. https://doi.org/10.1002/jsc.2141

Baker, G. P., Gibbons, R., & Murphy, K. J. (2008). Strategic alliances: Bridges between "islands of conscious power." *Journal of the Japanese and International Economies*, *22*(2), 146–163. https://doi.org/10.1016/j.jjie.2008.03.001

Balcıoğlu, Y. S., Çelik, A. A., & Altındağ, E. (2024). Integrating blockchain technology in supply chain management: A bibliometric analysis of theme extraction via text mining. *Sustainability*, *16*(22), 10032. https://doi.org/10.3390/su162210032

Baliga, A. (2017). *Understanding blockchain consensus models*. Persistent Systems.

Bartsch, D., & Winkler, H. (2020). Blockchain technology in Germany: An excerpt of real use cases in logistics industry. In H. Winkler, J. W. Böse, W. Kersten, & C. Ringle (Eds.), *Data science and innovation in supply chain management: How data transforms the value chain. Proceedings of the Hamburg International Conference of Logistics (HICL)* (Vol. 29, pp. 699–735). https://ideas.repec.org/h/zbw/hiclch/228937.html

Bitcoin in the maritime industry: TradeLens case analysis. (n.d.). Kaiko Systems. Retrieved June 17, 2025, from https://www.kaikosystems.com/blog/blockchain-in-the-maritime-industry-tradelens-case-analysis

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27–40. https://doi.org/10.3316/qrj0902027

Buterin, V. (2014). *A next-generation smart contract & decentralized application platform*. Ethereum Foundation. https://ethereum.org/en/whitepaper/

Cassell, C., & Symon, G. (2004). *Essential guide to qualitative methods in organizational research*. SAGE.

Catalini, C., & Gans, J. S. (2020). Some simple economics of the blockchain. *Communications of the ACM*, *63*(7), 80–90. https://doi.org/10.1145/3359552

Centobelli, P., Cerchione, R., Del Vecchio, P., Oropallo, E., & Secundo, G. (2021). Blockchain technology for bridging trust, traceability and transparency in circular supply chain. *Information & Management*, *59*(7), 103508. https://doi.org/10.1016/j.im.2021.103508

Chang, A., El-Rayes, N., & Shi, J. (2022). Blockchain technology for supply chain management: A comprehensive review. *FinTech*, *1*(2), 191–205. https://doi.org/10.3390/fintech1020015

Chen, D. Q., Preston, D. S., & Swink, M. (2021). How big data analytics affects supply chain decision-making: An empirical analysis. *Journal of the Association for Information Systems*, *22*(5), 1224–1244. https://doi.org/10.17705/1jais.00713

Çodur, S., & Erkayman, B. (2025). Blockchain technology from the supply chain perspective: A systematic literature review. *Spectrum of Decision Making and Applications*, *2*(1), 268–285. https://doi.org/10.31181/sdmap21202520

Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative Science Quarterly*, *17*(1), 1. https://doi.org/10.2307/2392088

Dutta, P., Choi, T., Somani, S., & Butala, R. (2020). Blockchain technology in supply chain operations: Applications, challenges and research opportunities. *Transportation Research Part E Logistics and Transportation Review*, *142*, 102067. https://doi.org/10.1016/j.tre.2020.102067

Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. *Strategic Management Journal*, *13*(S2), 17–37. https://doi.org/10.1002/smj.4250130904

Explore our history. (n.d.). Maersk. Retrieved June 17, 2025, from https://www.maersk.com/about/our-history/explore-our-history

Ge, X., Ma, S., Wang, G., Teng, Y., Qian, Q., & Jiang, H. (2023). Research on decision analysis with CVaR for supply chain finance based on partial credit guarantee and blockchain technology. *Managerial and Decision Economics*, *45*(3), 1395–1413. https://doi.org/10.1002/mde.4061

Ghosh, S., Mandal, M. C., & Ray, A. (2021). Green supply chain management framework for supplier selection: An integrated multi-criteria decision-making approach. *International Journal of Management Science and Engineering Management*, *17*(3), 205–219. https://doi.org/10.1080/17509653.2021.1997661

