

## RISK OPTIMIZATION OF LOGISTICS PROCESSES USING INTRALOGISTICS TOOLS IN POLAND

*Moshea Chidiebere Ajah<sup>a\*\*</sup>, and Michal Kot<sup>b</sup>*

**ABSTRACT:** Logistics and transportation, in particular, have emerged as having tremendous potential for improving firm production and material distribution. Understanding this is critical, especially in the textile industry, where each component of the supply chain is critical to the organization's overall profitability. The study's goal was to determine the risk optimization of logistics processes in Poland using intralogistics tools. The study's specific goal was to determine the impact of risk optimization of logistics processes using intralogistics tools such as transport management, logistics information system, inventory, and distribution management on PGT's company process/operational performance. This study used a descriptive research design to gather information about the study topic. Employees from (PGT), a licensed processing factory registered under the Company Act, made up the study's population. A questionnaire was used to collect data, which was then analyzed using descriptive and inferential statistics. The study discovered that transportation management practices, logistics information practices, inventory control practices, and distribution management practices were all widely implemented. The research also discovered a significant positive relationship between transportation and logistics and PGT performance. The study also discovered that there are obstacles that limit the effectiveness of the implementation process, the most common of which is employees' lack of acceptance for logistics and transportation practices. According to the study, expanding transportation and logistics operations would result in better performance. As a result, the study recommends that PGT management evaluate these strategies and how they are implemented.

**KEYWORDS:** *Optimization, logistics, process/performance, innovation, management*

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Moshea Chidiebere Ajah <sup>a\*</sup>, Czestochowa University of Technology The Management Faculty, Armii Krajowej 19B, 42-201 Czestochowa, Poland. Michal Kot <sup>b</sup> Czestochowa University of Technology The Management Faculty, Armii Krajowej 19B, 42-201 Czestochowa, Poland.

\* Corresponding author: Email: [ajahmoshea@gmail.com](mailto:ajahmoshea@gmail.com)

# 1. INTRODUCTION

In large cities with limited storage space, effective logistics and transportation management is critical to company performance. This includes getting materials, people, information, machines, and equipment to the work force in a Lean (Just-in-Time) manner (Mossman, 2015). According to reports, implementing more efficient logistics techniques might result in a 35 percent reduction in material waste, with the formulation and implementation of a robust production logistics plan being the key to achieving this. These plans are an essential tool for the industrial sector in ensuring that the appropriate materials are in the right location at the right time, in the right quantity, and at the right cost (Bowersox *et al.*, 2016).

The production sites are a very intense logistical location, with a large amount of material that must be managed in a complex manner in order to create and meet needs. However, due to a lack of harmonization of client requirements with materials and information flows, there is a lack of integration of suppliers and manufacturers, as well as inventories and markets. As a result, production in urban areas has two problems: material flow and numerous production coordination, which has prompted practitioners and government officials to pay close attention to logistics management during the last decade (Tilokavichai *et al.*, 2012; Gattorna & Walters, 2016). As a result, most businesses want to implement these techniques into their operations.

In particular, the research has produced mixed results about the connection between logistics and transportation and company performance indicators. Lai *et al.* (2018) found that logistics and transportation have a beneficial impact on returns in the textile business. In a study on Poland humanitarian organizations' transport management procedures, Kiraga (2014) found that bettering the logistics chain increased performance indicators. Other research, on the other hand, found little to no correlation between logistics and transportation and firm performance. In addition, an article examines the impact of logistics on the development of international trade in the Polish context. In contrast, Baiya and Kithinji (2020) establish that combining logistics and transportation into the textile industry resulted in increased expenses and decreased returns in research on reforming the Poland textile sector. As a result of these studies, a study gap in the study of logistics and transportation on corporate achievement has emerged, which must be filled in order for the Textile industries in Poland to get the most out of their logistics and transportation practices.

The present literature is insufficient to support the research of logistics and transportation on corporate performance in the Polish textile manufacturing industry because the results were inconclusive. These elements will be examined in this study in an effort to close the gap. The following research topic will be attempted to answer through the study: What part do logistics and transportation play in the performance improvement of Polska Grupa Tekstylna (PGT)?

The general objective of this study is to determine the impact/effect of logistics and transportation on Polish Textile Group's performance (PGT). With the following specific objectives a) to determine PGT's level of logistics and transportation strategy implementation; b) to recognize the issues and dangers connected to integrating logistics and transportation strategies into PGT operations and c) to ascertain how PGT performance relates to logistics and transportation.

The purpose of the study will allow for the evaluation of PGT and other industries' logistics and transportation efficacy. The study will benefit PGT management, government, stakeholders, the general public, academics, and scholars in particular.

