

The role of supply chain agility in the effectiveness of supply integration on new product innovation performance

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Abstract

The aim of this research is to study and investigate the impact of supply chain integration dimensions on new product innovation performance through supply chain agility in Pegah Pasteurized Dairy Company in the northwest region of Iran. This study is applicable in terms of its purpose, and descriptive-analytical in terms of method, using a survey method with a causal approach. The statistical population in this study includes managers of Pegah Pasteurized Dairy in the northwest region of the country, and the statistical sample consists of 104 people, selected by the Cochran formula and a simple random method. The primary data collection tool is a standard questionnaire, and the validity was confirmed in the form of face validity and factor analysis method with the KMO index, as well as their reliability with the report of the total Cronbach's alpha coefficient (0.907). Descriptive and inferential statistical methods were used in data analysis, in which SPSS version 21 software was used in descriptive analyses; and structural equations and LISREL 8.8 software were used in inferential analyses and testing of research hypotheses. The results of the study using path analysis technique show that internal integration, customer integration, and supply chain integration have a significant effect on supply chain agility. Also, supply chain agility, market knowledge, and product development have a significant effect on product innovation capability. And internal integration, customer integration, and supply chain integration have a significant effect on product innovation capability through the mediation of supply chain agility.

Keywords:

Supply chain integration, new product innovation performance, supply chain agility, customer integration, pegah Dairy Company

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Extended Abstract

Introduction

Supply chain management involves managing the flow of goods and services between businesses and locations, and includes the movement and storage of raw materials, work-in-process inventory, and finished goods, as well as end-to-end order fulfillment, from origin to point of consumption. In other words, timely and accurate supply chain information allows manufacturers to produce and ship only the saleable product (Karami, Rahimzadeh, 2023). Effective supply chain systems help manufacturers and retailers to reduce redundant activities. This reduces the cost of production, transportation, insurance, and storage of goods that cannot be sold. Over the past two decades, different perspectives have been examined by different researchers in the field of supply chain management; one of the important topics in this field is the concept of supply chain integration (Yu, et al., 2023). With the increase in competition in the business world and the emergence and development of new technologies, many companies in the world have turned towards integration. The goal of an integrated supply chain is to achieve effective and efficient flows of products and services, information, money, and decisions to provide the most value at low cost and high speed. In fact, supply chain integration provides a major opportunity for companies to improve their performance and market position. Supply chain integration is defined as a strategic collaboration of intra- and inter-organizational processes that leads to a more cohesive supply chain. In fact, new products are the answer to the biggest problems of organizations. The dairy industry, with its long value chain and numerous links, is considered an effective and efficient industry in the Iranian economy; and yogurt, as one of the most popular dairy products, is consumed daily by many customers. Therefore, identifying and understanding the customers' subjective expectations of this product as one of the important external sources of creating new knowledge and providing a product in line with the expectations and demands of customers is a necessary condition for the survival of dairy producers in the competitive market (Shriharsha Hungund, 2025). Pegah Dairy Company, as one of the leaders of the dairy industry in Iran, needs to improve quality, innovation and optimal supply chain management, given the perishability of products and continuous changes in demand. In the dairy industry, which is a vital part of the food industry, the use of environmental management systems and agility in the supply chain is of great importance for providing quality raw materials and responding quickly to market needs. Supply chain agility plays a key role in coordinating between suppliers, distributors and customers and ultimately, improving the health and quality of products. Therefore, the main question is: Can supply chain agility have a significant impact on improving the effects of supply chain integration on new product innovation performance in Pegah Dairy Company in the northwest region of Iran?

Theoretical Framework

Supply Chain Agility: An agile supply chain emphasizes improving adaptability and flexibility and has the ability to respond and react quickly and effectively to changing needs. As a type of operational capability, it refers to the ability of a company to perform activities that react and integrate with other partners in a rapid manner in order to adapt or respond to market changes (Panahi, Kazemi, 2018).