Grant, R. M. (1996). Toward a knowledge‐based theory of the firm. *Strategic Management Journal*, *17*(S2), 109–122. https://doi.org/10.1002/smj.4250171110

Group decision-making: Common models in organizational theory. (2024, December 1). Ivan Jureta. Retrieved June 17, 2025, from https://ivanjureta.com/group-decision-making-common-models-in-organizational-theory/

GTD Solution & IBM. (n.d.). *TradeLens solution brief* (3rd ed.). Retrieved June 17, 2025, from https://www.teu-group.com/ar/assets/pdf/Tradelens_Solution_Brief_v3.pdf

Haber, S., & Stornetta, W. S. (1991). How to time-stamp a digital document. *Journal of Cryptology*, *3*, 99–111. https://doi.org/10.1007/BF00196791

Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2022). Accounting and auditing with blockchain technology and artificial intelligence: A literature review. *International Journal of Accounting Information Systems*, *48*, 100598. https://doi.org/10.1016/j.accinf.2022.100598

Hart, O. (1995). *Firms, contracts, and financial structure*. Oxford University Press. https://doi.org/10.1093/0198288816.001.0001

Hart, O., & Moore, J. (1990). Property rights and the nature of the firm. *Journal of Political Economy*, *98*(6), 1119–1158.

Hartley, J. (2004). Case study research. In C. Cassell & G. Symon (Eds.), *Essential guide to qualitative methods in organizational research* (pp. 323–333). Sage Publications Ltd.

Hastig, G. M., & Sodhi, M. S. (2019). Blockchain for supply chain traceability: Business requirements and critical success factors. *Production and Operations Management*, *29*(4), 935–954. https://doi.org/10.1111/poms.13147

Hendrikse, G., Hippmann, P., & Windsperger, J. (2015). Trust, transaction costs and contractual incompleteness in franchising. *Small Business Economics*, *44*(4), 867–888. http://dx.doi.org/10.1007/s11187-014-9626-9

Holsti, O. R., & Allison, G. T. (1972). Essence of decision: Explaining the Cuban missile crisis. *The Western Political Quarterly*, *25*(1), 136. https://doi.org/10.2307/446741

IBM. (2018, August 9). *Maersk and IBM introduce TradeLens blockchain shipping solution*. PR Newswire. Retrieved June 17, 2025, from https://www.prnewswire.com/news-releases/maersk-and-ibm-introduce-tradelens-blockchain-shipping-solution-300694642.html

Jovanovic, M., Kostić, N., Sebastian, I. M., & Sedej, T. (2022). Managing a blockchain-based platform ecosystem for industry-wide adoption: The case of TradeLens. *Technological Forecasting and Social Change*, *184*, 121981. https://doi.org/10.1016/j.techfore.2022.121981

Laínez, J. M., Kopanos, G. M., Badell, M., Espuña, A., & Puigjaner, L. (2008). Integrating strategic, tactical and operational supply chain decision levels in a model predictive control framework. In L. Puigjaner & A. Espuña (Eds.), *Computer-aided chemical engineering* (pp. 477–482). Elsevier. https://doi.org/10.1016/s1570-7946(08)80084-3

Lan, B. (2024). Review of research on the impact of blockchain technology on supply chain operational decision making. *Frontiers in Business Economics and Management*, *15*(1), 312–315. https://doi.org/10.54097/knswev73

Lindblom, C. E. (1959). The science of "muddling through." *Public Administration Review*, *19*(2), 79. https://doi.org/10.2307/973677

Longo, F., Nicoletti, L., Padovano, A., D'Atri, G., & Forte, M. (2019). Blockchain-enabled supply chain: An experimental study. *Computers & Industrial Engineering*, *136*, 57–69. https://doi.org/10.1016/j.cie.2019.07.026

Maersk. (2024a, July 20). *A.P. Moller - Maersk and IBM to discontinue TradeLens, a blockchain-enabled global trade platform*. Retrieved June 17, 2025, from https://www.maersk.com/news/articles/2022/11/29/maersk-and-ibm-to-discontinue-tradelens

Maersk. (2024b, July 20). *Manual control halts global supply chains*. Retrieved on June 17th 2025 from https://www.maersk.com/news/articles/2022/08/22/manual-control-halts-global-supply-chains

March, J. G., & Simon, H. A. (1958). *Organizations*. Wiley.

