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Apprising The Service Quality Of Inland Container Depots In And Around Chennai

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ABSTRACT

ICDs play a very essential function in streamlining the flow of containers through the port and consolidating them into larger groups. One example of this is the transportation of containers to the port by rail or water. In addition to being accountable for a broad variety of duties, including the storage, transfer, and combination of products, as well as the supply of customs services and the maintenance of equipment in immaculate condition, the individual is also responsible for a wide range of responsibilities. They also provide a significant contribution to the enhancement of the effectiveness of the supply chain by ensuring that the supply chain network is comprised of a diverse range of organizations. These entities include, but are not limited to, manufacturers, producers, warehouses, transportation companies, distributors, suppliers, and retailers. These chains are aiming to minimize their expenditures, increase their efficiency, and make certain that they deliver their items to customers on time. In addition to ensuring that their quality requirements are followed, they are also looking to save money. The findings of this research indicate that the most significant elements that influence the quality of service provided by an ICD are its location and accessibility, the facilities that are available at the ICD, the policy that is in place, and the availability of the labor that is necessary.

KEYWORDS: ICD, Transportation, Supply Chain, Location and Accessibility, Facilities, and Labor.

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INTRODUCTION

It is generally agreed that an inland container depot, sometimes referred to as an ICD, is the most important component of any supply chain that is efficient. In light of the fact that there is a larger level of competition all over the world and that customers desire goods in a number of different ways, it is even more important to enhance logistics services in the current day. If you have an excessive amount of information about how the supply chain of an e-commerce firm runs, it is probable that the company will not be able to achieve success. In spite of the fact that the supply chain of a company is functioning well, it is still essential for the company to find methods to be able to improve it. For the purpose of assisting businesses in overcoming the difficulties that are connected with contemporary logistics, the purpose of this article is to provide assistance and suggestions to such businesses. In addition, the essay will make an investigation into the many methods in which an inland container depot may be of use to its customers. These users include shippers, charters, exporters, and other persons.

In addition to the supply of customs services and the upkeep of equipment in immaculate condition, ICDs are accountable for a broad variety of responsibilities, including the storage, transfer, and combination of commodities. In addition, they are responsible for the repair of equipment. It is believed that ICDs will significantly enhance port flow and container consolidation by facilitating the transportation of containers to the port by rail or river. ICDs are thought to improve port flow and container consolidation, according to Van den Berg and De Langen (2011), who divided the functions of ICDs into two groups: basic functions for multimodal transport, which include moving containers between different modes of transport and providing different logistics services based on customer needs; and extended functions, which are thought to improve port flow.

It is conceivable to consider intermodal container depots (ICDs) to be multi-modal terminals due to the fact that they are located inland and make it possible for goods that are loaded into intermodal loading units to be transported directly to seaports (Roso et al., 2009). Near ICDs are those that are less than 150 kilometers away from seaports, mid-range ICDs are those that are between 150 and 500 kilometers away, and distant ICDs are those that are farther than 500 kilometers away from seaports that are located away from seaports. As a consequence of this, the use of a variety of alternative forms of transportation is made easier. According to the findings of the study that was carried out by Rodrigue and Notteboom (2012), ICDs may be further classified into three distinct types. The following types of ports fall into these categories: satellite ports, ports that act as hubs for multi-modal transportation, and ports that function as transshipment centers. The technique categorizes ICDs that function as logistics centers into three primary categories: (i) logistics nodes, which are mainly responsible for storing and warehousing commodities; (ii) logistics centers that concentrate on transportation; and (iii) logistics centers that concentrate on value-added services.

Services that are rendered by ICDs

ICDs are a factor that contributes to the enhancement of the effectiveness of the supply chain. Supply chain management is the process of producing and shipping commodities in a series of consecutive procedures. This process is referred to as the supply chain. There are many different types of organizations that are part of this network. Some of these organizations include, but are not limited to, manufacturers, producers, warehouses, transportation companies, distributors, suppliers, and warehouses. These

chains are aiming to minimize their expenditures, increase their efficiency, and make certain that they deliver their items to customers on time. In addition to ensuring that their quality requirements are followed, they are also looking to save money. In spite of the fact that it is situated on land, the functioning of the inland container depot is comparable to that of a seaport. A significant place for storing and transferring stuff, it is an essential position. Their significance lies in the fact that they make it easier for commodities to be transported between seaports and sites farther inland. This is a crucial point to keep in mind. Because of the proximity of the inland container port to the sites where items are created and acquired, it is possible that firms may see considerable cost reductions as a consequence of this relocation.