The study's conclusions will focus on the effects of logistics and transportation on business optimization and sector management, especially for the Polish Textile Manufacturing Company. The study's findings will be used by management to enhance the performance of the organization. Industries will gain from the study by being able to improve productivity and performance via the use of effective supply chain management techniques.

The study would be beneficial to the government since it will enable regulatory bodies to guarantee that logistics and transportation policies are implemented in sectors that meet the requirements for effective implementation. You can maximize the benefits of your practices by doing this.

The study will educate stakeholders and the general public on the value of transportation and logistics in businesses. This will help them accept it and support its implementation. By analyzing the effect of logistics and transportation on organizational performance, the research will also advance theory. As a result, it will close a gap in the body of knowledge. The study will also suggest topics for further research, laying the groundwork for further examination.

The focus of this study is on the respondents' perceptions of the impact/effect of logistics and transportation on Polish Textile Group's performance (PGT). The research's goal is to improve performance in the textile manufacturing industry, and in order to understand how bad logistics and transportation management affects the industry, different respondents' viewpoints on the company's supply chains must be considered. The emphasis is on figuring out the extent to which PGT has implemented logistics and transportation strategies, the difficulties and dangers involved in doing so for PGT operations, and the connection between logistics, transportation, and performance at PGT. This research looks into how logistics and transportation management may mitigate and establish alternative measures to improve/optimize the performance of textile manufacturing companies.

## **2. REVIEW OF THE LITERATURE**

Most businesses now use logistics and transportation as one of their primary supply management practices. Logistics activities encompass all production activities undertaken to ensure that all goods are produced efficiently, whereas transportation focuses on how the final product is delivered to the consumer at the appropriate time. These two concepts do not exist as separate entities, but they must be well coordinated in order to achieve successful transportation (Ketchen & Hult, 2017). Logistics activities are primarily used by organizations to improve overall supply chain practices. Some organizations may lack the expertise and resources required to fully perform the desired logistical activities, forcing them to outsource logistics (Stevenson, 2019; Tukamuhabwa, 2021). All of this is done to improve the firm's supply chain performance, which will lead to proven results. Transportation is critical to service delivery as well as customer satisfaction. Low transportation costs, on-time delivery, and increased transportation velocity are all goals while maximizing the firm's resources. Transport and logistics seek to integrate and organize all activities in an efficient and cost-effective manner (Byrne & Markham, 2015). This is critical in today's business environment, where minor errors or delays can lead to significant losses (Shankar, 2017).

Given the current state of business dynamics, organizations must recognize the importance of proactively reevaluating their business processes (Nyaberi & Mwangangi, 2014; Chee & Harris, 2018). Every company, in particular, wishes to benefit from technological advancements and the expanding global market. Demand for supply chain tactics in operations has increased dramatically as it has been demonstrated that they can help businesses gain a competitive advantage. Logistics and transportation are two supply chain approaches that help businesses improve their activity coordination (Lai *et al.*, 2018). Logistics and transportation management is the organization of a company's activities to ensure smooth operations from the beginning of production to the end of distribution. Logistics is the branch of supply chain management that deals with the movement of data, goods, and services (Hackman, 2018; Stevenson, 2019). Logistics, according to Kiraga (2014), is the development, implementation, and oversight of protocols for effective supply chain management strategies. Transportation, on the other hand, refers to the processes and plans put in

place to ensure that goods are delivered on time and in a coordinated manner (Stock & Lambert, 2017; O'Connell, 2019).

Existing ideas, such as the Theory of Constraints, which contends that incorporating transportation and logistics into supply chain management would ensure that all areas of the business run as a single cohesive unit, support logistics and transportation's positive impact on firms, while Transactions Theory contends that logistics and transportation will improve the textile sector's performance by increasing productivity while also lowering costs. Logistics and transportation have grown in popularity in recent years as a result of the benefits they provide organizations (Ballou, 2014). Transportation improves other supply chain activities such as customer service, procurement, and inventory management, while logistics management focuses on the movement of information and goods (Harrison, 2020). Transportation, on the other hand, ensures that goods are delivered to consumers quickly, that final client expectations are met, and that the business makes the most money (Shankar, 2017).

A solid and effective supply chain can help a company gain a competitive advantage by providing excellent customer service (Stevenson, 2019). Customers' desires and suggestions are met, increasing their loyalty to and faith in the company. Distribution management, inventory control, and logistics information systems are examples of transportation and logistics tactics used in businesses. Transportation management refers to the methods used to transport commodities, including raw materials, to and from the organization. The logistics information system is concerned with the delivery and storage of transactional data (Mathur, 2020). Inventory control necessitates keeping track of current assets in order to determine whether they are adequate for the desired operations. Distribution management, on the other hand, ensures that the specified commodities arrive at their destinations on time.

