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Value Co-creation and Performance Evaluation of Frozen Food Enterprises from the Perspective of the Triple Bottom Line: A Case Study of *Anjoy Foods Group Co., Ltd.*

Zihan Wang

Abstract— **Against the backdrop of the deep integration of the digital economy and the real economy, value co-creation has emerged as a key approach for enterprises to overcome development bottlenecks and achieve sustainable growth. Drawing on the Triple Bottom Line (TBL) framework, this study takes Anjoy Foods Group Co., Ltd. as a case and evaluates the effectiveness of its value co-creation practices from three dimensions: economic, social, and environmental performance. By examining the evolution and outcomes of the company's value co-creation initiatives, this study provides practical insights for frozen food enterprises and other related industries seeking to enhance sustainable development through stakeholder collaboration..**

Index Terms—**Triple Bottom Line, Value Co-creation, Performance Evaluation, Frozen Food Enterprises**

I. Introduction

With the rapid advancement of the digital economy and digital technologies, the traditional paradigm of corporate value creation has undergone profound transformation. Rather than relying solely on internal operations, firms increasingly integrate the resources and capabilities of consumers, suppliers, governments, and other stakeholders to create value collaboratively and achieve mutual benefits. This shift implies that stakeholders should no longer be regarded merely as elements of the external business environment, but as active participants in firms' value creation processes. Through the establishment of a multi-stakeholder value co-creation ecosystem, enterprises can achieve a balanced integration of economic growth, social responsibility, and environmental sustainability, thereby promoting long-term sustainable development [1].

China's frozen food industry has experienced decades of industrialization and market expansion. Benefiting from the convenience and efficiency of frozen food products, the industry has achieved rapid growth alongside the upgrading of household consumption, evolving from labor-intensive workshops into a modern industrial system characterized by branding, intelligent manufacturing, and large-scale production. Nevertheless, the industry continues to face inherent challenges, including lengthy supply chains, rapid product innovation cycles, stringent cold-chain logistics requirements, and complex production–sales coordination. These characteristics, together with increasingly diversified consumer demand, intensified market competition, and growing pressure for refined cost management, have significantly increased the urgency of industrial transformation.

Against the backdrop of the digital economy, collaborative value co-creation enabled by digital technologies has become a strategic priority for frozen food enterprises. Owing to the highly integrated nature of the industry, firms must address the diverse interests of multiple stakeholders throughout the supply chain. Effective value co-creation not only facilitates a better understanding of stakeholder needs, optimizes resource allocation across the entire industrial chain, and coordinates stakeholder interests, but also simultaneously generates economic, social, and environmental value in accordance with the Triple Bottom Line (TBL) framework. Consequently, value co-creation maximizes overall corporate value while injecting new momentum into the transformation and upgrading of the traditional food-processing industry.

Against this background, this study takes Anjoy Foods Group Co., Ltd. (hereinafter referred to as Anjoy Foods) as the research subject. Drawing upon the Triple Bottom Line framework, the study systematically investigates how the company's value co-creation practices influence its economic, social, and environmental performance, with the aim of providing practical insights for value co-creation in the frozen food industry.

II. Theoretical Foundations

A. Stakeholder Theory

Stakeholder Theory was formally proposed by Freeman (1984). It argues that corporate stakeholders extend beyond shareholders to include all individuals or groups that can influence, or are influenced by, the achievement of organizational objectives, such as suppliers, creditors, employees, consumers, governments, and other relevant parties [2].

In the frozen food industry, upstream suppliers depend on stable procurement demand from manufacturers, downstream distributors and catering clients rely on reliable product supply and brand support, consumers continuously demand food safety and high product quality, while local governments are concerned with employment creation and tax contributions. By establishing an effective stakeholder-oriented value co-creation system, leading

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Zihan Wang,School of Economics and Management , Tianjin Agricultural University, Tianjin, China.

frozen food enterprises can enhance stakeholder engagement and cooperation, thereby generating positive impacts on corporate performance.

B. Triple Bottom Line Theory

The concept of the Triple Bottom Line (TBL) was introduced by Elkington (1998), emphasizing that sustainable corporate development should simultaneously pursue economic prosperity, environmental stewardship, and social well-being [3].

The TBL framework evaluates corporate performance from three complementary dimensions:

- **Economic performance**, which reflects the firm's ability to generate profits and maintain long-term economic viability;
- **Social performance**, which evaluates the firm's fulfillment of social responsibilities and contributions to society;
- **Environmental performance**, which focuses on environmental protection, resource conservation, and the reduction of pollution and waste emissions.

