



The Transparency Trade-off: How Food Companies Balance Tech-Driven Disclosure and Cost Efficiency in Digital Supply Chains

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Abstract. Food safety issues have increasingly become a focal point of public concern, driving supply chain transparency to the forefront as a core competitive advantage for food companies. As a key regulator and system promoter, the government plays an indispensable role in building transparent supply chains. For businesses, reasonable supply chain transparency is not only an effective means of shaping a positive reputation and enhancing consumer confidence and purchasing intent, but also significantly reduces capital costs by mitigating information asymmetry. However, the increased proprietary costs associated with enhanced transparency pose a significant challenge for businesses. Therefore, when making decisions regarding supply chain transparency disclosure, food companies are essentially balancing the benefits of capital cost savings against the potential increase in proprietary costs. Unfortunately, existing research has not yet delved deeply into how food companies precisely quantify and balance the proprietary costs incurred by supply chain transparency against the reduced capital costs, leaving this critical decision-making mechanism as a theoretical gap. Future research urgently needs to focus on revealing the underlying logic and influencing factors of this balancing process, providing a solid theoretical foundation and practical guidance for food companies to formulate optimal transparency strategies in complex environments.

Keywords: Supply chain transparency, Food Companies, Tech-Driven Disclosure, Cost. Efficiency

1 Introduction

With the development of the food industry, the gap between production and consumption has grown increasingly wide, while people's demand for food varieties has become increasingly diverse. Long-distance transportation, large-scale distribution, and multi-channel, multi-step circulation have become inevitable choices to address these realities. To meet consumers' diverse needs, food producers are also continuously adopting new production technologies to launch new products that align with consumer preferences; Conversely, consumers, influenced by factors such as their knowledge structure, are unable to obtain timely information about food products. The lack of transparency

in the food market as a whole makes it highly susceptible to severe food safety incidents. Take the “Sanquan Food African Swine Fever Incident” in 2019 as an example: due to the absence of raw material traceability, problematic pork products led to the collapse of brand trust, resulting in the company's market value plummeting by 4 billion yuan in a single day. In stark contrast, during the same period, Sam's Club saw a 200% increase in orders thanks to its blockchain-based traceability system. This phenomenon indicates that consumers are increasingly concerned about food safety and transparency. It also means that supply chain transparency has become a key competitive factor in the food industry.

Supply chain transparency, which refers to the level of detail in a company's disclosure of supply chain information, reflects the extent to which external parties understand the company's supply chain upstream and downstream [1]. Existing research has found that different levels of supply chain transparency can have varying impacts on companies. As a business practice, supply chain transparency has a product quality certification effect, helping companies establish a good image and reputation [2], increase consumer trust [3], and thereby boost sales and profit margins, leading to higher product market performance [4]. In terms of benefits, enhancing supply chain transparency can reduce information asymmetry, increase stock liquidity, and lower financing costs [5]. However, whether in China or other developed markets, few companies fully disclose their supply chain information [2]. Proprietary costs are the primary factor deterring companies from disclosing information [6]. Therefore, companies face a dilemma regarding supply chain transparency and urgently need to find a balance.

Through a literature review, it was found that research on supply chain transparency is primarily concentrated abroad, with limited domestic literature available. Additionally, few studies have examined supply chain transparency in the food industry, and there is a lack of research on the relationship between information disclosure and cost-benefit analysis in food companies. Therefore, the primary research question of this paper is: How can SCT strategies achieve tech-driven disclosure and cost efficiency?

2 Theoretical Research/Literature Review

2.1 Key Builders and Promoters of Supply Chain Transparency

The government primarily plays the role of food safety regulator in the food supply chain and is also the key builder and promoter of the food supply chain transparency system. Building a food supply chain transparency system is within the scope of government functions. The government should take the lead in establishing a professional, transparent, and standardized food supply chain monitoring platform to promote the overall modernization and scientific development of the food supply chain; establish a matched legal and regulatory framework, strengthen legal construction, and regulate the safe and stable development of the food safety market from the highest legal level, clarifying the standardized operations and transparent channels, transparent content, and other transparent information of the food market; Increase the frequency of proactive regulation to avoid ad-hoc regulation in response to issues. Learn from international hygiene standards and advanced technological experiences, such as the British

Retail Consortium Global Standard Certification (BRC) and the International Food Standard (IFS) jointly established by the German Retail Federation and the French Retail and Wholesale Federation. Strengthen the construction of supporting measures for the food supply chain, especially given the current situation where China's cold chain technology has not yet fully developed and supporting facilities and technologies are lagging behind [7].

The government should establish a comprehensive food safety standard system and legal framework based on the unique characteristics of each link in the food supply chain and the specific roles of relevant stakeholders, while referencing internationally recognized food supply chain safety standards. This system should cover the entire process, including raw material supply, production, processing, packaging, transportation, consumption, and waste disposal, as well as safety standards related to food itself and food suppliers. This system should provide food enterprises with clear and unified constraints on food safety before, during, and after production; it should also enable food consumers to understand and access food safety-related information, with traceability of food safety information traceable and verifiable, and food production and circulation subject to legal recourse.

