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Designing a Value Chain Management Model for Optimal Fulfillment of Social Responsibility in the Context of Blockchain Technology

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Abstract

The present study was conducted with the aim of designing a value chain management model for the optimal fulfillment of social responsibility in the context of blockchain technology. The research method employed was qualitative, based on the grounded theory strategy. For data collection, the tool of in-depth interviews was used. The target population consisted of academic experts, managers, and senior specialists who were involved in the processes and decision-making of value chain management in the insurance industry. Through purposive sampling and deep interviews, theoretical saturation was achieved. In the grounded theory approach used in this study, through three stages of open, axial, and selective coding, the general categories were represented within a paradigmatic framework, including causal conditions, contextual conditions, intervening conditions, core categories, strategies, and outcomes, all based on value orientation. The results indicated that all relationships among variables were significant. Specifically, the following influential relationships were confirmed: causal conditions had a significant effect on the main category of the model; contextual conditions influenced the strategies; intervening conditions also had a significant effect on the strategies; the main category had a direct impact on the strategies; and finally, the strategies had a direct and significant effect on the research outcomes. In the Importance-Performance Map Analysis (IPMA) section, the model's indicators were evaluated in terms of importance and performance. These results can serve as a basis for strategic and managerial decision-making in various fields, especially in the evaluation and improvement of organizational processes and change management strategies. In summary, this study effectively evaluated the conceptual model and demonstrated that various factors such as causal conditions, contextual conditions, intervening conditions, and strategies influence the research outcomes. Moreover, the structural model of the study exhibited high goodness-of-fit and validity, and the relationships among its variables were confirmed.

Keywords: Value Chain, Social Responsibility, Blockchain, Technology.

1. Introduction

The increase in global competition, coupled with the shift toward a knowledge-based economy, has created renewed emphasis on innovation. Rapid changes in the competitive environment are shaping a new world of competition. This new economy is driven by organizations that are innovative, creative, and capable of generating knowledge or transforming it into

new products, services, and methods faster than their competitors. In today's world, industrial challenges resulting from technological and social transformations compel industrial firms to enhance their agility and rapid responsiveness to effectively manage their entire supply chains. Therefore, companies require virtual and physical technologies that enable interoperability and rapid adaptability for their businesses and operations (Banerjee et al., 2021). The implementation of blockchain necessitates significant changes within companies. According to research, senior managers across various industries are not entirely confident about the outcomes of blockchain projects and the associated investment costs, and some lack sufficient knowledge about the concept of blockchain (Lacity, 2018). Thus, readiness and maturity models provide extensive knowledge about the current status of companies and offer methods for implementing blockchain strategies (Esfahbodi et al., 2022).

The increasing level of competition in the business environment has made value creation for customers the most crucial factor in gaining competitive advantage (López et al., 2022). The value chain describes all business activities required to create a product from start to finish (e.g., design, production, distribution, etc.). Value chain analysis offers businesses visual models of these activities. It is a method by which businesses can analyze their activities for creating a product. After analyzing the activities, businesses can use the findings to evaluate ways of improving their competitive advantage (Maesa & Mori, 2020). Moreover, the success of any business does not rely solely on customers who visit once, but rather on customers who maintain consistent engagement. Accordingly, in today's markets, the primary goal of market-oriented companies—those whose management is based on customer relationship management—is to deliver greater value to customers (Siltaloppi & Jähi, 2021). Value refers to the amount buyers are willing to pay for what a company provides to them. In essence, value is reflected in a company's product prices and revenues and represents what customers seek to obtain in exchange for payment (Gereffi et al., 2021).

A notable point regarding the value chain concerns companies' social and environmental considerations in creating sustainable value for customers (Lim et al., 2021). Over the past two decades, growing social and environmental concerns among customers have rightly led managers of manufacturing and service companies to recognize that value creation without adherence to social responsibility is impossible (Phillips et al., 2019). From the mid-20th century onward, the concept of corporate social responsibility (CSR) emerged among business management thinkers and professionals, becoming a significant concern in the academic, political, and economic circles of both developed and developing countries in the fields of management, marketing, and investment. The emergence of CSR has mainly been a response to developments and challenges such as globalization (Altwaijri, 2025; Wahdi, 2024; Yang et al., 2024). Economic enterprises are accountable to all stakeholders, including customers, employees, the organization itself, consumers, the environment, local communities, neighbors, universities, and the nation's economy. Hence, the conceptual foundation of CSR is the creation of a win-win relationship and shared value for both society and businesses (Velte, 2022).

