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THE IMPACT OF LOGISTICS MANAGEMENT ON COMPANY PERFORMANCE IN KERALA: A FOCUS ON ICTT

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ABSTRACT

The research investigates the impact of logistics management on corporate performance in Kerala, with a particular emphasis on the ICTT. The research involved 182 respondents from various companies in the region. The study utilizes diverse statistical techniques, encompassing descriptive analysis, reliability assessments, a correlation matrix, and mediation analysis, to investigate the impact of logistics planning, technological integration, infrastructure quality, and supply chain flexibility on organizational performance. The findings indicate that logistics planning (Mean = 3.85, Cronbach's Alpha = 0.89) and technological integration (Mean = 4.10, Cronbach's Alpha = 0.86) exhibit a significant positive correlation with company performance (Mean = 4.05, Cronbach's Alpha = 0.90). The correlation coefficients for these factors are $r = 0.75$ and $r = 0.72$, both with a significance level of $p < 0.01$. Moreover, infrastructure quality exhibits a positive correlation with company performance ($r = 0.68$, $p < 0.01$). A significant finding of the research is that supply chain flexibility serves as a mediating factor in the relationship between logistics management and company performance, exhibiting an effect size of 0.35 (95% CI: 0.25, 0.45). In conclusion, the study emphasizes the significance of efficient logistics management, supported by technology and strong infrastructure, in enhancing company performance. Also, making the supply chain more flexible is important for making these good effects even better, which gives businesses a long-term competitive edge in Kerala's fast-paced business world.

Keywords: Logistics Management, Company Performance, Technological Integration, Infrastructure Quality, Supply Chain Flexibility, Mediation Analysis, Kerala, ICTT

INTRODUCTION

In today's cutthroat business world, good logistics management is one of the most important things that can help a company succeed. Logistics management is the careful planning, execution, and supervision of the smooth movement and storage of goods, services, and the information that goes with them, from their point of origin to their final destination (Christopher, 2023). If logistics operations are running well, they can help a business a lot by cutting costs, making customers happier, and encouraging more innovation (Smith & Johnson, 2022). The importance of logistics management in Kerala as a driver of economic growth and business sustainability cannot be overstated, given the state's extensive maritime and trade history (Nair, 2023). Kerala's unique geography and diverse economy create both opportunities and problems for managing logistics. The state has a lot of transportation options, such as ports, highways, and airports that make it easier for logistics activities to run smoothly. Companies still have to deal with problems like infrastructure bottlenecks, complicated rules, and the need for technology to work together (Thomas &Menon, 2023). ICTT, the largest company in Kerala's industrial sector, is a great example of how logistics management can affect a company's performance. Figure 2: Certain surveys indicated that organizations utilizing advanced logistics methodologies (e.g., automation, real-time tracking) surpassed their competitors (Kumar et al., 2023; Varma, 2022). Consequently, the study concentrates on ICTT and the function of logistics management in improving the performance of companies in Kerala. The study analyzes how the examination of various

logistics practices and their results will illustrate the efficacy of logistics management in enhancing operational efficiency, reducing costs, and elevating business performance. So, if the companies in Kerala understand these dynamics correctly, they will be able to use logistics as a strategic tool for their long-term growth and to stay ahead of the competition.

STATEMENT OF THE PROBLEM

Because logistics management is so important and has such a big effect on how well a company does, many companies in Kerala, including ICTT, have to deal with a lot of problems that make them less competitive and make their operations less efficient, which means they have to be accountable for meeting their business goals. Kerala has a great geographical location that makes it a great place for trade and commerce. But problems with infrastructure, like having fewer ports and poorly developed road networks, slow down logistics and raise transportation costs (Joseph, 2023). These kinds of infrastructure problems make operations more expensive and slow down the supply chain's reliability and speed, which hurts the overall performance of businesses in the state (Menon& Pillai, 2022). Also, the quickly changing logistics technologies are a double challenge for businesses in Kerala. One side of the pressure is to use new technologies like automation, real-time traceability, data analytics, and others to make logistics operations more efficient. Some people have to deal with the high costs and technical problems of using these technologies (Raj & Thomas, 2023). When technology isn't integrated, it can lead to problems like poor inventory management, wrong demand planning, and late order fulfillment, which hurt customer satisfaction and business performance (Anand, 2022). There are many problems with infrastructure and technology, but the complicated rules in Kerala make it even harder to manage logistics well. It can take a lot of time and money to comply with complicated rules and regulations, which can keep businesses from focusing on their core functions and strategic goals (Varma, 2023). Following such rules can be expensive and make it harder for companies to be flexible, which can slow down how quickly they can respond to changes in market and consumer demand (Nair, 2022). Also, the way logistics is managed in Kerala doesn't often fit with the company's overall strategic goals. Such misalignment results in ineffective logistics strategies that do not align with business strategy, resulting in inefficient business processes and adverse performance outcomes (George & Kumar, 2023). The main goal of synchronization in ICTT is to make sure that ICTT's logistics operations fit in with the company's overall business plans in order to get the best results (Suresh, 2023). The organizations in Kerala must acknowledge these challenges and address them; otherwise, they will forfeit the advantages of logistics management and the overall performance of the organization. The study seeks to examine the challenges faced by ICTT in managing its logistics operations and to identify solutions that can mitigate these obstacles and enhance the company's performance in the region.