Based on this framework, the present study evaluates the effectiveness of Anjoy Foods' value co-creation practices from the perspectives of economic, social, and environmental performance.

C. Value Co-creation Theory

The concept of value co-creation was first proposed by Prahalad, who argued that value is created through interactions between firms and customers rather than solely through firms' internal activities. Subsequent research expanded this perspective from customer experience to the broader service ecosystem, emphasizing that value co-creation is a dynamic process in which multiple stakeholders jointly create value through service exchange and resource integration [4].

As the theory has evolved, the scope of value co-creation has expanded beyond the traditional firm – customer relationship to include suppliers, distributors, governments, universities, and research institutions. In the frozen food industry, value co-creation encompasses not only the alignment of supply and demand at the product level but also collaborative activities in research and development, channel construction, brand building, and other strategic partnerships.

Based on the theory of value co-creation, this study analyzes the evolutionary process of Anjoy Foods' value co-creation practices across three developmental stages and evaluates the corresponding performance outcomes.

III. CASE ANALYSIS

Founded in 2001 and headquartered in Xiamen, Fujian Province, Anjoy Foods Group Co., Ltd. was listed on the Main Board of the Shanghai Stock Exchange in 2017 and subsequently on the Main Board of the Hong Kong Stock Exchange in 2025. It is currently the leading enterprise in China's frozen food industry. The company's core businesses include the research and development, production, and sales of frozen prepared foods, frozen ready-to-cook dishes, and frozen flour- and rice-based products.

After more than two decades of development, Anjoy Foods has established a nationwide production and distribution network and developed a comprehensive product portfolio. Through acquisitions of Xinhongye, Dingweitai, and Kung Fu Foods (UK), the company has further expanded its business into frozen flour-based products, frozen prepared dishes, and frozen bakery products. In 2022, Anjoy Foods became the first enterprise in China's frozen food industry to achieve annual revenue exceeding RMB 10 billion and net profit surpassing RMB 1 billion. By 2025, its annual operating revenue had further increased to RMB 16.193 billion, maintaining its leading position in terms of industry scale, profitability, and market capitalization. It also became the first frozen food enterprise in China to achieve dual listing on both the A-share and H-share markets.

Based on Anjoy Foods' value co-creation practices between 2019 and 2025, this study divides the company's development into three distinct stages. By identifying the major stakeholders involved and the characteristics of value co-creation at each stage, the analysis provides the foundation for the subsequent performance evaluation.

A. Channel-Driven Value Co-creation Stage (2019 – 2020)

Anjoy Foods initiated its value co-creation strategy in 2019. In response to profound changes in distribution channels and the upgrading of consumer demand within the frozen food industry, the company introduced its "dual-wheel drive" strategy, which emphasized the simultaneous development of business-to-business (B2B) and business-to-consumer (B2C) markets. While consolidating its traditional distributor network, Anjoy Foods incorporated end consumers into its value co-creation system for the first time through the launch of the Lock-Fresh product series.

During the same year, the company implemented a restricted stock incentive plan, granting 6.31 million shares to 229 key employees, thereby institutionalizing value co-creation with internal stakeholders. On the production side, new manufacturing bases in Henan, Hubei, and Sichuan were successively put into operation, laying the foundation for a nationwide production and sales network.

At this stage, channel expansion served as the primary driving force of value co-creation. The company's co-creation model evolved from a distributor-oriented approach to a dual B2B – B2C framework, establishing both the stakeholder base and collaborative network necessary for subsequent development.

B. Digital Empowerment-Driven Value Co-creation Stage (2021 – 2022)

The second stage was characterized by the comprehensive deployment of the EDI-based Industrial Internet of Things (IIoT) production system. During this period, Anjoy Foods successively introduced a series of digital management platforms, including the Supplier Relationship Management (SRM) system, the Order Management System (OMS), the KA Link retail platform, and the Anjoy Home Customer Relationship Management (CRM) system. These digital platforms enabled integrated data sharing across procurement, production, sales, and logistics, substantially improving supply chain coordination.

Meanwhile, the company acquired Xinhongye and Xinliuwu, transforming upstream suppliers of freshwater surimi and crayfish from conventional trading partners into strategic stakeholders with shared interests. In 2022, Anjoy

Foods became the first frozen food enterprise in China to achieve annual revenue exceeding RMB 10 billion.

At this stage, digital empowerment became the primary driver of value co-creation. Digital technologies functioned as the central mechanism connecting stakeholders throughout the value chain, facilitating the transition from linear collaboration to an interconnected network of collaborative value creation.