On the other hand, the emergence of modern technologies, especially innovations based on information technology, has fundamentally altered the value chains of companies (Pan et al., 2019). Among the latest IT-driven technologies, blockchain has significantly transformed business models and value chains. Blockchain technology, as an enabler, plays a pivotal role in improving communication and coordination (Maesa & Mori, 2020). It operates inter-organizationally within a networked structure to establish and maintain communication and coordination supporting resource and competence sharing (Banerjee et al., 2021). Within a value chain, control should be shared among partners rather than monopolized by one company. Traditional chains generally face challenges such as transparency issues, product traceability problems, and accounting inaccuracies. In this context, blockchain technology, as one of the most promising IT innovations, can bring substantial improvements to all actions across the different stages of the value chain (Fathi et al., 2021). The impact of blockchain implementation on the accuracy, credibility, transparency, incorruptibility, and timeliness of value chain processes and transactions makes it an attractive element for strengthening transparency, accountability, and decision-making in value chain management. Therefore, the emergence of blockchain could present a valuable opportunity for organizations needing readiness and responsiveness to ambiguous and complex situations. Additionally, blockchain's potential enablers are factors that, if realized, could significantly reduce overall transportation costs and enhance monitoring and control over shipments in logistics (Aslam et al., 2021).

In this context, Efshabodi et al. (2022) conducted a study titled "Determinants of Companies' Willingness to Adopt Blockchain Technology" among 228 e-commerce companies in China, revealing that cost savings and traceability have a positive impact on perceived usefulness, while a weak relationship was found between data privacy security and perceived usefulness, as well as between perceived ease of use and consumer adoption intention (Esfahbodi et al., 2022). Similarly, Sunmola et al. (2022), in their research "An Overview of Blockchain Literature in the Value Chain," reviewed 102 articles from four databases and identified 64 factors influencing blockchain adoption, highlighting security, system integrity, trust, scalability, cost, and traceability as the most critical adoption factors (Sunmola et al., 2022). In another study, Alves et al. (2022) examined "Enhancing the Effectiveness of the Textile Industry Value Chain through Blockchain Technology," where they explored current traceability approaches within the textile and apparel value chain and outlined essential blockchain technologies for promoting a circular economy; their findings indicated that blockchain technology significantly enhances the effectiveness of value chain management practices (Alves et al., 2022).

Compared to many service industries (e.g., banking, tourism, etc.), the insurance industry has exhibited a much slower pace in adopting emerging technologies. This issue is particularly evident in domestic insurance companies. While many service industries have significantly enhanced their competitive advantages through the adoption of technological innovations, insurance companies have performed quite poorly in this regard (Janssen et al., 2020). Furthermore, in the national insurance industry, it appears that the concept of the value chain has not received sufficient attention from managers, resulting in increased costs, the loss of many market opportunities, and overall failure to achieve competitive advantage. Therefore, the main problem addressed in the present study is to propose a comprehensive model that explains all the factors influencing effective value chain management in the insurance industry. Additionally, corporate social responsibility is an important issue that has not been well-implemented within domestic organizations (including insurance companies). Yet, commitment to CSR can enhance a company's public image and consequently increase value creation for customers. Accordingly, the present study aims to design a value chain management model for managing social responsibility with a blockchain technology approach. The central research question is: What is the value chain management model for optimal fulfillment of social responsibility in the context of blockchain in the insurance industry?

2. Methodology

The present study is classified as qualitative research. Given the existing theoretical gap, the systematic approach of Strauss and Corbin (1998) for grounded theory development in the field of value chain management was employed as the primary qualitative research methodology. This approach aims to provide a model for a deep understanding of value chain management for the optimal fulfillment of social responsibility within the context of blockchain technology. Grounded theory is a type of qualitative research method that inductively applies a series of systematic procedures to develop a theory regarding the phenomenon under study.

The statistical population consisted of academic experts and specialists in supply chain domains, with the sample size selected using a purposive sampling method of the snowball type. Interviewees were asked to introduce other experts knowledgeable in the field, illustrating the use of snowball sampling common in qualitative research. The concept of purposive sampling, frequently utilized in qualitative studies, refers to the researcher's deliberate selection of individuals based on their potential to contribute to a deeper understanding of the research problem and the core phenomenon under investigation.

