

A Case of Blockchain in Agri-Food: Impacts on the Value Chain and Competitive Advantage

Authors: Elisa Ballini, Elena Cedrola, Grazia Li Pomi

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Abstract

This study aims to conduct a focused investigation into the impact of implementing blockchain technology on the value chain of businesses and to analyze how this technology contributes to achieving competitive advantage. The adopted methodological approach is qualitative in nature, centered around the analysis of a specific case study within the agri-food sector. The findings from this research clearly indicate that blockchain technology has a significant influence on the value chain, with particularly noteworthy effects in the context of marketing and sales activities. Specifically, a positive effect is observed in terms of safeguarding the competitive advantage of companies that adopt blockchain. These results provide a significant contribution to the understanding of the role and implications of blockchain technology in the business context, with relevant implications for researchers and for management.

Introduction

The blockchain technology, initially known for being the technology behind Bitcoin, is increasingly capturing the attention of scholars and practitioners and is considered a disruptive technology with significant potential (Kouhizadeth et al., 2021). The reason behind the success of this innovative technology lies in its characteristics. Blockchain technology is a distributed ledger technology that operates through a mechanism of sharing information across a network to create a record that cannot be altered, is traceable, and transparent. Network nodes agree on a version of the ledger's state through a consensus mechanism (Treiblmaier, 2019). These features make blockchain a technology with unique qualities. Many scholars have focused on the attributes of this technology: the transparency and clarity of recorded transactions (Wang et al., 2019), reliability (Blockchain ensures a single version of truth) (Quieroz, Wamba, 2019), and the ability to enable transaction completion (Shuetz, Venkatesh, 2020). What distinguishes blockchain as a technology is generating significant interest among both academics and professionals in the field of business strategy.

Porter (1985) emphasizes that innovative technologies play a significant role in achieving a competitive advantage and represent crucial factors that influence the rules of competition. Blockchain demonstrates the potential to influence the value chain in terms of generating, enhancing, and safeguarding competitive advantage. Using the value chain perspective, this study aims to explore the areas of the value chain where blockchain has the greatest impact and to understand how this technology contributes to the generation, enhancement, and protection of a competitive advantage.

After a brief literature review section that references the research streams that have addressed the topic, the methodology to be adopted will be outlined. Subsequently, the case study will be presented, focusing on Pastificio Mancini (a small company located in central Italy) and various empirical findings. Finally, the last section is dedicated to summarizing the conclusions and research and managerial implications.

Literature review

The existing literature in the field of blockchain technology research predominantly focuses on addressing current challenges and constraints, with significant attention given to issues related to privacy and security (Yli-Huumo et al., 2016). Moreover, studies that apply the value chain perspective to analyze the use of blockchain technology are often confined to specific domains (Witt, 2021), and much of this research primarily concentrates on supply chain management (SCM) (Witt & Schoop, 2022).

However, a recent study conducted by Li and Chen (2022) has highlighted that the adoption of blockchain technology offers a significant improvement in data traceability related to products, with the potential to enhance transparency and accountability within the complex supply chain network. According to the authors, despite these advancements, the technical impact of blockchain technology on transparency throughout the entire value chain remains largely unexplored.

In particular, within the realm of supply chain management, it is evident that the agriculture and food sector is emerging as an area of significant importance, especially concerning traceability (Fernández-Caramés & Fraga-Lamas, 2019). Additionally, Zhao et al. (2019) identified the adoption of various information technologies within the blockchain context aimed at enhancing traceability and food safety in the agri-food industry.

Other scholars and professionals have also emphasized the considerable potential of blockchain technology in the agri-food supply chain, highlighting its ability to add value by ensuring product traceability (Wang et al., 2019a). In this context, implementing traceability in the agri-food supply chain through the use of blockchain technology emerges as an effective means of establishing mutual trust between consumers and producers, ensuring clear exposure of the origin of food products (Bumblauskas et al., 2020).

It is important to note that, despite the highlighted progress, the current literature provides only a limited number of studies adopting a value chain-based perspective. For instance, the study by Dey & Shekhawat (2021) emphasized how the integration of blockchain and the Internet of Things (IoT) can enhance links both upstream and downstream in the agricultural value chain. Other studies, such as the one conducted by Miatton and Amado (2020), demonstrated how a web application based on blockchain technology can bring transparency and traceability to the coffee value chain. This research context underscores the need for further studies that thoroughly explore the role of blockchain technology in value chains and how it can contribute to achieving

and safeguarding competitive advantage, thus filling a significant gap in the existing literature.

Methodology

In this research, a qualitative approach was adopted to explore the impact of blockchain technology within a company's value chain, specifically focusing on its ability to influence the creation, enhancement, and protection of competitive advantage. This approach is based on Yin's (1984) recommendation, which suggests that a case study is particularly appropriate when investigating current and research-relevant phenomena, especially when attention is directed toward real-life situations within their natural context. A questionnaire has been developed based on a research model derived from an integrative approach of various theoretical frameworks, including the Resource-Based View (Barney, 1991), Transaction Cost Analysis (Coase, 1937), and Network Theory (Mitchell, 1969). This articulated research model enables a multidimensional analysis within the corporate context.