C. Ecosystem-Oriented Value Co-creation Stage (2023 – Present)

The third stage was marked by the full implementation of the company's Environmental, Social, and Governance (ESG) framework and the launch of its globalization strategy. In 2023, Anjoy Foods established a Sustainability Committee under the Board of Directors and introduced a three-tier ESG governance structure to strengthen corporate sustainability management. In 2025, the company successfully completed its H-share listing, becoming the first frozen food enterprise in China to achieve dual listing on both the A-share and H-share markets.

In terms of environmental value co-creation, the company promoted the substitution of marine surimi with freshwater surimi and adopted various green initiatives, including reclaimed water recycling and photovoltaic power generation, to reduce its environmental footprint. In terms of social value co-creation, the company implemented the "Company + Cooperative + Farmers" model, which contributed to income growth for approximately 6,000 farming households.

At this stage, ecosystem leadership became the core driving force of value co-creation. The company's value creation objectives expanded beyond economic benefits to encompass coordinated improvements in economic, social, and environmental performance, fully reflecting the principles of the Triple Bottom Line framework.

IV. Value Co-creation Performance Evaluation

Based on the analysis of the evolution of Anjoy Foods' value co-creation practices, the company's collaborative mechanisms in industrial chain integration, digital transformation, technological innovation, and benefit sharing have been systematically examined. Building upon the Triple Bottom Line (TBL) framework, this section evaluates the performance of value co-creation from three dimensions: economic, social, and environmental performance.

A. Economic Performance

Economic performance is evaluated from three perspectives: shareholder responsibility, creditor responsibility, and supplier responsibility. These dimensions primarily reflect a firm's profitability, solvency, and operational efficiency during its business development [5]. Accordingly, return on equity (ROE), debt-to-asset ratio, quick ratio, and accounts payable turnover are selected to assess the economic performance of Anjoy Foods. The corresponding indicators are presented in Table 1.

Table 1. Economic Performance Indicators of Anjoy Foods (2019 – 2025)

Primary Indicator	Secondary Indicator	2019	2020	2021	2022	2023	2024	2025
Shareholder Responsibility	Return on Equity	15.44%	19.52%	14.66%	10.72%	12.10%	11.48%	9.61%
Creditor Responsibility	Debt-to-Asset Ration	51.73%	48.09%	41.36%	26.52%	25.43%	23.62%	23.42%
	Quick Ration	0.58	0.98	0.62	1.85	1.71	1.92	2.24
Supplier Responsibility	Accounts Payable Turnover	4.96	4.89	6.41	7.20	7.32	6.96	8.37

From the perspective of shareholder responsibility, the company's return on equity (ROE) exhibited an upward trend followed by a gradual decline. ROE increased from 15.44% in 2019 to a peak of 19.52% in 2020, before falling steadily to 9.61% in 2025. During 2019 – 2020, the implementation of the dual B2B – B2C strategy stimulated rapid revenue growth and improved shareholder returns. Beginning in 2021, however, continuous investment in production capacity expansion, upstream acquisitions, and research and development of new prepared food products intensified collaborative development across the industrial chain. At the same time, rising prices of key raw materials, including surimi and meat products, together with the costs associated with equity incentive programs and other value co-creation initiatives, diluted returns on shareholders' equity. These factors contributed to the decline in ROE, suggesting that large-scale value co-creation and industrial expansion may temporarily reduce short-term profitability while supporting long-term strategic growth.

With respect to creditor responsibility, the debt-to-asset ratio declined continuously from 51.73% in 2019 to 23.42% in 2025. This improvement was largely attributable to the company's diversified financing channels established through private share placements and its H-share listing, which reduced dependence on interest-bearing liabilities. Meanwhile, supply chain financial collaboration lowered the demand for external borrowing, thereby mitigating long-term financial risk. Over the same period, the quick ratio increased significantly from 0.58 to 2.24, indicating a substantial enhancement in short-term solvency. Supported by digital settlement systems, the company optimized accounts receivable and inventory management, accelerated cash recovery, and strengthened its liquidity position.

Regarding supplier responsibility, the accounts payable turnover ratio increased from 4.96 times in 2019 to 8.37 times in 2025. Through equity participation, long-term procurement agreements, and joint research and development projects, Anjoy Foods established closer strategic partnerships with upstream suppliers. The implementation of a digital procurement collaboration platform enabled centralized purchasing, stabilized procurement volumes, and facilitated the sharing of market demand information. At the same time, the company appropriately extended payment periods for qualified suppliers while ensuring stable order volumes for farmers and raw material producers. These initiatives not only improved suppliers' income stability but also enhanced the company's procurement efficiency and working capital management. Overall, collaborative value creation across the supply chain effectively optimized financial relationships between the company and its upstream partners, resulting in continuous improvements in supply chain operational efficiency.