IDCs are of the highest relevance for the improvement of the supply chain since they are vital sites. This is because of the fact that they are crucial. The following are some areas that, if you make an attempt to improve, may be of great use to you and be of assistance to you in being more efficient, saving money, and eventually performing better: There are fewer people at the ports than there were in the past. To ensure that the seaports do not become congested, it is the responsibility of the inland container depot to store any containers that are in excess of necessary quantities. Ships are able to turn around more easily as a result of the decrease in congestion, which in turn leads to an improvement in the system's overall functionality.

Because it is close to the place where containers are used, it is an appropriate location for an ICD because it reduces the amount of distance that the containers have to go there. As a result of the fact that they live at a higher elevation, they are considering making the transition from utilizing roads to rail as a form of transportation since rail is better for the environment than roads. Additionally, this makes it simpler to get to market in a shorter amount of time, which indicates that the alternative option will have a cheaper price for the cost of shipping. When utilizing an ICD, it is considerably simpler to keep track of and manage stockpiles since it has a huge amount of space set out for containers. This makes it much easier to handle stockpiles.

This results in shorter lead times, which in turn suggests that you are able to complete jobs more quickly and without meeting any obstacles. This is because the management of stock has been improved, which has led to shorter lead times. Benefits include a reduction in financial expenditures, an increase in the number of available options, and an ease of usage. By using an inland container depot, a firm has the opportunity to save money since the depot will be responsible for handling customs and ensuring that the containers are maintained in top shape. The availability of these facilities makes the process of moving objects from one site to another less complicated and more cost-effective. Companies who participate in e-commerce are able to maintain track of their inventory and distribution network because they are able to move and store things in a way that is convenient for them. This allows them to move and store things in a manner that is in their best interest. The ICDs provide services that may assist individuals in navigating the customs process, which means that those who buy and sell items may also profit from these regulations. When there is no longer a need to go to ports that are situated at a bit bigger distance, it is a great deal easier to obtain things in order.

Recently built ICDs are outfitted with a real-time tracking system that makes use of the most current technology breakthroughs in order to monitor the movement of containers. This system takes use of the most recent technological advancements. There is also the possibility that inland container depot will make use of modern digital tools and technology in order to provide you with solutions that are acceptable for your requirements. With the support of these data-based insights, you will not only be able to execute duties in a more expedient manner, but you will also be able to fast respond to conditions that were not anticipated.

It is the job of the ICD to oversee the process of consolidating and deconsolidating, which ultimately results in cost savings for shipping services. It is the process of putting together packages of items for the aim of exporting that is referred to as consolidation. Deconsolidation, on the other hand, is a procedure that occurs during the process of boarding for imports. It takes place when cargo batches are withdrawn from containers. You may be able to save even more money on shipping charges by using container depots that are situated inside the United States. These depots will take care of chores such as labeling, packing, and preserving the quality of your product. There is a system that enables on-site clearing of customs at the majority of specialized ICDs, which speeds up the process of sending out freight. This system is available across the country. These kinds of processes not only save time and money, but they also save paper and other types of paper. In other words, they get rid of unnecessary paperwork.

Need for the Research

The issue of service quality is very important for ICDs in developing countries (Bui and Nguyen, 2022; Cao et al., 2023). This is due to the fact that the logistics-related services that are provided at these centers are subpar due to inadequate technological and infrastructural capabilities for these centers. This is due to the fact that these facilities are situated in countries that are still in the process of developing. Additionally, in light of the constraints that are imposed by the budget, it is essential for both private companies and municipal governments to have a comprehensive knowledge of the primary elements that influence the quality of service in order to be able to implement programs and policies that are both successful and suitable for the long-term expansion of ICDs. This is because the budget places limitations on the amount of money that can be spent on things. It is for this reason that it is very necessary to do study on the degree of care that is offered by ICDs in nations that are still in the process of economic growth. The study being conducted here is an effort to make progress in this specific direction.