Maroun, E. A., Daniel, J., Zowghi, D., & Talaei-Khoei, A. (2019). Blockchain in supply chain management: Australian manufacturer case study. In H. Treiblmaier & W. Wassermann (Eds.), *Lecture notes in business information processing* (pp. 93–107). Springer. https://doi.org/10.1007/978-3-030-32242-7_8

Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, *21*(2), 246. https://doi.org/10.2307/2392045

Morris, T. (2001). Asserting property rights: Knowledge codification in the professional service firm. *Human Relations*, *54*(7), 819–838. https://doi.org/10.1177/0018726701547002

Mumdžiev, N., & Windsperger, J. (2011). The structure of decision rights in franchising networks: A property rights perspective. *Entrepreneurship Theory and Practice*, *35*(3), 449–465. https://doi.org/10.1111/j.1540-6520.2011.00440.x

Murray, A., Kuban, S., Josefy, M., & Anderson, J. (2019). Contracting in the smart era: The implications of blockchain and decentralized autonomous organizations for contracting and corporate governance. *Academy of Management Perspectives*, *35*(4), 622–641. https://doi.org/10.5465/amp.2018.0066

Nakamoto, S. (2008). *Bitcoin: A peer-to-peer electronic cash system*. Retrieved June 17, 2025, from https://bitcoin.org/bitcoin.pdf

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, *5*(1), 14–37. https://doi.org/10.1287/orsc.5.1.14

Nutt, P. C. (1976). Models for decision making in organizations and some contextual variables which stipulate optimal use. *Academy of Management Review*, *1*(2), 84–98. https://doi.org/10.5465/amr.1976.4408670

Oriekhoe, N. O. I., Ashiwaju, N. B. I., Ihemereze, N. K. C., Ikwue, N. U., & Udeh, N. C. A. (2024). Blockchain technology in supply chain management: A comprehensive review. *International Journal of Management & Entrepreneurship Research*, *6*(1), 150–166. https://doi.org/10.51594/ijmer.v6i1.714

Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, *34*(5 Pt 2), 1189–1208. https://pubmed.ncbi.nlm.nih.gov/10591279

Petrusenko, T. (2022). *The economics of blockchain* [Master's thesis, University of Vienna].

Pires, M. C., Frazzon, E. M., Cordes, A., & Hellingrath, B. (2016). A communication procedure between tactical and operational levels in spare parts supply chains. In K. S. Soliman (Ed.), *IFIP advances in information and communication technology* (pp. 61–68). Springer. https://doi.org/10.1007/978-3-319-51133-7_8

Roeck, D., Sternberg, H., & Hofmann, E. (2019). Distributed ledger technology in supply chains: A transaction cost perspective. *International Journal of Production Research*, *58*(7), 2124–2141. https://doi.org/10.1080/00207543.2019.1657247

Schmitz, J., & Leoni, G. (2019). Accounting and auditing at the time of blockchain technology: A research agenda. *Australian Accounting Review*, *29*(2), 331–342. https://doi.org/10.1111/auar.12286

Sidyakin, V. (2007). *Global expansion strategies of Russian oil companies: The case of Lukoil* [Master's thesis, University of Nottingham].

Simon, H. A. (1947). *Administrative behavior; A study of decision-making processes in administrative organization*. Macmillan.

