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# THE INFLUENCE OF HUMAN RESOURCE QUALITY AND DISTRIBUTION CENTER LOCATION ON THE SMOOTHNESS OF GOODS DELIVERY THROUGH SEA TRANSPORTATION WITH THE MEDIATION OF DIGITAL COMMUNICATION AND LOGISTICS COSTS: A CONCEPTUAL MODEL

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## ABSTRACT

Over the past three years, PT X, a company engaged in shipping goods through sea transportation, has recorded a decline in the average delivery time key performance indicator. The company achieved an average delivery time of around 4.0 days in 2021, but there was a significant increase in delivery time to 5.2 days in 2022, which then rose further to 6.8 days in 2023. The smoothness of goods delivery through distribution centers is greatly influenced by the quality of human resources, the location of the distribution center, digital communication, and logistic costs. This quantitative study aims to examine the influence of the quality of human resources and the location of distribution centers on the smoothness of goods delivery via sea transportation, with digital communication and logistic costs serving as mediators.

## Keywords

Human Resource Quality, Distribution Center Location, Smoothness of Goods Delivery, Digital Communication, Logistics Costs, Conceptual Model.

## INTRODUCTION

PT X is one of the companies engaged in shipping goods through sea transportation. Over the past three years, PT X has recorded a decline in the average delivery time key performance indicator. In 2021, the company achieved an average delivery time of around 4.0 days, indicating good efficiency. However, in 2022, there was a significant increase in delivery time to 5.2 days, which then rose further in 2023 to 6.8 days.

The smoothness of goods delivery through distribution centers is greatly influenced by the quality of human resources (HR) involved in its operations. HR quality is a key factor in maintaining the efficiency and reliability of the distribution process. Additionally, the location of the distribution center also plays a crucial role in the smooth delivery of goods. Strategic location selection can optimize geographic reach and reduce travel distance between distribution centers and customers. In this context, HR quality at distribution centers and strategic location selection work together to create an efficient, reliable, and responsive distribution system to market demand.

Digital communication and logistic costs play a central role in determining the smoothness of goods delivery in this era of globalization. Digital communication enables stakeholders in the supply chain to interact in real-time. Through digital com-

munication, logistics players can minimize the risk of delays or uncertainties in the delivery process. Transportation, warehousing, and handling costs can affect a company's competitiveness and product pricing. Therefore, cost efficiency is key to maintaining operational smoothness.

HR quality and the location of distribution centers are interconnected in supporting the advancement of digital communication in the supply chain to ensure the smoothness of the entire goods distribution process. The combination of high HR quality and strategic distribution center locations creates synergy that supports efficient logistic cost management. This study delves into how the quality of human resources and the location of distribution centers on the smoothness of goods delivery via sea transportation, with digital communication and logistic costs serving as mediators.

## LITERATURE REVIEW

### A. Human Resource Quality

Human resource quality (HRQ) refers to the characteristics and competencies of individuals within an organization, playing a crucial role in achieving organizational goals effectively. According to Hullah et al. (2012), HRQ involves both individuals and the organization as a whole, emphasizing collaboration to achieve goals. Anggraeni (2013) defines HRQ as the ability of human resources to meet task demands, reflecting their contribution to operational success. Widodo (in Arfianti, 2011) adds dimensions such as skills, education, training, and experience, indicating that HRQ extends beyond physical abilities to include character and values. Overall, HRQ encompasses characteristics, skills, and values directly impacting organizational performance, requiring attention to development and management for operational success.

HRQ is central to a nation's welfare and progress, varying among nations and posing challenges for developing countries (Sugiyanto, Endarto, & Nugroho, 2016). Influencing factors are complex, including education, training, nutrition, public health, environment, and sociocultural influences. Education and training shape HRQ, while nutrition and health affect productivity. Environmental factors impact physical and mental health, influencing individuals' contribution to society. Understanding these factors allows for policy and program development to enhance population welfare, emphasizing education, health, and positive work environments.

HRQ significantly affects operational smoothness and efficiency in distribution processes (Sedarmayanti, 2013). Key indicators include physical, intellectual, and psychological qualities. Physical health and fitness impact operational efficiency, while intellectual abilities involve understanding distribution procedures and regulations. Psychological aspects, like work ethics and adaptability, influence the distribution process's smoothness. Understanding and measuring these indicators enable companies to improve HRQ through appropriate policies and training programs, contributing to operational efficiency and global reputation.