Performance refers to the effectiveness of an organization's internal operations, such as product quality, productivity, and customer satisfaction (Mathur, 2020). Non-financial operational performance measures include adaptability, efficiency, responsiveness, and quality (Green Jr. *et al.*, 2019). All of these elements are intended to determine how effectively the organization can operate with the resources at its disposal in order to gain a competitive advantage. Improving performance is critical to improving the overall performance of the organization. Firms with poor operational performance have a difficult time remaining profitable (Moberg *et al.*, 2016; Vijayaraghavan & Raju, 2018).

PGT Textile Company Poland is one of the most important textile processing companies in Poland. Because the textile industry has not been liberalized, the company has never had a monopoly since its inception in 2010. Multiple competitors entered the textile processing industry, increasing competition and decreasing profits. Management must constantly evaluate its operating procedures, such as transportation and logistics management, in order to maintain dominance. The study, however, does not clearly establish the performance effects of these strategies. As a result, keeping the current link operational is critical for PGT's future coordination and performance development.

Improved coordination across all of these responsibilities will boost supply chain performance. However, the concept of transportation and logistics is still relatively new in Germany, particularly in textile processing companies (Shepherd & Günter, 2016). As a result, most businesses are still resistant to it. This is due, in part, to most managers' fear of incurring higher costs as a result of integrating transportation and logistics operations, which leads them to prefer manual methods. Furthermore, despite well-developed strategies, most organizations struggle to put these strategies into action. These raises concerns that can be addressed by thoroughly examining the supply chain procedures that are best suited to each company (Shepherd & Günter, 2016). The ability of an organization to meet its objectives and benchmarks is referred to as performance. The operational performance of a company determines how well it generates wealth and gathers resources (Komppula, 2014).

There are various points of view on how the textile industry is actually performing. According to one viewpoint, global demand for a variety of textile-based products has increased, resulting in continued global textile business growth (Jayne *et al.*, 2020). According to the opposing viewpoint, the sector's performance is underperforming expectations (Ranaweera, 2019). As a result, assessing and calculating the actual performance of these companies is difficult. The first priority for all businesses is to improve operational performance (Narasimhan & Das, 2016). As a result, entrepreneurs and managers are constantly devising methods to reduce operational expenses while increasing profits. Logistics and transportation, in particular, have shown enormous promise in terms of improving business production and distribution of goods and materials. When the supply chain is fully integrated, performance improves significantly and businesses gain a competitive advantage (Narasimhan & Das, 2016).

Despite the obvious importance of logistics and transportation for businesses, research on how they affect performance has yielded a mixed bag of results. While some industry professionals believe that improving logistics and transportation efficiency will result in higher returns, others believe that implementation processes will always result in higher costs and thus have a negative impact on operational performance (Baiya & Kithinji, 2020; Nyaberi & Mwangangi, 2014; Kiraga, 2014). This emphasizes how erratic the exact effect is. This is especially important in the textile industry, where every link in the supply chain is critical to the overall profitability of the company. Effective supply chain management will result in lower costs and a higher volume of defined textile production services (Baiya & Kithinji, 2020; Juttner & Christopher, 2021). Logistics and transportation will ensure that textile-related products are delivered on time. This study investigates respondents' perceptions of the significance and consequences of logistics and transportation management risks affecting textile production and delivery, as well as ways to improve the company's performance.

Through inventory management and distribution management, organizations incorporate logistics and transportation practices. The inventory control program is intended to boost the credibility and transparency of textile operations and transactions. If inventory control is not properly implemented, the entire transportation scheme will fail (Mathur, 2020). While distribution ensures that goods arrive at their designated locations on time. It also enables the tracking and tracing of goods in order to prevent loss (Phelan, 2019).

Thus, logistics is the largest single expenditure in many industries' cost of goods sold, and it is a major critical success factor influencing productivity, profitability, shareholder volume, and competitive advantage. Furthermore, successful and efficient logistics system operation, as well as increased productivity and profitability, are critical if people are to maintain their current living standards in the face of rising population pressures and inflation rates.

### **3. RESEARCH METHODOLOGY**

This study used a descriptive research design to gather information about the risk optimization of logistics processes using intralogistics tools in Poland. The descriptive research design allows for close association of variables while minimizing researcher interference, making it the best choice for the study.

Employees from PGT, a licensed processing factory registered under the Company Act, made up the study's population. This population was chosen to allow for comparisons of operational performance among all PGT, Poland employees.