The selected unit of analysis for this research is an Italian agricultural company that uses blockchain to trace wheat and production process. The data required for this investigation were acquired through the execution of a semi-structured interview involving two key figures within the company, namely the owner and the responsible party for key account, marketing, and communication.

Furthermore, in order to comprehensively and thoroughly analyze and interpret the collected data, a content analysis was subsequently conducted. This methodology of analysis allows for the identification of emerging themes, patterns, and relationships within the collected data.

Empirical evidence: The Mancini Case

In this research, we focus on "Pastificio Mancini," an Italian agricultural pasta manufacturer located in central Italy. The company is involved in growing its own wheat and producing pasta exclusively with its self-produced wheat. From wheat cultivation to the creation of the final product, the production process largely takes place internally within the company. The only external actor the company cooperates with is the mill, which is located near the pasta factory and is considered "almost an internal facility". The fact of producing pasta with their own wheat is a rare characteristic in the pasta sector and highly relevant in the agri-food supply chain, which faces challenges in terms of product traceability.

For the company, blockchain was the most consistent tool with their strategy because it provided a form of guarantee for what they do, as emphasized by the marketing and communication manager. It allowed them to demonstrate that the wheat used for pasta production is the same wheat they cultivate. The company relied on a startup to enter the world of blockchain through the Trusty platform, a blockchain platform designed for agri-food supply chains.

Despite being an agricultural pasta manufacturer, the company is highly innovative, using modern and technologically advanced machinery. The adoption of blockchain presented an opportunity for the company to further integrate digitalization into the production process, as stated by the marketing and communication manager.

The area of the value chain that felt the most impact from blockchain technology is marketing and sales, especially in terms of communication. The message to be communicated was clear from the beginning of the Pastificio Mancini project, but to make it even more credible, a reliable tool like blockchain was necessary.

From the interview, it is clear that the company is diligently pursuing a strategic approach characterized by a long-term perspective. In this regard, blockchain emerges as having significant relevance, being considered an essential component for optimizing its competitive position, especially in light of the competitive dynamics in the relevant industry. The words of the marketing manager confirm this distinctive vision:

"What we see as truly distinctive today, and blockchain helps us understand this, is that even those involved in traceability in the pasta world, without working in the fields, only focus on distinguishing between Italian and foreign wheat."

He continues:

"Everything is imitable, but at the moment, we have a sort of gap, from this point of view, which is very advantageous in terms of communication. Blockchain helps us protect, it helps us say that we did it first, in any case."

From these words, it is easy to understand how blockchain plays a fundamental role in protecting the company's competitive advantage.

The adoption of blockchain has allowed the company to establish new relationships with universities, various observatories, and the press. It has also created several promotional opportunities. However, among the stakeholders, the most affected are the most significant ones: the customers and the relationship with them, particularly in terms of loyalty, as confirmed by the marketing and communication manager:

"Above all, the value we have in the eyes of the customer has increased significantly. The relationship with the customer has improved greatly... Currently, we know that our customers use this topic when they propose Mancini pasta."

Conclusions and Implications

The interview with Pastificio Mancini provides compelling evidence of how blockchain impacts the value chain, particularly in the marketing area, and how this technology positively influences the formation and protection of competitive advantage for businesses. The company has demonstrated how the implementation of blockchain has contributed to solidifying its leadership position in the industry, guaranteeing traceability and emphasizing the origin of its wheat. Blockchain is, therefore, an innovative technology capable of playing a significant role in achieving a competitive advantage, influencing the rules of competition (Porter, 1985). Blockchain has emerged

as a fundamental tool for protecting the company's competitive advantage, making imitation by other players difficult. This clearly demonstrates the potential of blockchain technology in the context of agri-food value chains.

Furthermore, the interview highlighted how blockchain played a significant role in increasing consumer trust in the company, proving to be a technology that adds value to agri-food supply chains (Wang et al., 2019a). The ability to transparently demonstrate the origin and quality of the wheat used in pasta production strengthened the bond between the Mancini brand and its customers. This is evidenced by the fact that customers themselves use blockchain as a selling point, confirming its importance in building a trustworthy relationship with customers (Bumblauskas et al., 2020).

Regarding the implications of this research, there are relevant considerations for both managerial professionals and scholars. From an academic community perspective, it could be intriguing to conduct a comparative analysis by selecting different case studies within the same industry. In addition, extending a similar analysis to companies operating in different sectors may generate interest in exploring the potential use of this technology in diversified contexts. Finally, conducting an in-depth quantitative investigation to assess the effect of blockchain technology on the relational dynamics between the company and its customer base could prove fruitful. In terms of managerial implications, it is advisable for business executives to carefully consider the adoption of blockchain technology if they wish to enhance the organization's reputation and strengthen customer trust. Furthermore, in the event of implementing this technology, it may be advantageous to involve the marketing and sales department, as these functions may perceive the impact of such innovation more significantly.

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