

Modeling the Key Factors Influencing the Collaboration in Fresh Produce Supply Chain

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Abstract

This study aims to elucidate the key factors driving collaboration within the fresh produce supply chain (FPSC) by conducting a comprehensive literature analysis and examining the interrelationships of these factors to pinpoint the most influential ones. Employing Interpretive Structural Modeling (ISM) alongside the Matrice d'Impacts Croisés-Multiplication Appliquée à un Classement (MICMAC) method, and complemented by content analysis for factor identification, this research identifies a collaboration culture as the paramount factor influencing collaborative behaviors in FPSCs. The study's scope is confined to internal factors, omitting external influences like government policies, logistics infrastructure, and financial support. The insights gleaned are intended to guide managers and policymakers towards enhanced understanding and strategic decision-making that foster collaboration in FPSCs, thus contributing to the achievement of sustainable development goals within this sector.

Keywords: Fresh products; Supply chain; Collaboration; Key factors.

1. Introduction

Attaining sustainable development within Fresh Produce Supply Chains (FPSCs) is a complex challenge, compounded by an array of social, environmental, and economic obstacles. The advent of the COVID-19 pandemic has exacerbated these challenges, adversely impacting FPSCs and leading to considerable delays in delivering fresh food to consumers at retail and wholesale levels. These disruptions can be attributed to a confluence of factors, including labor shortages, congested ports, elevated input costs, diminished road transport efficacy, and regulatory constraints.

A supply chain is conceptualized as an interconnected network comprising three or more entities—organizations or individuals—engaged in the bidirectional flow of products, services, finances, and information from the point of origin to the end consumer (Krykavskyy et al., 2023; Mugurusi et al., 2021; Oliveira et al., 2022). Supply Chain Management (SCM) involves the strategic and systematic coordination of conventional business functions and policies both within a particular enterprise and across the network of businesses constituting the supply chain, aiming to optimize the long-term efficacy of both individual entities and the supply chain collectively (Haleem & Sufiyan, 2021; Min et al., 2019; Oliveira et al., 2022). Supply Chain Collaboration (SCC) represents a multi-tiered collaborative effort that leverages the external business environment to amplify a firm's competitive edge (Aggarwal et al., 2020; Stefansson &

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Russell, 2008; Yi et al., 2016) . The current discourse on SCC is vigorous, reflecting its criticality: empirical evidence suggests that enterprises engaging in efficacious supply chain collaboration report marked reductions in costs and inventory levels alongside enhancements in operational efficiency, service quality, and consumer satisfaction.

The perishable nature of fresh produce necessitates an intensified focus on timely delivery, setting it apart from other goods and imposing more stringent management requirements within the supply chain. To ensure the seamless integration of various stages such as production, procurement, storage, transportation, processing, and sales into a cohesive system, a profound comprehension of SCM principles is indispensable for both agricultural producers and production companies. Against this backdrop, this paper seeks to explore the following research questions:

2. Literature review

2.1 Theoretical perspectives

The theoretical perspectives on supply chain management underscore the significance of collaborative management, stakeholder engagement, and critical success factors. Collaborative management, rooted in Ansoff's synergy concept, is pivotal for enhancing operational efficiency within supply chains through the strategic alignment and integration of stakeholder activities, focusing on shared objectives and resource optimization. Freeman's stakeholder theory extends beyond profitability to include the social responsibilities of organizations, advocating for a balanced consideration of all stakeholder interests in decision-making processes, thereby serving as an ethical and strategic means to achieve a competitive edge. The critical success factors theory highlights the necessity for organizations to recognize and manage a core set of essential elements—typically five to nine—to maintain competitiveness and achieve their mission, as neglecting these can impede goal attainment. Together, these theories provide a comprehensive framework for understanding the dynamics of supply chain management and the importance of collaboration, stakeholder consideration, and focused strategic planning.

2.2 Causes of Management Collaboration in FPSCs

Moon et al. (2020) suggest that the competitive edge of agricultural products depends on the collective efforts within a unified supply chain rather than isolated actions by individual entities. Effective FPSC management requires aligning individual and collective goals through systematic and comprehensive approaches to maximize benefits. The FPSC network, comprising farmers, co-ops, processors, logistics, retailers, and consumers, operates collaboratively, respecting mutual service boundaries and adhering to standardized protocols to enhance supply chain efficiency.

This collaboration is evident in decision-making and logistics. Companies within the FPSC align closely in their decisions, jointly analyzing market trends to devise unified production, procurement, and inventory strategies that reduce costs throughout the supply chain. In today's multi-channel retail environment, logistics integration is vital, including efficient distribution, returns handling, and after-sales support. Failures in last-mile delivery or return processes can significantly undermine supply chain performance.

2.3 Problem Statement

The distribution and production patterns of fresh produce are notably varied, which sets them apart from practices in other countries. In the U.S., agriculture is marked by high specialization, regional clustering, and large-scale production. Japan primarily uses a lengthy distribution process involving multiple stages of wholesale markets. In contrast, the U.S. favors a shorter distribution system focused on large-scale distribution centers. China's approach to product circulation is more complex and varied, featuring both multi-