All employees in various departments at PGT's licensed textile processing factories will be targeted using a census approach. This census approach will be justified as a tool for achieving a comprehensive determination of the occurrence with equal representation of all study elements, which will be supported by Mugenda and Mugenda (2013), who claim that a census approach is

appropriate when the sample size is small and manageable in order to minimize bias and ensure the findings are complete.

The research will rely on primary data to learn about PGT's logistics and transportation practices. The data was gathered using online questionnaires/google survey for the period of 2 months, which are preferred due to their efficiency in gathering a wide range of data in a short period of time. The questionnaires were semi-structured, with open and closed ended questions, ensuring that the data gathered is both quantitative and qualitative.

Data were cleaned before being analyzed, and then coded and keyed into the computer using SPSS version 21. To sort, tabulate, and summarize the data, descriptive statistics such as means, standard deviations, and factor analysis tests was used.

#### 4. RESULTS AND DISCUSSION

Through correlation analysis, the study's specific objectives were to determine the impact of risk optimization of logistics processes using intralogistics tools such as transport management, logistics information system, inventory, and distribution management on company process/operational performance at PGT.

**Table 1. Correlation Analysis.**

		OPC	Transport	Logistics	Inventory	Distributio n
<b>Transport Management System</b>	Pearson Correlation	.532**	1			
	Sig. (2-tailed)	.000				
<b>Logistics Information System</b>	Pearson Correlation	.355**	.572**	1		
	Sig. (2-tailed)	.002	.000			
<b>Inventory Management Control</b>	Pearson Correlation	.147	.204	.068	1	
	Sig. (2-tailed)	.221	.088	.572		
<b>Distribution Management Control</b>	Pearson Correlation	.593**	.296*	.211	.344**	1
	Sig. (2-tailed)	.000	.012	.077	.003	
	N	71	71	71	71	71

**\*\*.** Correlation is significant at the 0.01 level (2-tailed).  
**\*.** Correlation is significant at the 0.05 level (2-tailed).

Source: Own elaboration.

According to the table above, the Transport Management System has a positive and significant influence on PGT performance ( $r(71) = .532, P = .000$ ). This implies that improving transportation management practices will improve organizational performance significantly. This is consistent with the findings of Wathe (2016), who investigated the impact of logistics on manufacturing firm performance. He discovered that companies with well-developed transportation management practices outperformed the competition. As a result, investing in transportation management practices will pay off. The study sought to ascertain the extent to which transport and logistics practices were implemented at PGT. The study focused on four important practices: Transport Management System, Logistics Information Systems, Inventory Management Control, and Distribution Management Control. In terms of the Transport Management System, all practices were designed to be extensively applied. However, the organization's efforts to educate staff about future information system maintenance support were the least successful. The level of logistics information system implementation was limited, which may be attributed to the information

system's relative novelty in the firm. It is said that personnel risk and future information system maintenance support are important elements in increasing financial performance. Comparing the subjective impression of sources of human risk between organizations based on their country of operation can provide significant information for businesses and national authorities. (Petrankova *et al.*, 2023)

According to the findings, the Logistics Information System has a positive and significant influence on PGT performance ( $r(71)=.355$ ,  $P=.002$ ). Furthermore, Logistics Information System has a significant impact on operational performance when compared to the other three variables. According to the literature, one of the key drivers that positively influence firm performance is the Logistics Information System (Stevenson, 2019). This is accomplished by ensuring internal consistency, accountability, and a smooth flow of operations. The study's findings back up this observation. Inventory Management Control was discovered to have a positive effect on PGT performance ( $r(71)=.147$ ,  $P=.221$ ). However, the effect was not statistically significant at the 5% confidence level. This means that the Inventory Management Control System cannot be used to forecast performance changes at any time. It must be used in conjunction with other transportation and logistics practices. Because of the technicalities involved, most organizations have yet to fully approve Inventory Management Control systems. PGT's performance is also positively and significantly influenced by Distribution Management ( $r(71)=.593$ ,  $P=.000$ ). Improved distribution management practices will result in higher returns. Distribution management that is efficient and dependable is critical not only for ensuring on-time deliveries, but also for building trust among suppliers and customers. According to Jayne *et al.* (2020), distribution management practices should be designed with the organization's structure in mind in order to be successful.