Supply Chain Integration: Supply chain integration involves the efficient integration of suppliers, manufacturers, warehouses, and stores with the aim of minimizing system costs while meeting customer demand; for this purpose, various supply chain management parameters such as lean, agile, sustainable, and green are used to achieve integration. Supply chain integration involves the efficient integration of suppliers, manufacturers, warehouses,

and stores with the aim of minimizing system costs while meeting customer demand. For this purpose, various supply chain management parameters such as lean, agile, sustainable and green are used to achieve integration (Abbasi, et al. 2023). Supply chain integration can be defined as the extent to which a company collaborates and manages business processes in its supply chain. Supply chain integration is defined as the strategic collaboration of intra- and inter-organizational processes that lead to a more cohesive supply chain (Pesch et al., 2024). Over the past two decades, different perspectives have been examined by different researchers in the field of supply chain management; one of the important topics of which is the concept of supply chain integration. With the increase in competition in the business world and the emergence and development of new technologies, many companies in the world have turned towards integration. The goal of an integrated supply chain is to achieve effective and efficient flows of products and services, information, money, and decisions to provide the most value at low cost and high speed. In fact, supply chain integration provides a major opportunity for companies to improve their performance and market position. The levels of supply chain integration include the following:

Internal integration Internal integration is defined as the strategic collaboration of intra-organizational processes that leads to a more cohesive organization (Freijea et al., 2024).

Customer integration Customer integration refers to the interactive behavior of customers by providing constructive ideas and opinions (the role of the customer) in the process of producing a service or tangible good (Valaei et al., 2019).

Market knowledge: In marketing, it is necessary to understand the organization's position which can be analyzed in terms of internal factors, i.e. strengths and weaknesses, and in terms of external factors, in the concept of opportunities and threats. Then, taking into account the analysis of the organization's position, targeted and timed planning, especially strategic planning, is carried out and a plan is designed to turn weaknesses into strengths and threats into opportunities (Lovafan, 2023).

Product Development: Introducing new products to the market is one of the main activities of FMCG companies. New product development is appropriate within the scope of activities that companies use to grow market share in the existing market or to grow the total market for their products. (Freijea et al., 2024).

Research Methodology

This research is applicable in terms of its purpose, and descriptive-analytical in terms of its method, using a survey method with a causal approach. The statistical population in this study includes managers of Pegah Pasteurized Dairy in the northwest region of Iran, and the statistical sample is 104 people, selected using the Cochran formula and a simple random method. The primary data collection tool is a standard questionnaire, and the validity was confirmed in the form of face validity and factor analysis method with the KMO index, as well as their reliability by reporting the total Cronbach's alpha coefficient (0.907.)

Research findings

Descriptive and inferential statistical methods were used in data analysis; SPSS version 21 software was used in descriptive analyses, and structural equations and LISREL 8.8 software were used in inferential analyses and testing of research hypotheses. The results of the study using path analysis technique show that internal integration, customer integration, and supply chain integration have a significant effect on supply chain agility. Also, supply chain agility, market knowledge and product development have a significant effect on product innovation capability. And internal integration, customer integration, and supply chain integration have a

significant effect on product innovation capability through the mediation of supply chain agility.

Conclusion

This study, focusing on Shirpegah Company, one of the leaders in the Iranian Dairy industry, has examined the role of supply chain integration at the internal, customer, and supplier levels on supply chain agility and product innovation capability. The results are consistent with previous studies such as Wong et al., (2023); therefore, it shows that all three types of integration have a significant impact on supply chain agility; and this agility, as a mediating factor, plays a key role in strengthening the effects of these integrations on product innovation. Also, variables such as market knowledge and product development directly affect product innovation. In the dairy industry, which faces challenges such as high perishability, demand fluctuations, and the need to maintain quality; creating an agile, coordinated, and responsive supply chain is of particular importance. Accordingly, effective supply chain management through the use of information technology, facilitating information flow, and enhancing interaction between suppliers, manufacturers, and customers can create a significant competitive advantage. To achieve this goal, it is suggested that Pegah Dairy Company take steps by focusing on strengthening technological infrastructure, continuously updating knowledge bases, creating effective communication networks, and developing strategic partnerships with suppliers. Also, holding training sessions to transfer experience, conducting accurate needs assessments in the supply chain, and continuous negotiation with business partners to adapt to market changes are other suggested solutions to improve performance and promote product innovation in this industry.