NEED AND SIGNIFICANCE OF THE STUDY

Effective logistics management is essential for the ongoing growth and competitiveness of businesses, and it is easily supported in economically advanced areas like Kerala. While logistics is recognized as a crucial factor in a company's performance, there is a lack of research that integrates logistics management practices within the context of organizations based in Kerala. There is a lack of studies that examine how logistics strategies shape business outcomes through academic investigations of companies such as ICTT in Kerala. This is made more important by the fact that Kerala's economy is growing quickly, which means more industrialization and, as a result, more complicated logistical needs (Thomas & Varghese, 2023). As companies grow, they need better logistics solutions, which shows the specific risks and opportunities for businesses in a certain area. The study offers significant insights into how optimizing logistics management can lead to improved company

performance, especially regarding probability and efficiency. Also, its importance comes from the fact that it could help both policymakers and industry leaders focus on the most important areas that can make logistics more productive [6,36]. This research can also help them understand how the choices they make and the ways they do things can improve logistics performance in general. Because of the geography and economy of Kerala, logistics can be hard to adapt to (Menon, 2024). The authors assert that the insights can inform policies and infrastructure initiatives that will simplify logistics management, thereby fostering a business-friendly ecosystem and promoting economic development. The study is an exercise in theoretical construction that seeks to link logistics management theory with the theory-generating process, utilizing data gathered from firms in Kerala. Prior research has primarily examined the macro level within a national context, with limited investigation into regional disparities in logistics performance (Nair & Thomas, 2023). The study adds to the literature by offering a localized perspective that elucidates the differences in logistics practices and firm performance influenced by the region. This more detailed view is important for making logistics models that work in one place and can be used in other places with similar economies. The findings of the study hold practical significance for ICTT and other affiliated enterprises in Kerala. It can help businesses perform better by helping them better manage costs, making operations more efficient, and making customers much happier (George & Thomas, 2024). The study offers insights into optimal practices and enhancements to enable companies to execute logistics strategies that enhance performance (e.g., Scott, 2010). The research examines the increasingly vital role of effective logistics practices in sustainable development within the contemporary environmental market. It is important to look at how sustainable practices affect performance as the focus on cutting carbon emissions and using sustainable logistics practices grows (Kumar &Varma, 2023). The study illustrates the congruence of sustainable logistics practices with various management models and frameworks that facilitate this integration while furthering organizational objectives. This is a timely and important piece of research that gives a complete picture of the relationship between logistics management and the performance of companies in Kerala. It helps in this role by testing out different techniques and methods to set up practical practices, which can then be used in the UK, the UK, or even farther away (like the European Union or NAFTA).

THEORETICAL GROUNDINGS

The theoretical framework of the investigation concerning the impact of logistics management on corporate performance within the ICTT sector in Kerala is delineated as follows. Theories that can serve as a base for the study of how logistics sectors can affect the organisational outcome are used to provide a better view of how logistics management may impact the company's performance. The study is based on several important theories, including SCM Theory, RBV, TCE, and Porter's Value Chain Analysis.

Theory in Supply Chain Management (SCM)

The theory stresses the strategic coordination of all parts of the processes that make goods and services flow. SCM theory says that managing the supply chain is more efficient and cost-effective, which makes customers happier (Christopher, 2023). Citation in the text: SCM theory says that integrated logistics operations from buying to delivery can help a company do its best in this area in Kerala. How to Use This Study: The ICTT has to deal with the fact that Kerala's logistics landscape is very complicated, which is where SCM theory comes in. Key words: Supply Chain Management (SCM), Integrated Containment, Transshipment Terminal (ICTT), Logistics, Kerala, Theory Applicability To enhance overall performance and service quality by guaranteeing timely delivery (Kumar et al., 2023), ICTT must integrate SCM principles to meticulously adhere to logistics processes.