2.2 How does supply chain transparency influence consumer purchasing intent

The theoretical foundation of this section is based on the theory of source credibility and the theory of message credibility. The theory of source credibility was first proposed by Hovland et al. in 1953, emphasizing that the credibility and professionalism of the information source are key factors in determining the persuasiveness of the information [8]. Subsequently, Ohanian further developed this theory in 1990, proposing a three-dimensional framework encompassing professionalism, credibility, and appeal [9]. Companies enhance their image as professional information sources by disclosing technical evidence of their supply chains (such as blockchain traceability and ISO certification). Consumers infer that the company has the ability to regulate its supply chain, thereby reducing information asymmetry risks. Consistent transparency practices over the long term (such as regularly publishing supply chain responsibility reports) build a reputation for reliability. Consumers form the perception that “the company has no motive to deceive,” establishing institutional trust in the information source. Information credibility theory is defined as the audience's subjective assessment of the authenticity, accuracy, and reliability of specific information content [8]. Companies provide verifiable specific data (such as raw material origin coordinates and carbon footprint values) to meet accuracy requirements, allowing consumers to objectively assess product value propositions (such as environmental friendliness and safety). Meanwhile, the company's full-chain disclosure (from raw materials to recycling) covers ethical concerns important to consumers (such as labor rights and animal welfare). Highly relevant information (such as localized supply chains reducing transportation pollution) activates consumers' moral identity recognition and stimulates responsible purchasing motives.

The theory of source credibility and the theory of information credibility form a dual credibility synergy: high source credibility reduces consumers' information verification

costs, while high information credibility provides decision-making basis. The combination of the two strengthens consumers' purchase intentions. Supply chain transparency reduces consumers' concerns about performance risks (such as quality issues) and social risks (such as ethical controversies) through dual pathways, directly enhancing purchase confidence and thereby increasing consumers' purchase intentions [10].

2.3 Whether to disclose supply chain information is the result of a cost-benefit analysis by the company

From a benefit perspective, detailed supply chain disclosure can reduce a company's capital costs. Investors can assess the stability of a company's supply chain structure through supply chain information, evaluate the potential impact of changes in suppliers or customers, and use information on the identities and transaction volumes of upstream and downstream companies to infer related information such as tax compliance, earnings management, and dividend policies. Therefore, supply chain information disclosure helps investors improve their assessment of a company's operational quality and risks, enhance communication efficiency in capital markets, and reduce capital costs. From a cost perspective, supply chain information disclosure may also increase a company's proprietary costs, i.e., costs arising from reduced asset value. The disclosure of supplier and customer identities may be exploited by competitors, leading to the disruption of critical supply chain relationships. When key companies face negative impacts such as environmental pollution or operational crises, disclosing companies may also suffer losses. It is evident that increasing supply chain transparency leads to a decrease in capital costs and an increase in proprietary costs, and the balance between the two influences companies' disclosure decisions.

Previous literature has found that disclosing supply chain information has capital market benefits [11]. Companies disclosing supply chain information can reduce stock price synchronization and stock price crash risks. This indicates that supply chain information disclosure improves the company's information environment and reduces information asymmetry. Some companies incur lower costs when disclosing supply chain names, such as those facing lower product market competition pressure or lower proprietary costs. When disclosing supply chain information has a positive impact on the company's overall welfare, these companies will still choose to disclose supply chain information. The decision to disclose information is essentially a trade-off between proprietary costs and capital costs.

3 Conclusion

As public concern over food safety issues continues to grow, supply chain transparency has emerged as a core competitive advantage for modern food enterprises. In this process, the government plays an indispensable role, with its core function focused on food safety regulation and actively driving the development and improvement of a food supply chain transparency system. For food enterprises, establishing and maintaining an appropriate level of supply chain transparency yields significant positive effects. It is

not only a key driver in shaping and enhancing corporate brand image and market reputation but also directly strengthens consumer purchasing confidence, thereby effectively increasing consumer purchasing intent. As such, an appropriate transparency strategy can generate a series of positive chain reactions for businesses. From a financial perspective, higher supply chain transparency helps reduce a company's capital costs, primarily because it effectively mitigates market information asymmetry, thereby enhancing investor confidence and reducing perceived risk. However, pursuing high transparency is not without its costs. Companies may incur proprietary costs, such as the potential risk of leaking key commercial secrets (e.g., supplier relationships, unique processes, cost structures) or facing excessive scrutiny and public pressure on specific operational aspects.

Therefore, when food companies decide whether to disclose more supply chain transparency information, they are essentially carefully balancing the net benefits between the increased proprietary costs and reduced capital costs resulting from enhanced transparency. While academic research has extensively explored the value of supply chain transparency and its influencing factors, it has yet to delve into how food companies specifically conduct this critical cost-benefit decision-making process. Future research urgently needs to fill this gap, deeply investigating how food companies can effectively manage and minimize the accompanying proprietary costs while pursuing transparency to reduce capital costs. This will provide crucial theoretical insights and practical guidance for understanding corporate transparency decision-making behavior.

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