Mather, Marlow, and Cummings (2013) demonstrate that aspects of human resource quality, such as communication and collaboration skills, can influence the effectiveness of digital communication in the context of clinical supervision. Kick, Contacos-Sawyer, and Thomas (2015) imply that characteristics of Generation Z, including speed and diversity in using digital technology, can influence future work relationships. Barata (2020) found that human resource quality was identified as one of the key factors that can affect the magnitude of logistics costs. Dullayaphut, Sakulkoo, and Tubsree (2014) show that human resource management strategies can significantly impact operational efficiency and, therefore, logistic costs. Anggraeni (2022) provides a concrete view on how human resource quality contributes to overall smoothness in goods delivery. Vijayakumar et al. (2021) provide an overview of how human resource quality can affect overall operations smoothness, including goods delivery via maritime transportation.

### B. Distribution Center Location

The distribution center location is a strategic element in a company's supply chain, crucial for managing the flow of goods from producers to consumers. According to Viale (2014), it serves as a central hub where distribution activities are controlled and organized, playing a vital role in inventory management, operational efficiency, and customer satisfaction. Key factors influencing location selection, as discussed by Viale (2014), include accessibility, transportation connectivity, operational costs, and overall supply chain strategy.

The selection of a distribution center location is a strategic decision with significant impacts on a company's supply chain efficiency and effectiveness. Various factors influencing this decision, as outlined by Viale (2014), Utami (2008), and Nasution (2008), include human resource availability, transportation accessibility, operational costs, proximity to markets and customers, environmental conditions, and technological infrastructure. Understanding and considering these factors are essential for minimizing distribution costs, accelerating delivery times, and enhancing inventory efficiency.

In evaluating distribution center location indicators, several crucial factors need to be considered to ensure operational success and efficiency in the supply chain. Key indicators, as identified by Viale (2014), Utami (2008), and Nasution (2008), include strategic location, management quality, leadership effectiveness, staff competence, and infrastructure facilities. These indicators encompass aspects such as transportation accessibility, management capabilities, leadership vision, workforce skills, and facility adequacy, all of which contribute to optimizing distribution operations and achieving competitive advantages.

Kostikov, Jílková, and Stránská (2021) emphasize that the physical location of distribution centers can influence the smooth integration of digital communication. Kolosok and Lazarevska (2020) indicate that the distribution center's location is considered a

critical variable that can affect the level of efficiency of digital communication. He (2023) demonstrates that selecting the right location in the cold chain can minimize logistics costs associated with storing and distributing temperature-controlled products. Cui et al. (2022) show how location selection can significantly impact logistics expenditures. Hasanpour Jesri et al. (2023) provide insights into how distribution center location selection can affect the smooth flow of goods shipping. Hu et al. (2015) indicate that the concept of distribution center location selection remains relevant for a broader understanding of how distribution center locations can influence the efficiency and smoothness of goods delivery.

### C. Digital Communication

Digital communication, rooted in the Latin "communicatio," refers to the process of conveying information and shared understanding among individuals or groups using digital technology. It reflects the exchange of knowledge, information, or experiences among individuals through electronic media. Digital communication involves conveying statements from one individual to another through digital devices and platforms, seen as a process with specific patterns and goals, facilitating the exchange of information and influencing opinions through digital technology (Suprpto, 2011). In the workplace, effective digital communication fosters harmonious environments through email, instant messaging, and social media platforms, supporting shared understanding and efficient goal achievement.

In maritime transportation, digital communication is crucial for operational efficiency, security, and safety. Factors influencing digital communication include adequate information technology infrastructure, such as reliable internet networks and signal coverage in maritime areas, enabling real-time communication and effective coordination among involved parties (Abotaleb et al., 2021). Security protocols, data encryption, and system interoperability are essential for protecting confidential information and ensuring seamless information flow across various systems. Additionally, human resources training is vital for utilizing digital technology optimally and overcoming technical challenges, while robust backup solutions are necessary for maintaining communication in adverse environmental conditions.

Digital communication indicators play a central role in supporting smooth cargo delivery via maritime transportation, ensuring timely and accurate information flow along the logistics supply chain (Jabeena et al., 2017). Real-time monitoring, inventory management systems, collaborative platforms, automatic notifications, and digital education and training enable stakeholders to monitor cargo status, optimize inventory, collaborate efficiently, manage risks, and adapt to industry changes. Leveraging these indicators allows logistics companies and stakeholders to create integrated and efficient ecosystems for cargo delivery.