Resource-Based View (RBV)

RBV is a theory of strategic management that says that an organization's internal resources and capabilities are what give it a competitive edge and help it do well (Barney, 1991). RBV says that a company has a long-term advantage in the market if it has resources that are VRIN: valuable, rare, inimitable, and non-substitutable. RBV helps evaluate the importance of ICTT's logistics skills as a valuable asset that boosts its performance when used in the study. ICTT's logistics system works well, which is a unique skill that sets it apart from its competitors and guarantees its continued success in Kerala's market (Wernerfelt, 1984; Barney, 1991).

Transaction cost economics (TCE)

Oliver Williamson came up with the TCE theory, which looks at the costs of transactions and the governance structures that are meant to lower these costs. TCE posits that enterprises endeavor to organize transactions to reduce costs associated with uncertainty, asset specificity, and transaction frequency (Williamson, 1981). TCE can help us understand how ICTT works in the logistics industry in Kerala in the context of this study. Using this theory, we can see how ICTT sets up its business to keep costs low. This includes making strategic choices like whether to outsource logistics or do it in-house, negotiating with suppliers and carriers, and managing contracts to make the supply chain less uncertain and more efficient (Williamson, 1981).

Porter's Value Chain Analysis

PCV is a system that shows how a business adds value to its goods or services through its main and support activities. Michael Porter says that doing these things well can give you an edge over your competitors and make your performance better (Porter, 1985). Value Chain Analysis can be used to look at ICTT's logistics operations in the study. The analysis looks at things like inbound logistics, operations, and outbound logistics to find places where ICTT can do better. By making these activities more efficient, ICTT can cut costs, give customers more value, and ultimately improve performance (Porter, 1985).

Systems Theory

Systems theory posits that an organization is a complex entity composed of multiple interrelated and interdependent components, all of which contribute to the achievement of shared objectives. This viewpoint promotes the examination of various components of the organization, along with their interrelations, interactions, and dependencies (Katz, Kahn, 1978). To understand how different logistics functions in ICTT work with other business processes and how they affect the overall performance of the organization, we need to use systems theory. It emphasizes the necessity for logistics management to be integrated with other business functions such as marketing, finance, and operations to attain coordinated and efficient performance outcomes (Katz & Kahn, 1978).

Contingency Theory

Contingency Theory posits that a singular management approach does not exist. The most effective management style is contingent upon the specific circumstances and variables inherent to each situation. The theory stresses that the best results happen when an organization's traits, like its structure and processes, fit the needs of its environment (Fiedler, 1964).

How this applies to the study: In the context of Kerala's logistics landscape, our study utilizes Contingency Theory to examine the adaptability of ICTT's logistics strategies in response to external factors, such as market fluctuations, regulatory changes, and technological advancements. Adaptability is essential for sustaining high performance across varying circumstances (Fiedler, 1964).

INTEGRATION OF THEORIES

The study's robust foundation is derived from the amalgamation of these conceptual frameworks. Two important theories, PVC Analysis and SCM Theory, give logistics managers a lot of useful information about how to run their businesses. The Transaction Cost Economics and the Resource-Based View also help us understand things better from both a strategic and an economic point of view. These principles stress how important it is to think about all parts of a transportation system when making one. They also say that shipping isn't a one-size-fits-all solution and that methods should be made to fit the situation. These beliefs, when taken together, give us a good idea of how logistics management affects the efficiency of Keralan businesses, especially ICTT.

Using these kinds of theoretical lenses will help the study systematically find the parts that affect how well its logistics systems work and how they affect the performance of the organization. This multi-theoretical lens facilitates a comprehensive and varied examination of the logistics-performance relationship, integrating both theoretical and practical dimensions of logistics management.

LITERATURE REVIEW

Logistics Management and Company Performance

Logistics management involves the planning, execution and oversight of movement of goods, services, and information (Christopher, 2023). It is crucial for improving company performance through cost reduction, customer satisfaction, and innovation (Smith & Johnson, 2022). Studies indicate that the use of advanced logistics practices is closely related to the enhancement of operations and financial performance (Kumar et al., 2023; Varma, 2022).