REVIEW OF LITERATURE

There is a limited amount of research that has been undertaken in India with regard to the evaluation of the service quality of ICDs. As an additional point of interest, it has been shown that ICDs play a key part in the generation of employment possibilities, the improvement of commercial and import-export activities, and the reduction of logistical costs via the development of the service that they provide. Research was conducted by Rodrigue and Notteboom (2012) to explore the influence that ICDs have had on the economy of North America in comparison to the progress that has been done in European nations (European countries).

The research was carried out in contrast to the progress that has been made in European nations. Based on the findings of the research, it has been determined that the most significant factor that is influencing the growth of the ICD system is the rail link, which enhances both the efficiency and the quality of the service.

Over the course of the last several years, academicians have conducted investigations on the impact that the ICD system has had on the growth of the logistics business as well as the economy of Nigeria (Akinade, 2020). During the year 2009, Roso and his colleagues carried out a research in which they investigated the advantages of ICDs from the perspective of a collection of stakeholders. Seaports, rail and road operators, shipping lines, shippers, local governments, and society as a whole were all included in this group of stakeholders.

Through the course of their investigation, Nguyen and Notteboom (2018) investigated 107 ICDs from various regions of the world and discovered that these ICDs had a few qualities in common with one another. The findings of the research indicated that ICDs are influenced by three factors: (1) the geographical position of the port in relation to the sea and inland, as well as the operational functions of the ICD; (2) the technical specifications of the seaport to which the ICD is linked, which include port traffic, connectivity, utilization, and other related factors; and (3) the transportation distance between the ICD and the seaport. In the study that Roso (2008) performed on the factors that impact the development of ICDs, the most significant challenges that stand in the way of the implementation of ICDs were identified as being infrastructure, land use, environmental concerns, and legal requirements.

When people have the opportunity to evaluate the service quality of Inland Container Depots (ICDs), they often concentrate on three key topics: whether or not there are methods to save money, whether or not there are ways to manage containers at ports, and whether or not there are ways that ICDs are better for the environment. Nevertheless, the subject of what makes ICDs better or worse has not been examined to a great amount, despite the fact that it is a very crucial feature that has not been discussed. It is of the highest significance to emphasize that shippers and shipping lines may opt not to utilize ICDs if they do not fulfill adequate conditions. This would prevent the benefits of ICDs from being achieved, which would be a significant loss.

Objectives of the Research

The goal of this study is to examine the factors that determine the quality of service that is offered by ICD within the context of Chennai. More specifically, the research will focus on determining the extent to which users of ICD regard particular characteristics to be significant or fulfilling.

METHODOLOGY

The research is descriptive in nature and comprises users of ICDs who operate within the Chennai area. These users include Shippers, Charters, Exporters, and Importers. According to the findings of the research, the most significant elements that influence the quality of service that is provided by ICDs are four independent criteria: location and accessibility, facilities available at ICDs, policy and management, and the availability of needed labour. 75 individuals who utilize the services of ICDs are included among the responses, as stated above.

The location and the accessibility

It has been stated by Ha et al. (2019) that the location and accessibility of ICDs is one of the most important variable that is responsible for determining the quality of service that is provided at these ports. They made an investigation into a number of different factors, including the relevance of the ICDs to the transportation network, the effectiveness with which they link to transport axes, and the ease with which huge multimodal transport trucks may reach them.

The primary reason why stakeholders are interested in the intermodal services offered by ICDs is that these services cut down on the amount of time and money that is spent on shipment. The ease with which individuals may move from using individual care devices (ICDs) to using public transportation is the primary focus of accessibility to modes of transportation concerns. For this purpose, it is necessary to be located in close proximity to highway ramps and to observe a substantial amount of traffic on a regular basis for the transportation of road freight (Laptaned, 2007?).