For data collection, in-depth semi-structured interviews were conducted. Prior to the interviews, a summary of the research design, definitions of key terms used in the study, and the main research objectives and questions were sent to the interviewees via email, Telegram, or through in-person researcher visits, to provide preliminary preparation. Additionally, at the beginning of each interview session, a brief explanation of the study and its prior work was provided.

3. Findings and Results

Through axial coding, the categories extracted from open coding and secondary coding were classified into six groups, including the core category, causal conditions, intervening conditions, contextual conditions, strategies, and outcomes. Based on the research objective, the core category is the design of a value chain management model for managing social responsibility

with a blockchain technology approach (case study: the insurance industry). The formation of causal, intervening, and contextual conditions, strategies, and outcomes is further explained based on the corresponding table and diagram.

Causal conditions refer to incidents or events that lead to the occurrence or expansion of a phenomenon. In the present study, based on the participants' perspectives, the categories of information and communication technology (ICT), alignment with supply chain values, acceptance of social responsibility, and cultural development for technology adoption were identified and linked to a broader category called causal conditions. Related interviews were referenced as follows:

1. **Information and Communication Technology (ICT):**
    - **Data and information management:** ICT provides the necessary tools for collecting, storing, and analyzing data, contributing to transparency and traceability in the supply chain.
    - **Rapid and effective communication:** Communication technologies facilitate interactions between supply chain members and stakeholders, enabling real-time information exchange.
    - **System integration:** ICT supports the integration of different systems within the supply chain and facilitates the sharing of social responsibility information.
2. **Alignment with Supply Chain Values:**
    - **Goal alignment:** Aligning with supply chain values ensures that all components of the supply chain adhere to shared goals and social responsibilities.
    - **Participation in social responsibilities:** This alignment helps activate social responsibility across all parts of the supply chain, ensuring that all members are committed to their obligations.
    - **Creating competitive advantage:** Alignment with values and social responsibilities can serve as a competitive advantage for companies in the market.
3. **Acceptance of Social Responsibility:**
    - **Commitment to standards:** Acceptance of social responsibility means adhering to ethical, environmental, and social standards reflected in value chain management.
    - **Participation in social initiatives:** Companies must actively engage in social initiatives and projects, integrating these responsibilities throughout supply chain processes.
    - **Transparent reporting:** Acceptance of social responsibility involves providing clear and accurate reports on the social and environmental impacts of activities.
4. **Cultural Development for Technology Adoption:**
    - **Training and awareness:** Cultural development for technology adoption includes training employees and stakeholders about the advantages and applications of blockchain technology.
    - **Promotion of technology acceptance:** Creating a culture that promotes technology acceptance within organizations facilitates the swift adoption and utilization of new technologies.
    - **Support for innovation:** Proper cultural development can strengthen the spirit of innovation and promote the use of advanced technologies within the supply chain.

These components are interdependent, and through effective collaboration, they can contribute to the improvement of value chain management and the realization of social responsibilities in the insurance industry.

Table 1. Open Coding of Qualitative Data (Causal Conditions)

Core Category	Basic Code
Information and Communication Technology	Information management capability
	Communication encryption
	Protection of sensitive information
	Communication management
	Supply chain technology infrastructures
	Technological specialization
Alignment with Supply Chain Values	System sustainability
	Time planning
	System intelligence
	Production planning
	Transportation planning
	Logistics planning
	Production smartization

Acceptance of Social Responsibility	Legal responsibility
	Ethical/humanitarian responsibility
	Economic responsibility
	Environmental responsibility
Cultural Development for Technology Adoption	Perceived ease-of-use facilitation
	Perceived value facilitation
	Perceived benefit facilitation
	Training for technology acceptance culture

Strategies are based on actions and reactions aimed at controlling, managing, and providing feedback on the phenomenon under study. Strategies are purposeful and implemented for a specific reason. There are always intervening conditions present that either facilitate or constrain the strategies. The identified strategies include: management based on sustainable development indicators, learning organization, and the attraction and deployment of human resources. The following sections refer to interviews that indirectly clarified the core code:

1. **Management Based on Sustainable Development Indicators:**
    - **Performance evaluation and monitoring:** Blockchain technology can assist in collecting and analyzing data related to sustainable development indicators, leading to the improvement of performance evaluation and monitoring of social responsibility in the insurance industry.
    - **Transparency in reporting:** Blockchain enables transparent and credible reporting of progress and challenges related to sustainable development indicators and supports the validation of such reports.
    - **Informed decision-making:** Access to accurate and reliable data through blockchain helps decision-makers make more informed decisions aligned with sustainable development goals.
2. **Learning Organization:**
    - **Continuous improvement:** Blockchain technology can continuously share information and experiences related to social responsibility, helping organizations enhance their processes.
    - **Learning from past experiences:** The use of blockchain enables organizations to leverage previous experiences and data, preventing the repetition of past mistakes.
    - **Support for innovation:** Blockchain can provide a platform for continuous innovation and learning in the domain of social responsibility, assisting organizations in identifying and implementing best practices.
3. **Attraction and Deployment of Human Resources:**
    - **Talent acquisition:** Organizations that utilize advanced technologies such as blockchain may be more successful in attracting new talents seeking modern and sustainable working environments.
    - **Training and skill development:** Blockchain can contribute to the education and skill development of human resources, particularly in areas related to technology and social responsibility.
    - **Sustainability and job satisfaction:** Using blockchain for managing social responsibility can enhance employee sustainability and job satisfaction, as it demonstrates organizational commitment to social responsibility, thus increasing employee motivation and engagement.

The use of blockchain technology in these areas contributes to the improvement of value chain management and the achievement of social responsibility goals, enabling organizations to fulfill their commitments more effectively.

Table 2. Open Coding of Qualitative Data (Strategic Conditions)

Core Category	Basic Code
Management Based on Sustainable Development Indicators	Green intellectual revision
	Environmental protection and development
	Green innovation and initiative
	Green responsibility and accountability
	Application of appropriate technologies for producing eco-friendly products and services
	Triple focus of green management (focus on quality, profitability, and environment)
Learning Organization	Use of innovative educational methods
	Organization of continuous training courses
	Reduction of environmental and health-related pollution
	Participation and commitment of human resources
	Employee cultural development

Attraction and Deployment of Human Resources	Individual encouragement and motivation Use of innovative educational methods Green attitude, competence, and behavior Risk-taking and creativity Belief in environmental protection Training of human and occupational skills Adherence to green values Flexible and reliable human resources

Outcomes are the results that emerge as a consequence of the strategies. Outcomes are the products of actions and reactions. Outcomes cannot always be predicted and are not necessarily those intended by individuals. Outcomes may manifest as events and incidents, may take a negative form, may be explicit or implicit, and may occur either in the present or future. Furthermore, it is possible that what is considered an outcome at one point in time may later become part of the conditions and influencing factors. The identified outcomes include the achievement of environmental goals, the establishment of a sustainable performance management system, transparency, and trust management. The following sections refer to interviews that indirectly clarified the core code:

1. **Achievement of Environmental Goals:**
    - **Tracking and reporting:** Blockchain enables precise tracking and reporting of activities related to environmental goals. This may include resource tracking, waste management, and assessment of environmental impacts.
    - **Ensuring sustainability:** Using blockchain for documentation and proof of compliance with environmental standards assists organizations in more effectively pursuing their environmental goals and reporting their progress transparently and reliably.
    - **Green supply chain management:** Blockchain can help track environmental impacts throughout the supply chain and ensure that suppliers and supply chain partners also adhere to environmental principles.
2. **Sustainable Performance Management System:**
    - **Measurement and evaluation:** Blockchain can be used to measure and evaluate sustainable performance. By providing accurate and immutable data, organizations can continuously monitor their performance in various areas (such as energy consumption, carbon emissions, etc.).
    - **Continuous management and improvement:** Information obtained from blockchain can help identify strengths and weaknesses in sustainable performance, allowing organizations to plan and implement corrective and continuous improvement measures.
    - **Validation and reporting:** Through the use of blockchain, organizations can transparently and credibly report their sustainable performance and reassure stakeholders that they are seriously pursuing their sustainability goals.
3. **Transparency and Trust Management:**
    - **Creating transparency:** Blockchain helps create transparency in activities and processes related to social responsibility and value chain management. This transparency can enhance stakeholder and customer trust.
    - **Trust management:** By providing a system for immutable and accessible data registration for all stakeholders, blockchain strengthens trust in the management of social responsibility, ensuring that stakeholders are confident the organization is adhering to its commitments.
    - **Accountability and issue resolution:** The transparency generated by blockchain can improve accountability and facilitate issue resolution. In the event of problems or violations of commitments, it enables quicker identification and tracking of issues.