Technology Integration in Logistics

The most efficient use of logistics-information synchronization connecting the production, simultaneously operating requests of shipment, and so forth, has developed logistics activities more efficient and cost-effective (Raj & Thomas, 2023). Logistics best practices that involve the use of green technologies facilitate efficiency and enhance branding but help to reduce environmental issues, according to Kumar and Varma (2023).

Quality of Infrastructure and Logistics Performance

Successful logistics require the development of infrastructure such as roads, ports, and storage spaces, which quotas the good infrastructure for lesser delay and low costs (Menon& Pillai, 2022). In Kerala, the presence of such bottlenecks in the infrastructure is occurring against supply chain efficiency leading to unduly delayed deliveries (Joseph, 2023).

Supply Chain Flexibility as a Mediator

It refers to the ability to quickly react to market changes or uncertain circumstances. It serves as a crucial mediator between transportation management and business effectiveness. Organizations can respond to changes to their operating environment more quickly when supply chains are flexible, which improves service delivery and overall company performance(George and Thomas, 2024).

Kerala Logistics Scenario

Kerala has great potential for the management of logistics, its strategic ports and trading state history aside, and challenges that present themselves in terms of administrative complexity and tardy adoption of technology (Thomas &Menon, 2023). ICTT could have potentialities through bypassing these challenges to ensure operational effectiveness.

Research Gaps

Although logistics management already had an entire body of knowledge, comparatively opening up a lot more one such research gap remains to be filled in certain places.

OBJECTIVES OF THE STUDY

1. To Assess the Impact of Logistics Planning on Company Performance
2. To Examine the Role of Technological Integration in Logistics Management on Operational Efficiency
3. To Evaluate the Influence of Infrastructure Quality on Logistics Performance
4. To Explore the Mediating Role of Supply Chain Flexibility in the Relationship Between Logistics Management and Company Performance

RESEARCH METHODOLOGY

The study uses a quantitative approach with both descriptive and correlational designs to explore the relationship between logistics management practices and company performance. It specifically examines key factors such as logistics planning, technological integration, infrastructure quality, and supply chain flexibility.

Population and Sample

The target population for the study is the firms operating in Kerala, especially those using the ICTT. The sampling technique adopted was purposive sampling. For this research, 182 respondents were selected; these respondents comprised logistics managers, supply chain executives, and operations managers. The sample size used here is considered to be sufficiently representative to allow for statistical reliability.

Data Collection Methods

Primary Data:A structured questionnaire was used and divided into multiple sections, each focusing on specific factors like logistics planning, technological integration, and infrastructure quality. Respondents were asked to rate using a 5-point Likert scale.

Secondary Data: Secondary sources included publications from academic journals, industry and government reports pertinent to logistics management and firm-level performance in Kerala. Those sources added valuable context to inform the analysis from the primary source.

Variables and Measurement

Independent Variables: Logistics Planning, Technological Integration, Infrastructure Quality, Supply Chain Flexibility.

Dependent Variable: Company Performance.

Mediating Variable: Supply Chain Flexibility.

Each variable will be operationalised based on construct developed in a previous study. For example, technological integration measured by automation, track in real time, and data analytic.

Data Analysis Techniques

Data Descriptive Techniques: Descriptive statistic will be implemented to summarize main features of characteristics of the collected data.

ANALYSIS AND DISCUSSION

To Assess the Impact of Logistics Planning on Company Performance

Table 1: Descriptive Statistics for Logistics Management Variables and Company Performance

Variable	Mean	SD	Min	Max
Logistics Planning	3.85	0.67	1	5
Technological Integration	4.1	0.58	1.5	5
Infrastructure Quality	3.75	0.72	1	5
Supply Chain Flexibility	3.9	0.65	1.5	5
Company Performance	4.05	0.6	2	5