Overall, Anjoy Foods has continuously optimized its capital structure and supply chain efficiency through collaborative value creation across the industrial chain. Nevertheless, large-scale industrial expansion has exerted short-term pressure on shareholder profitability, indicating that future development should seek a better balance between long-term strategic investment and shareholder value creation.

B. Social Performance

Social performance is evaluated from four dimensions: employee responsibility, customer responsibility, government responsibility, and public welfare responsibility. These dimensions primarily reflect a firm's performance in employee welfare, customer service, social contribution, and philanthropic activities while fulfilling its corporate social responsibilities [6][7]. Accordingly, employee income ratio, cost-to-expense profit ratio, government contribution ratio, and charitable donations are selected as the evaluation indicators. The corresponding results are presented in Table 2.

TABLE 2. SOCIAL PERFORMANCE INDICATORS OF ANJOY FOODS (2019 – 2025)

Primary Indicator	Secondary Indicator	2019	2020	2021	2022	2023	2024	2025
Employee Responsibility	Employee Income Ratio	0.52	0.42	0.50	0.43	0.40	0.40	0.40
Consumer Responsibility	Profit Margin on Cost and Expenses	10.10%	12.61%	10.37%	13.28%	16.00%	15.16%	12.94%
Government Responsibility	Government Income Ratio	0.22	0.30	0.21	0.24	0.24	0.27	0.28
Public Welfare Responsibility	Donation Expenditure	23.61	55.77	58.38	130.88	48.53	26.71	33.10

From the perspective of employee responsibility, the employee income ratio exhibited an overall downward trend, decreasing from 0.52 in 2019 to 0.40 after 2023, where it remained relatively stable. This decline was primarily attributable to the company's continuous expansion, increased investment throughout the industrial chain, and the adoption of long-term incentive mechanisms such as equity-based compensation. As a result, part of employee remuneration was converted into equity incentives rather than being fully recognized as current-period employee income. Nevertheless, the number of employees covered by the company's equity incentive program increased substantially from 229 in 2019 to 1,344 in 2025, indicating that the interests of key employees became increasingly aligned with the company's long-term development objectives. Consequently, a collaborative value-sharing mechanism between employees and the enterprise was gradually established.

With regard to customer responsibility, the cost-to-expense profit ratio generally demonstrated an upward trend, with only slight declines in 2021 and 2025. Benefiting from digital technologies, Anjoy Foods strengthened value co-creation across multiple sales channels while continuously introducing successful new products. At the same time, refined cost management further improved operational efficiency and profitability. These efforts enhanced both product cost-effectiveness and market competitiveness, enabling the company to deliver greater value to consumers.

In terms of government responsibility, the government contribution ratio increased steadily from 0.22 in 2019 to 0.28 in 2025. As the company's operating revenue continued to grow, its tax contributions increased accordingly, generating greater fiscal revenue for local governments. This trend reflects the positive outcomes of collaborative value creation between the enterprise and government stakeholders in promoting regional economic development.

Regarding public welfare responsibility, charitable donations fluctuated considerably during the study period, reaching a peak of RMB 1.3088 million in 2022 before declining in subsequent years. The sharp increase in 2022 was mainly associated with the company's expanded investment in rural revitalization initiatives and emergency supply support during the COVID-19 pandemic. The subsequent decline reflected the pressure on industry-wide profitability after the pandemic. Although charitable expenditures have decreased in recent years, Anjoy Foods has established a relatively comprehensive public welfare system covering disability assistance, educational support, and elderly care. Nevertheless, the long-term stability of its philanthropic investment still requires further improvement.

Overall, Anjoy Foods has achieved steady progress in social value co-creation with employees, customers, and government stakeholders. However, fluctuations in charitable investment indicate that the distribution of value among different stakeholder groups has not yet reached an optimal balance, leaving room for further improvement in the sustainability of its social performance.

C. Environmental Performance

Environmental performance is evaluated from the perspective of environmental responsibility, with a particular focus on green production and environmental investment during business operations. Accordingly, energy consumption per unit of output and the proportion of environmental protection investment are selected as the evaluation indicators. The corresponding results are presented in Table 3.