The use of blockchain technology in these areas can help organizations achieve their environmental goals, improve sustainable performance management systems, and strengthen transparency and trust in value chain management.

Table 3. Open Coding of Qualitative Data (Outcomes)

Core Category	Basic Code
Achievement of Environmental Goals	Reducing costs and negative environmental impacts
	Optimal resource consumption and waste reduction
	Use of renewable energy and clean technologies
	Reduction of toxic and greenhouse gas emissions
	Reforming traditional waste disposal methods
Sustainable Performance Management System	Human resource performance planning
	Internal and external support
	Green performance evaluation
	Reward and compensation
	Meritocracy in the appointment of managers and human resources
Transparency	Fraud reduction
	Establishment of inter-organizational data access platforms
	Consultation with international units
	Coordination and connection of various departments for data exchange
	Accuracy and reliability of information
	Improvement of data maintenance on a large data scale
Trust Management	Data security
	System documentation clarity
	System intelligence
	System reliability
	System sustainability
	Accessibility

Context or background refers to the set of specific characteristics that pertain to the phenomenon in question, meaning the environment where the events and incidents related to the phenomenon occur. The context represents the particular conditions under which the strategies of action and reaction take place. Electronic network management, production management, and environmental factors were identified as the contextual conditions. Related interviews are referenced below:

1. **Electronic Network Management:**
    - **Coordination and integration:** Blockchain can contribute to improved coordination and integration within the electronic network. By providing a transparent and secure layer for information exchange, it facilitates communication and data sharing among various stakeholders.
    - **Data management and documentation:** Using blockchain, all transactions and data related to social responsibility and value chain management can be accurately and immutably recorded and documented, aiding in better data management and error reduction.
    - **Security and credibility:** Blockchain enhances security and credibility in electronic network management. Through encryption and its decentralized structure, blockchain minimizes the possibility of data manipulation and improves information security.
2. **Production Management:**
    - **Quality monitoring and control:** Blockchain can assist in monitoring and controlling the quality of products and services. With accurate and transparent documentation of production processes, it ensures that products are manufactured in accordance with social responsibility and environmental standards.
    - **Supply chain management:** Blockchain technology supports the optimal management of supply chains and production processes. By precisely tracking and documenting resources and production stages, it enables more effective resolution of inefficiencies and ensures compliance with social responsibility principles.
    - **Accountability and transparency:** Utilizing blockchain allows production processes to be reported transparently, thereby strengthening accountability to stakeholders and customers.
3. **Environmental Factors:**
    - **Tracking environmental impacts:** Blockchain can help track and record the environmental impacts of processes and activities, including resource consumption, waste generation, and greenhouse gas emissions.
    - **Sustainable resource management:** Through blockchain, it is possible to optimize and monitor the use of natural resources, ensuring that activities and processes align with environmental sustainability principles.

- **Reporting and transparency:** Blockchain technology facilitates accurate and transparent reporting of environmental performance, enabling stakeholders to effectively monitor environmental progress and challenges.

Table 4. Open Coding of Qualitative Data (Contextual Conditions)

Core Category	Basic Code
Electronic Network Management	Accuracy testing and diagnosis
	Identification of production levels and order volumes
	Shared memory of node status
	Real-time and precise monitoring
	Centralization and updating of information
Production Management	Energy management
	Production safety
	Support and assistance for specialists and managers
	Cost management
	Time management
	Route management
	Warehouse management
Environmental Factors	Reduction of production and emission of environmental pollutants
	Monitoring operations in green spaces and nature
	Improvement of air quality (reduction of air pollution)
	Reduction of noise pollution
	Paperless administrative processes
	Promotion of environmental protection culture and green spaces

Intervening conditions are structural factors that pertain to the phenomenon and influence the strategies of action and reaction. They either facilitate or constrain the strategies within a specific context. Technical infrastructure, information standardization, and business information were identified as the intervening conditions. The following refers to related interviews:

1. **Technical Infrastructure:**
   - **Security and scalability:** Blockchain technical infrastructure must ensure the security and scalability necessary to process high volumes of data and transactions. This supports the preservation of data related to social responsibility and value chain management.
   - **System integration:** Technical infrastructure must be capable of integrating with existing systems and other modern technologies. Such integration helps improve coordination and efficiency in value chain management.
   - **Accessibility and sustainability:** Technical infrastructure should be designed to ensure that the blockchain system is continuously available and resistant to technical problems and disruptions.
2. **Information Standardization:**
   - **Data synchronization:** Information standardization aids in synchronizing data among various stakeholders and components of the value chain. This includes data formats, reporting methods, and evaluation metrics.
   - **Enhancing data accuracy and quality:** Standardizing information improves data accuracy and quality. This helps organizations manage social responsibility data and value chain performance data more precisely and reliably.
   - **Facilitating information exchange:** Information standardization facilitates information exchange among different components of the supply chain and stakeholders, enhancing transparency and coordination in processes.

3. **Business Information:**
    - **Analysis and decision-making:** Business information recorded on the blockchain can contribute to more accurate analyses for strategic decision-making, including performance analysis, risk evaluation, and opportunity identification.
    - **Transparency and accountability:** Transparent and immutable recording of business information via blockchain strengthens accountability and trust among stakeholders. This transparency enables customers and other stakeholders to be more accurately informed about the organization's social responsibility activities.
    - **Performance management and monitoring:** Business information can assist in monitoring organizational performance and its impact on social responsibility, supporting continuous evaluation and improvement across various areas.

Table 5. Open Coding of Qualitative Data (Intervening Conditions)

Core Category	Basic Code
Technical Infrastructure	Cloud computing
	Optical fiber development
	Internet of Things (IoT) infrastructure
	Smart technologies
	High-speed internet
	Social media
	Semantic web
Information Standardization	Data recording free from bias and manipulation
	Improvement of institutional action transparency systems
	Establishment of a supervisory unit for information and data registration
	Creation of a common language for data sharing
	Creation of a fixed format and standard for data understanding
	Specification of standards for data recording, storage, and dissemination
	Policy-making for data sharing transparency
Business Information	Number of logistics centers
	Number of product categories
	Volume of orders
	Number of secondary customers
	Number of primary customers
	Inventory estimation and balance with orders
	Number of vendors

The main stage of grounded data analysis is selective coding, during which the researcher develops the theoretical framework based on the results of open and axial coding. In this section, the underlying causes and reasons for the formation of these conditions are expressed in the form of theoretical memos containing the analyst's reflections and thoughts regarding the research conditions.

Among the identified factors, axial coding was conducted, and based on it, the linear relationship among the research categories—including causal conditions, core categories, contextual conditions, intervening conditions, strategies, and outcomes—was specified.