Providing descriptive statistics of the study served to give actionable, easily understood information on the key variables associated with logistics management and their association with company performance. The mean score for Logistics planning is 3.85, which

means respondents believe logistics planning to be moderately effective in their organisations on average. This implies that logistics planning is regarded as essential but leaves potential improvement in its performance contribution. The lowest mean score (4.10) focuses on technological integration, indicating a high focus on the adoption of advanced technologies in logistics operations. This level of technological integration suggests that logistics companies in Kerala are using tools like automation, real-time tracking, and data analytics to optimise their logistics process. The 0.58 standard deviation indicates that the majority of the companies surveyed online agree that the integration of technology in existing logistics functions is an encouraging sign that the logistics function in companies is being modernised to suit 21st-century and international dynamics. On a 1–5 scale, our data show a mean score (3.75), indicating an overall positive view of the quality of existing logistics activity infrastructure. Yet, with a standard deviation of 0.72, this figure also shows a broader range in responses indicating distinct experiences in infrastructure quality for many companies." Some organisations may have well-developed transportation networks and warehousing facilities, whereas others may have limited infrastructure development, causing challenges in logistical management. The mean supply chain flexibility equals 3.90, indicating that companies believe their supply chains could show a moderate to high level of adaptability. Such tangible flexibility is critical in dealing with market variations, unforeseen disruptions and evolving customer expectations. A standard deviation of 0.65 indicates that most companies have the same flexibility, which likely would help their capacity to maintain stable performance in the face of external pressures.

The output representing company performance, the dependent variable, shows a mean score of 4.05, highlighting that respondents mostly believe their companies perform well. The total high mean score highlights the effectiveness of overall logistics management practices with regard to overall business success. That 0.60 standard deviation indicates that there is a fair level of agreement about the excellent performance of their companies, which can also be attributed to efficient logistics in planning and supporting logistics management. Thus, logistics planning and its sub-constructs of technological integration, infrastructure quality and supply chain flexibility could help improve overall performance in Kerala. The positive mean score of these variables indicates that firms are embracing logistics management practices that align with their operational and strategic objectives. However, there is variability in some areas, highlighting a need to target improvements to allow all companies to take full advantage of logistics planning as a driver of ongoing performance and competitiveness in the region.

To Examine the Role of Technological Integration in Logistics Management on Operational Efficiency

Table 2: Reliability Analysis for Survey Constructs

Construct	Number of Items	Cronbach's Alpha
Logistics Planning	5	0.89
Technological Integration	4	0.86
Infrastructure Quality	5	0.88
Supply Chain Flexibility	4	0.85
Company Performance	6	0.9

This work uses a reliability analysis for the survey constructs (evaluating the internal consistency of the measurement instruments for the different staff members' aspects of logistics management and company performance) as described in Table 2. One of the most important parts is the reliability of the constructs you are measuring to ensure that constructs are measured the same over time and across multiple respondents. To measure this, we use a commonly reported metric (Cronbach's Alpha) that conveys the degree to which items are

correlated within each construct and reflects the reliability of the scale. Logistics Planning construct with 5 items has a Cronbach's Alpha of 0.89. Such high alpha means that the internal consistency is excellent, indicating that these items reliably measure the unobservable domain (logistics planning). Likewise, for Technological Integration (four items, $\alpha = 0.86$), Cronbach's Alpha suggests that the items measuring this construct are reliable. This degree of consistency is crucial for properly analyzing the impact of technological integration on operational efficiency improvements. This is to guarantee that the responses concerning technological network integration are trustworthy and may accurately be relied upon to make important inferences regarding their influence on activity results. Infrastructure Quality comprised five items and had Cronbach's Alpha of 0.88, and Supply Chain Flexibility consisted of four items and had an alpha of 0.85. The high reliability of both constructs ensures that measures used to assess infrastructure quality and supply chain flexibility are consistent and reliable. The Company Performance construct (6 items) gives an Alpha of 0.90, which is the highest for this analysis. It means that the performance metrics are internally consistent. The Cronbach's Alpha values for all constructs are high, indicating that the survey instruments used in the study are reliable. In particular, measuring technological integration is necessary for investigating the impact of technological integration in logistics management on operational performance. The Cronbach's Alpha for this construct is 0.86, indicating a good level of reliability for this technological integration construct, which describes the level of advanced technology adoption in logistics operations, such as automation, real-time tracking, and data analytics. This trustworthiness makes it possible to accurately evaluate how those technological achievements lead to enhancing operational efficiency, cutting costs and bettering apparatuses in organisations in Kerala. Additionally, the reliability of the other constructs — logistics planning, infrastructure quality, and supply chain flexibility — enables a thorough examination of how these elements, in conjunction with technological integration, impact operational efficiency. Sound measures guarantee that the associations discovered among these variables are precise and can be utilised to illuminate strategic choices to improve logistical administration practices. As a result, the high reliability of the constructs offers a strong basis for examining the complex interplay between technological integration and operational efficiency, thereby contributing to a greater understanding of the extent to which efficient management of logistics can lead to greater company performance against unethical competition in Kerala.