ICDs are responsible for a wide range of tasks, including the reception and shipment of cargo, the packaging and consolidation of export items, the storage of products, the repair of containers, the transportation of goods to their ultimate destination, the clearance of customs, the provision of handling equipment, and the establishment of connections with other individuals involved in the supply chain (Laptaned, 2007). When choosing and studying ICDs, shippers search for those that are situated in close proximity to industrial zones or export processing zones before making their pick. This is done in order to ensure safety and efficiency. When it comes to ensuring the success of operations, it is very necessary to be situated in close proximity to the facilities of service providers or logistical hubs. Given the information presented above, the first hypothesis may be stated as follows:

H01: ICD's quality of service is impacted by its location and accessibility.

Facilities available at the ICDs

In the year 2020, Moldabekova and colleagues conducted research to explore the interrelationships and effects of various elements at inland container depots (ICDs) on the quality of logistics service. They put a special focus on the influence that components of physical infrastructure, such as vehicles and equipment for cargo handling, have on the quality of service that is provided. Furthermore, they examined the many ways in which the information technology infrastructure has the potential to enhance the

quality of services. According to Andersson and Roso (2016), it is necessary for ICDs to modify themselves and align themselves with the requirements of modern infrastructure systems. This is essential in order to guarantee the ongoing growth of the logistics system and to make significant contributions to it. Phan et al. (2020) were able to achieve their goal of determining the factors that impact service quality and customer satisfaction at container ports in Vietnam by using survey data from 108 different enterprises. According to the findings, the quality of service inside container ports may be assessed based on a number of different criteria. These aspects include resource factors, output factors, process elements, and management components, issues about image and reputation, and social responsibility requirements.

There is a possibility that information technology will have a substantial impact on the field of logistics. This is because it will make it simpler for participants in the supply chain to work together and plan their operations. Additionally, it is able to take care of a substantial number of logistical tasks on its own, which allows ICDs to focus more on matters relating to operational management. This benefits both parties. As stated by Closs (2003), the use of information technology has had an immediate and direct influence on every aspect of the operations of a logistics service provider. The commercial outcomes, the quality of the service, and the operational expenditures are all included in this. Furthermore, Sauvage (2003) arrived at the conclusion that the use of information technology makes it possible to provide logistical services to customers in an effective way. This, in turn, may lead to an increase in productivity, an improvement in service quality, and an increase in competitiveness. Due on the information presented above, the following hypothesis has been developed:

H02: ICD's quality of service is impacted by the availability of services.

Process and Management

Maritime transport and freight forwarding businesses in Taiwan and China were the subjects of a research that was carried out by Lai and colleagues (2004). As a result of the results of this research, it was proved that the deployment of novel ideas, service delivery methods, technologies, or service management approaches may boost customer value, consequently improving the competitive advantages of a variety of logistics service providers. According to the results of previous studies (Yang et al., 2009), the use of new technology, equipment, and policy in the provision of services has the potential to enhance the quality of the services that are being provided. As stated by Phan et al. (2020), the quality of container port services may also be assessed based on the characteristics of the processes that are engaged as well as the management of the organization. These conclusions are the result of an investigation of 108 various types of organizations' operations. The approach known as Partial Least Squares Structural Equation Modeling (PLS-SEM) was used by Pham and Yeo (2019) in order to explore a number of variables of port service quality and to ascertain the degree to which certain aspects influenced the level of satisfaction experienced by customers. The outcomes of the study indicated that management characteristics, the image of the firm, and social responsibility all had a significant and favorable impact on the degree of service satisfaction experienced by consumers as well as the quality of service that was delivered to them. Following the preceding, the third hypothesis has been formulated as follows:

H03: ICD's quality of service is impacted by its process and management.