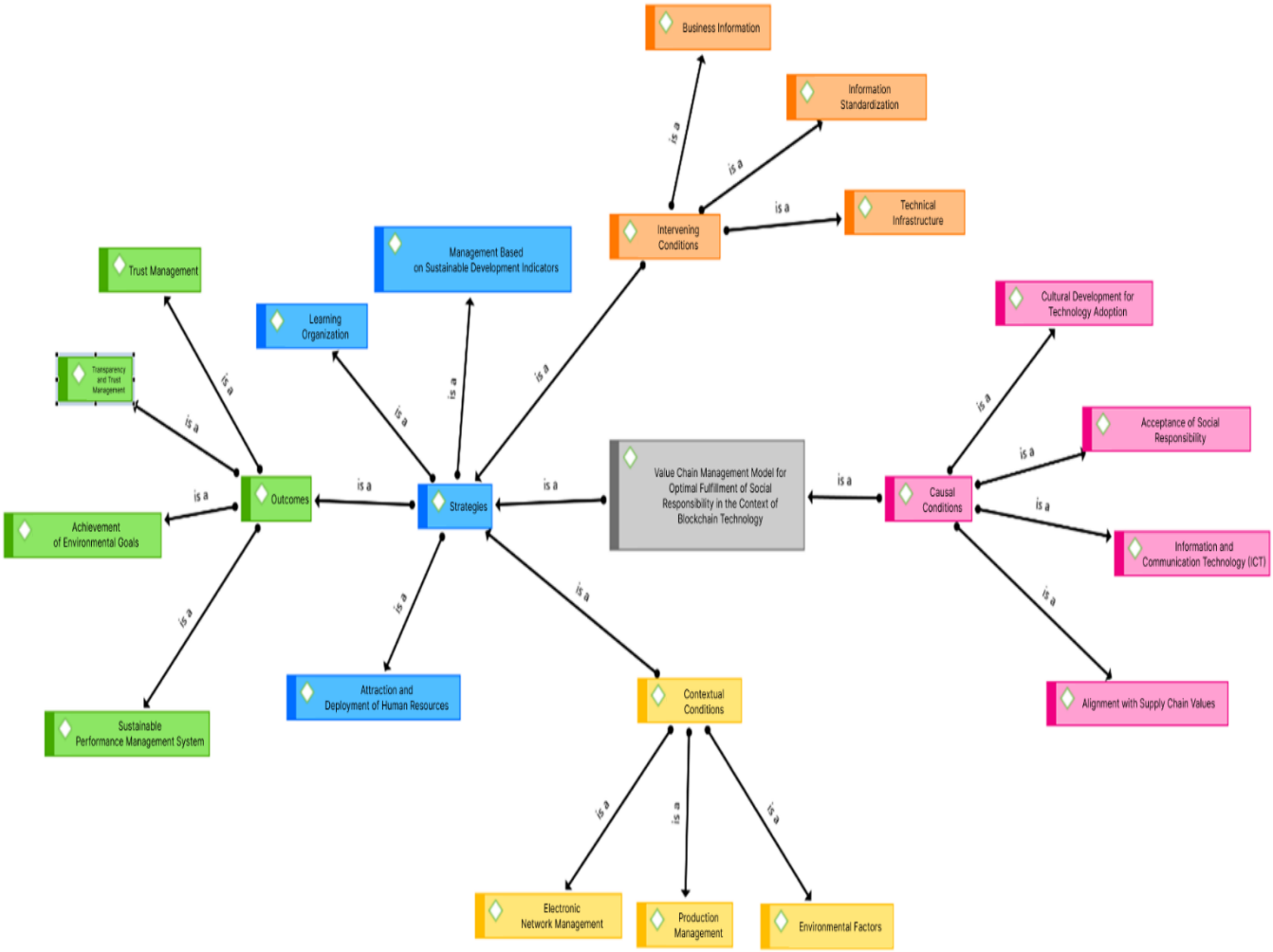

Figure 1. Graphical Output of ATLAS.ti Software

4. Discussion and Conclusion

In the contemporary world, businesses are responsible not only for their profitability and economic growth but also for contributing to sustainable social and environmental development. These responsibilities, given their profound impacts on society, the environment, and even global economic processes, have become an inseparable component of organizations' long-term strategies. In this regard, the concept of Corporate Social Responsibility (CSR) refers to organizations' commitment to actions that go beyond mere profitability and contribute to the improvement of social, economic, and environmental conditions. CSR has increasingly become one of the most important criteria for evaluating organizational performance. However, challenges such as a lack of transparency, limited traceability, and difficulties in measuring the impacts of CSR activities have necessitated innovation and the adoption of new technologies in these processes. In this context, blockchain technology can serve as a powerful and efficient tool, significantly transforming the implementation of CSR initiatives. Blockchain, with its unique characteristics such as transparency, security, traceability, and immutability of information, can offer an effective solution for the management and monitoring of CSR processes on a global scale.

Blockchain, as an emerging technology in the field of data storage and transmission, is capable of recording and sharing information in a decentralized manner, making it particularly suitable for enhancing trust and transparency in supply chains and CSR processes. The application of blockchain in supply chains—especially concerning the responsible sourcing of materials, human resource management, monitoring environmental impacts, and evaluating labor conditions—can prevent corruption, misconduct, and negligence, thereby strengthening mutual relationships and trust among various stakeholders. One of the critical challenges in CSR management is the difficulty in measuring and evaluating the impacts of such activities. Many organizations have been unable to provide accurate measurements of the effects of their CSR initiatives on society and the

environment. Blockchain can play a crucial role in this regard; the technology enables precise data recording and tracking, allowing for effective evaluation of the social and environmental impacts of activities.

Furthermore, today's consumers are increasingly seeking products and services that adhere to principles of social and environmental responsibility. With growing social and environmental awareness, consumers want to know under what conditions their purchased products were produced and whether companies adhere to ethical and social standards. Blockchain can act as a tool for the transparent and immutable verification of such information, attracting consumer trust and enabling brands to leverage this competitive path to attract more customers.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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