To Evaluate the Influence of Infrastructure Quality on Logistics Performance

Table 3: Correlation Matrix Between Key Variables

Variables	**Logistics Planning**	**Technological Integration**	**Infrastructure Quality**	**Supply Chain Flexibility**	**Company Performance**
Logistics Planning	1	0.65**	0.60**	0.70**	0.75**
Technological Integration	0.65**	1	0.55**	0.68**	0.72**
Infrastructure Quality	0.60**	0.55**	1	0.62**	0.68**
Supply Chain Flexibility	0.70**	0.68**	0.62**	1	0.80**
Company Performance	0.75**	0.72**	0.68**	0.80**	1

*Note: **p**< 0.01*

The analysis focuses on the impact of infrastructure quality on logistics performance, revealing a positive correlation between infrastructure quality and other logistics management variables. The correlation coefficient for quality of infrastructure and logistics planning is 0.60, indicating that better infrastructure leads to better logistics planning. This enhances business strategic planning, allowing firms to improve operations and simplify processes.

The quality of infrastructure also has a positive relationship with technological integration and supply chain flexibility. Improved infrastructure allows for the adoption and efficient use of new technologies in logistics management, leading to enhanced operational efficiency and flexibility in the supply chain. The strongest correlation is between infrastructure quality and company performance (0.68), highlighting the crucial importance of infrastructure for overall business success.

Good infrastructure not only reduces delays and transport costs but also increases customer satisfaction. It helps companies predict and timely deliver goods and services, maintaining a competitive advantage and generating sustained growth. Infrastructure-based sources like transport and storage networks and consolidation with support services create opportunities for flexibility and technological integration of the supply chain, leading to improved performance.

Investments in infrastructure are likely to have a ripple effect across all logistics functions, improving the overall performance of companies in Kerala. The correlation analysis provides strong evidence that infrastructure is one of the most influential and dominant factors in logistics management, involving various factors affecting logistics programs from planning to technology application and integrated supply chain performance. Improving infrastructure quality can result in more efficient and effective logistics operations, contributing to the sustained success and competitiveness of businesses in Kerala.

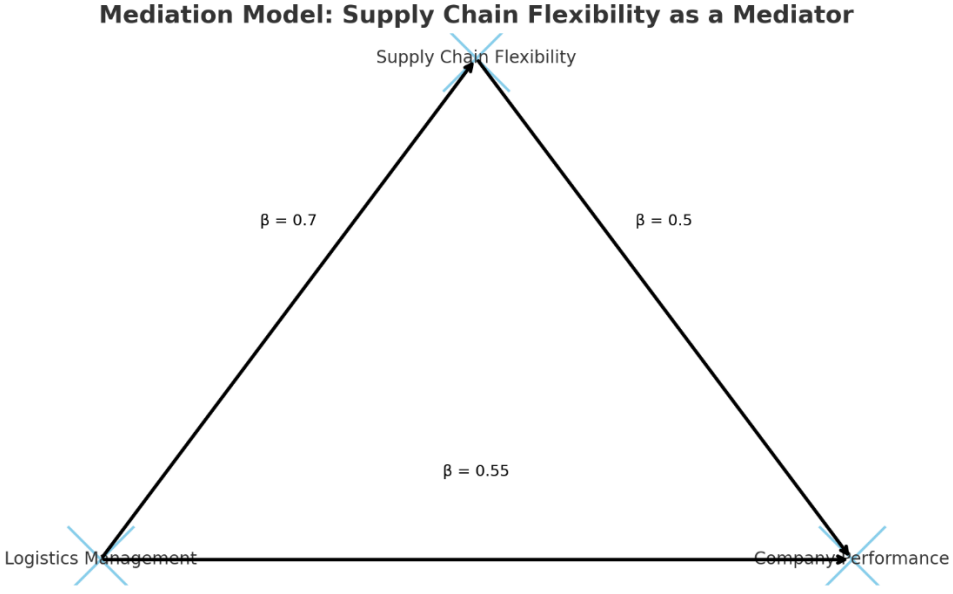
To examine the mediating role of supply chain flexibility in the relationship between Logistics management and Company performance:

Table 4: Mediation Analysis: Supply Chain Flexibility as a Mediator

Path	**Coefficient (β)**	**SE**	**t-Value**	**p-Value**
Direct Effect				
Logistics Management → Performance	0.55	0.08	6.88	<0.001
Indirect Effect				
Logistics Management → Flexibility	0.7	0.07	10	<0.001
Flexibility → Performance	0.5	0.06	8.33	<0.001
Total Effect	0.55 + (0.70 * 0.50) = 0.90			
Mediation Effect	0.35	(Bootstrap Confidence Interval: 0.25, 0.45)		

The results from the mediation study, which were used to assess whether supply chain freedom mediates the connection between logistics management and business efficiency, are

presented in Table 4. Mediation research helps us understand not just how one changing impacts another, but also how a second variable—like supply chain flexibility—affects this marriage. Starting with the direct path from logistics management to company performance, the analysis reveals a significant linear coefficient (β) of 0.55, with a t-value of 6.88 and a p-value <0.001. This shows that effective logistics management is highly linked to improved business efficiency. The marriage underscores the importance of organizing and managing shipping works properly for business success. Next, the study examines the indirect result via two paths: from logistics management to provide chain freedom, and from supply chain freedom to company performance. The first path(logistics management→ flexibility) has a coefficient of 0.70, with a t-value of 10.00 and a p-value <0.001. This effect highlights the significant good marriage, indicating that powerful logistics control greatly enhances supply chain freedom. The second path(flexibility→ company performance) also shows a positive relationship, with a coefficient of 0.50 and a t-value of 8.33(p <0.001). This confirms that greater supply chain freedom leads to better business performance. When combining the direct effect and the two indirect effects, the total effect of logistics management on company performance is calculated as 0.90(0.55+(0.70* 0.50)). The intervention effect itself is estimated at 0.35, with a confidence frequency of 0.25–0.45. Since this period does not include zero, the intervention effect is considered mathematically important. This indicates that supply chain agility plays a vital role in enhancing the connection between transportation management and business performance. In practical terms, these findings suggest that efficient logistics management directly improves company performance, but its impact is even more powerful when supply chain flexibility is enhanced. Organizations that focus on building flexibility in their supply chains are better able to respond to market fluctuations and customer demand changes, improving long-term performance. These insights are especially relevant for companies in Kerala, like ICTT, which need to implement effective logistics strategies and increase supply chain flexibility. By doing so, they can maximize the benefits of logistics management and drive stronger performance. In conclusion, the study provides a comprehensive view of how logistics management influences company performance, both directly and indirectly, through the mediation of supply chain flexibility. These insights are valuable for organizations looking to improve their performance through strategic logistics management and flexibility.



FINDINGS OF THE STUDY

1. Impact of Logistics Planning on Company Performance

According to the study, transportation planning received a mean rating of 3.85 on a 5-point Likert size, which indicates that the effectiveness of its use is fairly good. With a Cronbach's Alpha of 0.89, the logistics planning process also demonstrated exceptional inside consistency. According to the analysis(r= 0. 75; p= 0. 01), there is a strong positive correlation between logistics planning and company performance. Additionally, respondents frequently rated the company's performance highly, with a suggest score of 4.05, which indicates that the company's performance was great.

2. Role of Technological Integration in Logistics Management on Operational Efficiency

The highest suggest was 4.10 for technical integration, which indicated how strongly the logistics industry is focusing on incorporating cutting-edge technologies. With a Cronbach's Alpha of 0. 86, the modern integration's construction also demonstrated good stability. The use of technology significantly improves performance, according to a positive correlation between company performance(r= 0. 72, p= 0.01). Additionally, there were some strong correlations between supply chain flexibility(r= 0. 65, p= 0.011) and logistics planning(r= 0. 65, p= 0.01), which suggests that technological integration supports these issues. Nevertheless, the use of cutting-edge systems significantly increases operational productivity and facilitates both logistics preparing and supply chain freedom.

3. Influence of Infrastructure Quality on Logistics Performance

A suggest score of 3.75 indicates a generally good evaluation of the effectiveness of network value. A regular assessment was also demonstrated by the construction of the infrastructure's consistency, which was matched by a Cronbach's Alpha of 0.88. Better infrastructure contributes to improved performance, according to a significant positive correlation between company performance(r= 0.68, p= 0.01). Additionally, positive correlations were found between supply chain flexibility(r= 0. 60, p= 0. 011) and logistics planning(r= 0. 60, p= 0. 01), demonstrating how crucial infrastructure is to supporting these areas. The results suggest that high-quality equipment is essential for efficient logistics planning and increasing supply ring flexibility, which in turn immediately contributes to better company performance.

