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Tesis

Logistic Management and Neural Network Maps: Keys to Cost Optimization in Cardboard Packaging Manufacturing

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Logistic management and neural network maps: Keys to cost optimization in cardboard packaging manufacturing

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A B S T R A C T

The focus of this research is to analyze how supply chains' management affects production costs in the cardboard and Packaging sector in Peru, specifically through the creation of artificial neural networks (ANN) to improve the logistical activities. Non-experimental quantitative design was applied, collected the data from the Year 2020 to the Year 2024 and sought to assess variables such as supplier capacities, stocks held, bottom line costs incurred and stock out ratios. The study revealed that there exists a proportionate inverse relationship between the logistical
costs and production costs, proving that as the cost of acquiring goods needed for production as well as the cost of keeping and managing stock decreases, the overall production cost also decreases significantly. The ANN model was able to perform cost predictions with a high degree of accuracy which points out the relevance of sophisticated instruments in the shift of the supply chain. Also, it is important to note the core contribution of the research – effective logistics management is emphasized as a way of increasing competition in industries where supply chains are of critical importance. This research reinforces the effectiveness of designing ANN in minimizing costs, while adding knowledge to the reporting practice of the companies aimed at bettering their costs. The results are a good contribution in terms of technological change in logistics aimed at helping the organizations remain flexible in a changing economy.

1. Introduction

Procuring materials is closely linked to a company's logistics, as outlined by Tang (2018), who defines logistics as a concept tailored to meet customer demands and forms the bedrock of an organization's productive endeavors. At present, there is an enigma surrounding effective logistics management: on one hand, achieving optimal inventory levels is a common objective pursued by harmonizing initial supply and demand. In today's market landscape, characterized by swift globalization fueled by information and communication technologies, logistics is emerging as a fresh factor setting companies apart in the competition. Even locally, enterprises situated in remote locales have witnessed notable upticks in production and competitive capacity in services, largely attributed to robust logistics practices. A robust logistics framework doesn't just facilitate competitive forays into distant markets but also bolsters and elevates local market competitiveness. Hence, it becomes vital for companies not just to enhance their logistics for heightened competitiveness but to sustain it over the long term (Flores Vilcapoma, 2024).

Adeniran et al. (2024) point out that logistics is now a pivotal instrument for enhancing competitiveness. Well-structured logistics can confer substantial edges over other economies, effectively addressing scarcity issues and streamlining product transportation. Similarly, Mora (2024) underscores that modern logistics management is a key distinguishing factor for organizations. It's a core component of a systemic approach that links vital processes within the logistics system: procurement (purchasing management, storage, and inventory management), production, distribution or sales, and even

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