In terms of Inventory Management implementation, a least level of implementation was obtained. On the level of distribution management implementation and Transport Management System, an above-average degree of adoption was achieved. This means that transportation management was the most generally employed activity, whilst logistics information systems were the least popular. This could be related to the belief that having efficient transport management techniques ensures efficient movement and coordination of goods and commodities to and from the company (Mugo, 2013). As a result of the research, Distribution Management techniques and Transport Management System were the most generally adopted. This suggests that management prioritized the distribution and transportation of goods and commodities into and out of the organization. Logistics Information System and Inventory Management methods were moderately acceptable, indicating that they had not reached their full potential. In contrast, the Inventory Management System was the least extensively used in the organization. This demonstrates either a disrespect for good standards or a lack of resources to adopt them. Because each area of transportation and logistics is crucial to how the organization functions, it is recommended that equal attention be given to all of them. It is also suggested that frequent evaluations be carried out in order to identify and correct any shortcomings that may arise from the use of these practices (Tran *et al.*, 2022).

The study also sought to determine the relationship between logistics and transportation and the PGT operational procedure. Correlation and regression analysis were utilized to achieve this. According to the correlation study, the variables had a beneficial impact on performance based on the positive correlations discovered. As a result, growing transportation and logistics activities would yield larger profits. The regression analysis also found that the study's logistics and transportation components may account for 49.1% of the performance variation. As a consequence, the positive link between the research variables was validated and found to be significant at the 95% level. Theories like Transactions Theory, which contends that logistics and transportation would enhance organisational processes in the textile industries by boosting productivity and cutting costs, attest to the beneficial effects of these activities on performance. As mentioned in the writings of Kowalczyk-Rólczyńska and Rólczyński, the Theory of Constraints

states that incorporating logistics and transportation into supply chain management guarantees that all components of the company operate as a single unit (Kowalczyk-Rólczyńska & Rólczyński, 2020).

The study also aimed to determine whether any challenges arose when putting logistics and transportation techniques into practice. The results show that PGT faced several difficulties throughout the deployment phase. Organisations are unable to fully implement and reap the benefits of transportation and logistics techniques due to the challenges they face. It is in line with the findings of Jayne *et al.* (2020), who examined the difficulties facing smallholder farmers in Sub-Saharan Africa and found that one major roadblock to sector outputs is a deficiency in technology advancement. By carefully assessing the supply chain strategies that are most appropriate for each company, the challenges can be solved (Shepherd & Günter, 2016). In a similar vein, Vijayaraghavan and Raju (2018) looked into how logistics and transportation affected the productivity of Indian companies. Mugo (2013) investigated transport and logistics for Polish mobile service carriers. According to the report, logistics increases operational efficiency by enhancing corporate operations, bringing down overall costs, cutting business risks, and giving firms a competitive edge. In contrast, Kiraga (2014) investigated transportation at Polish humanitarian organisations but was unable to find a meaningful correlation between the factors under investigation. Baiya *et al.*, (2021) found that the textile industry saw reduced returns and increased costs when they integrated logistics and transportation..

## 5. CONCLUSION

The research findings indicate that there is widespread use of transportation management strategies, logistics information practices, inventory control, and distribution management. The study comes to the conclusion that there are variations in the degree to which the procedures are implemented. Therefore, it is concluded that the management's preferences or the desired goals will ultimately influence how far implementation goes. The study also found that there are barriers preventing the implementation process from being as successful as it may be. The study comes to the conclusion that these issues need to be resolved for the implementation to be successful. Additionally, the study found a significant positive correlation between PGT company performance and logistics and transportation. The analysis comes to the conclusion that better business performance would come from growing logistics and transportation operations. This is due to the fact that enhanced transaction speed and flexibility, along with information transfer, facilitate more effective coordination, which in turn generates larger profits and revenues.

Thus, in light of its findings, the study offers a number of recommendations. The study found that by using logistics and transportation techniques, the PGT enhanced its operations. Therefore, it is advised that other companies use these tactics in order to fulfil their objectives and offer top-notch services. The study also found that the PGT's transportation and logistics tactics have an impact on business performance. Therefore, the report recommends that PGT's management keep a closer eye on and assess these tactics more regularly. This will enable them to formulate methods to guarantee the effective execution of these plans.

The study also discovered that there were extra expenses associated with the application of logistics and transportation procedures. Consequently, the study suggests that appropriate planning and budgeting considerations be made prior to starting any activity. This will enable you to weigh the advantages and disadvantages of that particular procedure and, in turn, determine whether it is suitable. The report also recommends that legislative and policy authorities take into account the necessity of creating and facilitating laws that will enhance the firm's ability to implement logistical strategies. The logistics information system should receive enough attention, according to the study, as it is essential for prompt customer feedback, information sharing, and storage inside the company.

Ultimately, the outstanding business performance of PGT depends on the continuous observation and assessment of all logistics and transportation procedures. Management should therefore be well aware of the frequency and timing of the evaluation process.

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