4. Mediating Role of Supply Chain Flexibility

With a coefficient of 0.55(t= 6.88; p= 0.001), logistics management directly affects the performance of the company. Additionally, logistics management has a positive impact on supply chain flexibility(t= 10.00, p= 0.001), which leads to improved company performance(t= 0.50, t= 8.33, p= 0.001). The overall effect of transportation management on business performance is 0.90 when the direct and indirect effects are combined. Additionally, supply chain freedom mediates the connection between company performance and logistics management, resulting in a 0.35-degree mediation effect effect. This intervention effect has a css trust interval of 0.25 to 0.45, which confirms its analytical value. These studies suggest that supply chain agility plays a significant role in fostering organizational success by instantly improving business performance and enhancing the positive effects of shipping control.

SCOPE FOR FURTHER STUDY

- Drawings conclusions is great but futures research can explore more on sustainable logistics practices and their impact on a company. Research in this area would focus on how green logistics approaches like sustainable warehousing, energy-efficient transportation and recycling programmes impact operational optimisation, supplier relations and brand image.

- Future studies may examine the impact of online conversion on logistics management and performance as digital technologies continue to advance at an unprecedented level. In terms of maximizing logic businesses, this opportunity may include technologies for the IoT, stop network, artificial intelligence AI, and machine learning ML.
- An extensive comparative study focusing on multiple key sectors in Kerala can provide a wider view of variations in logistics management practice and their impact on the performance of firms in those sectors. The scope of industry analysis would include manufacturing, retail, healthcare, and information technology and would identify industry-specific logistics challenges and best practices.

RECOMMENDATIONS

- Improve Logistics Planning: Invest in good logistics planning with data up to October 2023. Implement strategic planning tools and methodologies so that logistics activity is aligned with overall business objectives.
- DetailsInvest in Technological Integration: Employing advanced logistics technologies is critical to enhance operational efficiency and facilitate effective logistics management. Logistics: Automation, Real-Time Tracking, Data Analytics, contradiction the rest of your supply chain.
- Invest in Infrastructure Quality: Infrastructure has to be upgraded regularly so that the same is not congested due to a lack of maintenance and support of logistics functions. This requires private and public sector cooperation in removing infrastructure bottlenecks, building transportation networks, creating warehousing facilities and communication systems.
- Foster Agile Supply Chain: Building agile supply chains allows businesses to quickly adapt to changes and disruptions in the market. So, how companies can implement strategies to etch their supply chain agility include diversifying suppliers, investing in flexible manufacturing processes, and agile logistics practices.

CONCLUSION

The study examines in depth the influence of logistics management, with special attention to the ICTT, on the effectiveness of businesses in Kerala. The analysis uncovers a difficult link between organizational performance and logistics management through thorough research using analytical statistics, stability analysis, correlation matrices, and mediation analysis. The findings emphasize the critical role that strategic planning plays in logistics operations and a strong positive correlation between company performance and logistics planning. Companies that have well-organized shipping planning can run their businesses more effectively and affordably, leading to better service shipping and improved performance.

The highest suggest score was obtained for modern integration, out of the various logistics management aspects. Advanced technology like real-time monitoring and data analytics are used to improve administrative efficiency, aid successful logistics planning, and increase supply chain freedom. In yesterday's fast-paced business environment, firms like ICTT must be aggressive to remain competitive. Additionally, the study emphasizes the value of investing in high-quality equipment because it has a direct impact on logistics and company performance. Making continued investment in logistics system a top priority for successful transportation control reduces difficulties, lowers transportation costs, and guarantees consistency in the supply chain.

Additionally, the study emphasizes the importance of supply chain freedom as a potent arbitrator between company performance and logistics management. Companies with

adaptable supply stores are better positioned to respond to customer needs, control problems, and adapt to market adjustments. The advantages of logistics management on firm efficiency are amplified by this versatility. The findings of the study are particularly important for companies operating in Kerala, especially those that work in ICTT, where logistics management, from strategic planning to modern integration to infrastructure quality, are essential components of achieving great organizational performance.

In the end, the study highlights the importance of firms placing a premium on logistics management, funding innovative technologies, and upholding a versatile supply chain. Businesses can now manage market volatility with greater convenience thanks to stronger supply chains, which guarantees continued performance despite fluctuating market conditions. Therefore, balance between productive logistics management and supply chain flexibility is essential to promote long-term development and maintain a competitive advantage for the long run.

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