Simon, H. A. (1956). Rational choice and the structure of the environment. *Psychological Review*, *63*(2), 129–138. https://doi.org/10.1037/h0042769

Simon, H. A., Guetzkow, H., Kozmetsky, G., & Tyndall, G. (1954). *Centralization versus decentralization in organizing the controller's department*. Controllership Foundation, American-Book Stratford Press.

Singh, S., Gaur, A., & Singh, D. (2023). Blockchain‐based governance: Implications for organizational boundaries and structures. *British Journal of Management*, *35*(4), 1692–1699. https://doi.org/10.1111/1467-8551.12784

Sreckovic, M., & Windsperger, J. (2025). *Blockchain, (de-)centralization and organization design of intra-and interfirm networks*. SSRN. https://doi.org/10.2139/ssrn.5147811

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications. http://lib.tums.ac.ir/site/catalogue/61151

Swan, M. (2015). *Blockchain: Blueprint for a new economy*. https://cds.cern.ch/record/2000805

Theodorakopoulos, L., Theodoropoulou, A., & Halkiopoulos, C. (2024). Enhancing decentralized decision-making with big data and blockchain technology: A comprehensive review. *Applied Sciences*, *14*(16), 7007. https://doi.org/10.3390/app14167007

The World Economic Forum. (2019). *TradeLens overview*. Retrieved June 17, 2025, from https://www.wko.at/oe/netzwerke/tradelens-transportlogistik.pdf

Treiblmaier, H. (2018). The impact of the blockchain on the supply chain: A theory-based research framework and a call for action. *Supply Chain Management an International Journal*, *23*(6), 545–559. https://doi.org/10.1108/scm-01-2018-0029

Using blockchain to drive supply chain transparency. (n.d.). Deloitte United States. Retrieved June 17th 2025, from https://www2.deloitte.com/us/en/pages/operations/articles/blockchain-supply-chain-innovation.html

Vendette, S., & Thundiyil, T. G. (2023). Decentralization in blockchain: Reconsidering change management theories. *American Journal of Management*, *23*(3). https://doi.org/10.33423/ajm.v23i3.6376

Von Hippel, E. (1994). "Sticky information" and the locus of problem solving: Implications for innovation. *Management Science*, *40*(4), 429–439. https://doi.org/10.1287/mnsc.40.4.429

Warehousing services. (n.d.). Maersk. Retrieved June 17th 2025, from https://www.maersk.com/supply-chain-logistics/warehousing-and-distribution/warehousing-services

WHAT IS TRADELENS - Solution brief - Edition Two (n.d.). Retrieved June 17, 2025, from Tradelens_Solution_Brief_v3.pdf

Werbach, K., & Cornell, N. (2017). Contracts ex machina. *Duke Law Journal*, *67*(2), 313–382. https://paperity.org/p/85253834/contracts-ex-machina

Windsperger, J., Galak, O., & Raha, A. (2023). The structure of decision rights in international joint ventures: A property rights and transaction cost view. *European Journal of International Management*, *1*(1), 1. https://doi.org/10.1504/ejim.2022.10046548

Xia, J., Li, H., & He, Z. (2023). The effect of blockchain technology on supply chain collaboration: A case study of Lenovo. *Systems*, *11*(6), 299. https://doi.org/10.3390/systems11060299

Yang, C. (2019). Maritime shipping digitalization: Blockchain-based technology applications, future improvements, and intention to use. *Transportation Research Part E Logistics and Transportation Review*, *131*, 108–117. https://doi.org/10.1016/j.tre.2019.09.020

Yin, R. K. (2017). *Case study research and applications: Design and methods*. SAGE. http://cds.cern.ch/record/2634179

Zhang, T., Jia, F., & Chen, L. (2024). Blockchain adoption in supply chains: Implications for sustainability. *Production Planning & Control*, 1–24. https://doi.org/10.1080/09537287.2023.2296669

Zhao, X., Ai, P., Lai, F., Luo, X., & Benitez, J. (2022). Task management in decentralized autonomous organization. *Journal of Operations Management*, *68*(6–7), 649–674. https://doi.org/10.1002/joom.1179