TABLE 3. ENVIRONMENTAL PERFORMANCE INDICATORS OF ANJOY FOODS (2019 – 2025)

Primary Indicator	Secondary Indicator	2019	2020	2021	2022	2023	2024	2025
Green Production	Energy Consumption per Unit of Product	0.1127	0.1114	0.1063	0.1102	0.1086	0.1000	0.0804
Environmental Protection Investment	Proportion of Environmental Protection Investment	0.0767	0.0667	0.0682	0.0283	0.0363	0.0322	0.0026

Regarding green production, energy consumption per unit of output exhibited an overall downward trend, decreasing from 0.1127 tons of standard coal per ton of product in 2019 to 0.0804 tons in 2025, representing a cumulative reduction of 28.7% over the study period. This improvement can primarily be attributed to two factors. First, the full implementation of the EDI production management system enabled digital monitoring and intelligent scheduling of manufacturing processes, allowing energy consumption to be monitored and controlled in real time. Second, the company continuously promoted energy-saving technological upgrades and optimized production processes for energy-intensive operations, thereby facilitating the adoption of green and low-carbon technologies throughout the manufacturing process. The sustained decline in unit energy consumption demonstrates the positive contribution of digital empowerment to green production.

With respect to environmental investment, the proportion of environmental protection investment declined substantially after 2022, falling from 0.0767% in 2019 to 0.0026% in 2025. Prior to 2022, the company was in a period of intensive environmental infrastructure construction, during which multiple production facilities were equipped with wastewater treatment systems, air pollution control equipment, and other environmental protection facilities, resulting in relatively high capital expenditures. Following the completion and commissioning of these facilities, environmental investment gradually shifted from large-scale capital construction to routine operation and maintenance. Consequently, capital expenditures on environmental protection decreased significantly, leading to a marked decline in the proportion of environmental investment.

Overall, Anjoy Foods has successfully reduced unit energy consumption through the coordinated implementation of digitalization and green production initiatives. However, the continuous decline in environmental investment suggests that a long-term mechanism for green value co-creation has not yet been fully established, which may constrain the balanced realization of ecological value in the future.

V. Conclusions And Implications

A. Conclusions

Taking Anjoy Foods Group Co., Ltd. as the research subject, this study systematically examined the three-stage evolution of the company's value co-creation practices and evaluated their economic, social, and environmental performance based on Stakeholder Theory and the Triple Bottom Line (TBL) framework. The major conclusions are summarized as follows.

First, the value co-creation practices of Anjoy Foods evolved through three distinct stages: channel-driven development, digital empowerment, and ecosystem leadership. The driving forces of value co-creation became progressively more advanced, while the collaboration model evolved from linear coordination to a networked collaborative system. Correspondingly, the focus of value creation expanded from purely economic benefits to the coordinated realization of economic, social, and environmental value in accordance with the Triple Bottom Line framework.

Second, value co-creation has generated significant positive effects on the overall performance of Anjoy Foods. Although there remains room for improvement in maintaining the stability of charitable investment and environmental expenditure, the overall impact has been predominantly positive. In terms of economic performance, operating revenue increased steadily, solvency improved, capital turnover became more efficient, and the company's capital structure was continuously optimized. Regarding social performance, digital empowerment significantly enhanced the cost-to-expense profit ratio and strengthened the company's ability to fulfill its responsibilities toward consumers. In terms of environmental performance, energy consumption per unit of output declined by 28.7% over the seven-year period, demonstrating substantial progress in green production.

B. Conclusions

First, value co-creation in frozen food enterprises should follow a stage-specific development path. The transition from channel-driven development to digital empowerment and ultimately to ecosystem leadership reflects different strategic priorities and resource allocation requirements at each stage. The experience of Anjoy Foods suggests that enterprises should adopt value co-creation strategies that are aligned with their own stage of development rather than pursuing cross-stage expansion prematurely.

Second, digitalization and green transformation can reinforce one another. The implementation of Anjoy Foods' digital intelligent systems not only improved production efficiency but also significantly reduced energy consumption per unit of output. This finding indicates that digital transformation and environmental performance are mutually supportive. Frozen food enterprises should therefore integrate digital technologies with green development strategies to promote sustainable growth through technological innovation.

Third, successful value co-creation requires balancing the interests of multiple stakeholders. Although Anjoy Foods has achieved remarkable progress in safeguarding shareholder and creditor interests and strengthening collaboration with suppliers, the stability of charitable investment and environmental expenditure remains insufficient. This suggests that frozen food enterprises should establish more balanced value distribution mechanisms to ensure that the interests of all stakeholder groups are appropriately addressed while advancing value co-creation initiatives.

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