Labour force

According to the findings of the study that was carried out by Woo et al. (2013), human resource factors, which include management and staff, as well as knowledge, abilities, and adaptability, have the potential to enhance the effectiveness of ICDs and the quality of service that they provide. In the research that Marlow and Paixão Casaca did in 2003, they demonstrated that the aforementioned features have a significant influence on the quality of service, competitiveness, and consumer attractiveness in ports. Turkish (2013, 2008) shown that in order to increase the quality of logistics services that are offered by port service providers, leaders and staff in ICDs need to possess particular skills and experience. This is necessary in order to improve the quality of the services. Knowledge of management and operations, an awareness of consumer wants and requirements, and the capacity to gather feedback from customers are all examples of the talents and abilities that fall under this category. In light of the information presented above, the fourth hypothesis has been formulated as follows:

H04: ICD's quality of service is impacted by the availability of labour

Data Analysis

Table 1 Model Summary of factors influencing service quality of ICDs

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.622[a]	0.448	0.542	0.01189
a. Predictors: (Constant), Location and Accessibility, Facilities, Process and Management and Labour				

Table 1 presents the result of analyzing the factors influencing service quality of ICDs. All of the independent (latent) variables had VIF values being less than 2, thus multicollinearity issue was reassured. The adjust R^2 value of 54.2% was over than 0.5, thus the prediction capacity of the estimate model was adequate.

Table 2. Table 2 Regression Analysis of Coefficients

Model		Standardized Coefficients		*T*	Sig.	VIF
		β	Std. Error			
1	(Constant)	5.363×10^{-16}	0.069	0.001	1.003	-
	Location and accessibility	0.325	0.080	4.013	0.001	1.272
	Facilities	0.283	0.072	3.868	0.001	1.383
	Process and management	0.259	0.063	3.492	0.001	1.321
	Labor	0.217	0.071	2.532	0.013	1.328

DISCUSSION

Consistent with other previous research studies (Lai, 2004; Laptaned, 2007; Thai, 2013), all four latent components shown a positive correlation with the service quality of ICDs. Consequently, the four presented hypotheses (H1, H2, H3, H4) are validated and accepted.

Location and accessibility were the most essential factors for ICD among constructs. It is evident that location and accessibility strongly influenced transportation costs, a primary factor affecting pricing and a significant predictor of service quality at ports (Thai, 2013; Ugboma et al., 2009). Location that is hard to get to may make things less reliable, especially when it comes to transportation (Phan et al., 2020). Also, it's hard to rectify flaws in choosing a place, and making it easier to get there needs a lot of money and time (because of the effect on infrastructure). Location may be regarded as an external element, whilst the others are considered internal criteria for ICDs.

The list covered facilities, processes and management, and labor, based on how big the consequences were. The facilities are without a doubt quite important for the safety and dependability of operations in ICDs (Laptaned, 2007). From a service point of view, amenities are the most evident and powerful things that impress clients (Kolanović et al., 2008).

Management has not been seen as a significant aspect of service quality in the past since consumers only see part of it. But the internet technology has made the management process more clear, and consumers can use it to get the latest information.

Labor has a little effect. This conclusion contrasts with the study of Ugboma et al. (2009), which highlighted that direct staff assistance is one of the most significant determinants of service quality at ports. Our conclusion may be due to the fact that the job market in this industry is quite rich and well-trained, as well as the use of information and communication technology.

CONCLUSION

There is little doubt that ICDs help areas flourish economically and socially. To ensure the long-term growth of ICDs, it is very important to check and improve the quality of their services. In line with this approach, we have done a quantitative study of the service quality of ICDs in Chennai. In general, the quality of service at ICDs was rated as satisfactory, but not very effective. The findings indicated that the four significant service quality elements included location and accessibility, facilities, procedure and management, and labor.

Based on the results of the factors, some suggestions for managers were made as follows. The most important thing to think about when making plans for logistics and transportation is where to put things. To create algorithms that choose the best places for ICDs with the best multimodal access, several types of data should be gathered (Ambrosino and Sciomachen, 2014; Božičević et al., 2021; Tadić et al., 2020). The accessibility should be increased regularly by the development of expressways, which would shorten travel times. The use of modern technology should help improve the facilities and management process, which may mean that more workers are needed. Because of this, ICDs may need to stay in regular contact with colleges and universities about how to teach and train students. Governments (local) may need to come up with policies and campaigns to make the working and living circumstances better for the ICD workers, as most of them are from the area. This research has furnished empirical data for the examination of variables influencing the service quality of ICDs in a developing nation. The results on the impacts of the four factors—location and accessibility, facilities, process and management, and labor—have contributed to the literature.

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