The study by Gayialis et al. (2022) provides an overview of how the integration of information technology, particularly digital communication, can enhance the efficiency and smoothness of the flow of goods shipping through maritime transportation. Bhandari (2014) offers insights into how technology, especially digital communication, can impact logistics overall, becoming relevant in understanding how technology can improve the smoothness of goods delivery. Studies by Kick et al. (2015) and Gayialis et al. (2022) demonstrate how human resource quality, including proficiency in digital communication, can affect the smoothness of goods delivery through maritime transportation. Kostikov et al. (2021) and Bhandari (2014) indicate that digital communication can moderate the relationship between distribution center location and the smoothness of goods delivery via maritime transportation.

### D. Logistic Costs

Logistics costs are pivotal factors in modern supply chain management, influencing operational efficiency and overall business success. Various definitions of logistics costs encompass the expenditure aspects involved in managing the movement and distribution of goods. Logistics costs refer to all expenses related to planning, execution, and control of the flow of goods and information within the supply chain. They include transportation, storage, inventory management, packaging, and other activities involved in the journey of goods from source to end consumers (Garside, 2017). Operational logistics costs, focusing on direct expenditures in daily logistics operations, provide insight into how efficiently an organization can run its logistics operations to meet market demands (Martono, 2018).

Total logistics cost concept involves measuring all direct and indirect costs involved in the entire supply chain. It covers operational logistics costs, inventory-related costs like storage expenses, and customer service costs. The goal is to gain a comprehensive understanding of the efficiency and effectiveness of the overall supply chain. By understanding total logistics costs, companies can identify areas where expenditures can be optimized, minimize wastage, and enhance net profits (Suarna et al., 2022). These definitions reflect the complexity of managing logistics costs in a constantly evolving supply chain context. Effective logistics cost management involves not only monitoring day-to-day operational costs but also gaining a deep understanding of their impact on the overall supply chain. Thus, companies can make better decisions, improve operational efficiency, and remain competitive in dynamic markets.

Logistics costs in the supply chain are influenced by various complex and diverse factors. A profound understanding of these factors is crucial for effectively managing costs and enhancing operational efficiency. Some key factors affecting logistics costs include distance and shipping routes, transportation methods, technology and automation, infrastructure conditions, planning and forecasting capabilities, regulations and compliance, and security and insurance aspects. Through a deep understanding of these factors, companies can identify opportunities to optimize their logistics costs, improve efficiency, and add value to their supply chain management (Suarna et al., 2022).

The study by Ojenya Salawu and Mohammadreza Ghadiri (2022) provides a concrete overview of how logistics costs can affect

the performance of goods delivery. Zheng et al. (2021) offer insights into how costs can influence operational effectiveness in maritime goods shipping. Barata (2020) and Ojenya Salawu and Mohammadreza Ghadiri (2022) suggest that as mediators, logistics costs can be a crucial factor that strengthens or moderates the relationship between human resource quality and the smoothness of goods delivery. He (2023) and Zheng et al. (2021) demonstrate that a distribution center location considering optimal access to sea routes can result in significant logistics cost effectiveness.

**E. Smoothness of Goods Delivery**

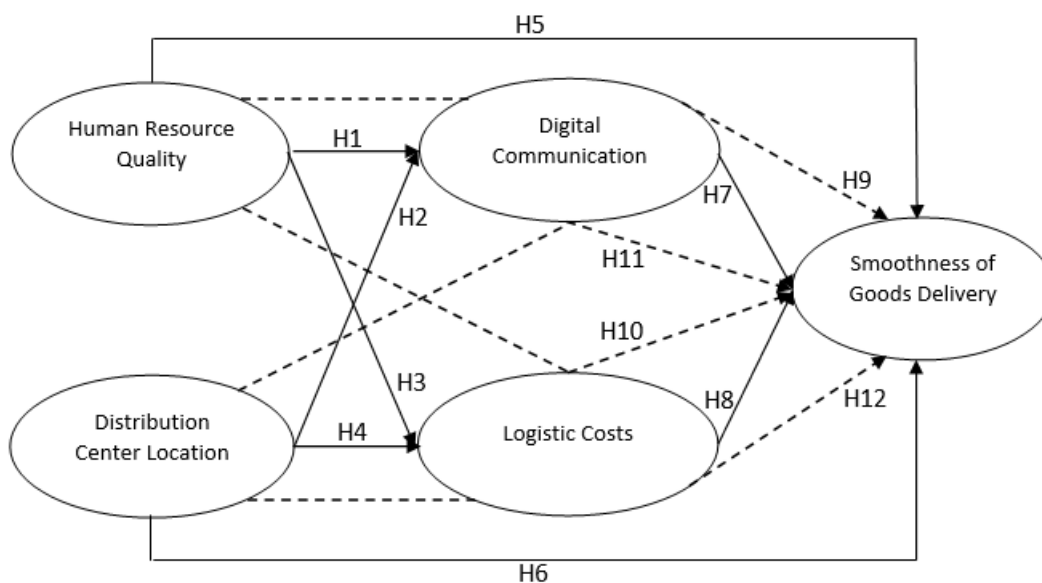
Smooth shipment of goods is a highly desired condition in the logistics and supply chain realm. Defined as the optimal state where each stage of the physical shipment process, from warehouses or distribution centers to the final destination, proceeds without significant obstacles or hindrances, the importance of smooth shipment reflects efficiency and timely fulfillment of customer demands (Nasution, 2008). It involves preparing the goods appropriately, selecting efficient shipping routes, and delivering the goods to the final destination. Smooth shipment ensures not only fast delivery but also the availability of goods as expected by customers. Achieving smooth shipment involves a delicate balance between various factors affecting the shipping process, including inventory management, effective route selection, and meeting customer demands.

Various factors play crucial roles in ensuring smooth shipment of goods via maritime transportation, which is essential in the context of globalization and international trade. Factors such as weather and sea conditions, port infrastructure, inventory management, security and legal compliance, technology and information systems, availability of vessels and cargo space, and logistics costs influence smooth shipment (Gunawan, 2014). These factors require careful management and coordination among all parties involved in the maritime logistics chain. In a constantly evolving world, adaptability to changes and investment in technology and infrastructure are key to ensuring smooth shipment of goods via maritime transportation.

Indicators of smooth shipment of goods through maritime transportation are vital in maintaining the efficiency and sustainability of the global supply chain. Key indicators include timeliness, completeness and accuracy of ordering documents, completeness and accuracy of shipping documents, the condition of goods upon receipt, and precision in selecting transportation modes (Nasution, 2008; Gunawan, 2014; Kotler and Armstrong, 2013). These indicators provide guidance for companies to continuously improve and optimize their logistics operations, enabling them to compete in increasingly complex and dynamic markets. Through detailed evaluation and enhancement of these indicators, companies can navigate the challenges of the maritime logistics chain effectively, ensuring smooth shipment of goods and maintaining a competitive edge.

**CONCEPTUAL MODEL**

Based on the literature review above, the conceptual model is formulated as follows:



**Figure 1. Conceptual Model**

**HYPOTHESES**

Based on the conceptual model and literature review, the hypotheses can be formulated as follows:

- H<sub>1</sub>: Human Resource Quality directly and significantly influences Digital Communication.  
H<sub>2</sub>: Distribution Center Location directly and significantly influences Digital Communication.  
H<sub>3</sub>: Human Resource Quality directly and significantly influences Logistics Costs.  
H<sub>4</sub>: Distribution Center Location directly and significantly influences Logistics Costs.  
H<sub>5</sub>: Human Resource Quality directly and significantly influences the Smoothness of Goods Delivery.  
H<sub>6</sub>: Distribution Center Location directly and significantly influences the Smoothness of Goods Delivery.  
H<sub>7</sub>: Digital Communication directly and significantly influences the Smoothness of Goods Delivery.  
H<sub>8</sub>: Logistics Costs directly and significantly influence the Smoothness of Goods Delivery.  
H<sub>9</sub>: Digital Communication mediates the relationship between Human Resource Quality and Smoothness of Goods Delivery.  
H<sub>10</sub>: Logistics Costs mediate the relationship between Human Resource Quality and Smoothness of Goods Delivery.  
H<sub>11</sub>: Digital Communication mediates the relationship between Distribution Center Location and Smoothness of Goods Delivery.  
H<sub>12</sub>: Logistics Costs mediate the relationship between Distribution Center Location and Smoothness of Goods Delivery.

## METHODOLOGY

This research adopts a quantitative approach, utilizing primary data collected through questionnaires. The study encompasses all employees working at PT X's distribution center, with a sample size of 430 individuals. Data processing and analysis employ the path analysis method, which extends beyond multiple linear regression analysis. This technique enables researchers to explore the relationship between exogenous (independent) and endogenous (dependent) variables, whether direct or indirect.

## CONCLUSION

This research aims to construct a conceptual framework exploring how the quality of human resources and the location of distribution centers affect the efficiency of goods delivery via sea transportation, with digital communication and logistic costs serving as mediators. It includes an examination of the research background, literature review, hypotheses, and research methodology. By employing the conceptual model proposed in this study, we can ascertain the extent to which human resource quality and distribution center location influence the smoothness of goods delivery, mediated by digital communication and logistic costs.

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