Article

Major Determinants of Logistics Cost of Manufacturer-Exporters in Dubai

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Abstract

International trade involves the exchange of products and services across international borders. It includes the exchange of capital between the nations as well. The present paper finds the major determinants of the logistics cost of manufacturer exporters in Dubai. The researcher analyses the various determinant factors responsible for manufacturer exporters in the study area. This paper identifies Nature of business, Size of company, Human factor, Range of commodity, Property of product, Infrastructure, Tax and tariff, Currency exchange, Customs clearance, Law and regulation, Demand variability of logistic Services, Cultural difference in payment, delivery and corporate culture, Application of information and communication technology, Cost of ICT, Warehouse and inventory management, Inventory model, One-stop service, Service capacity, Alliance and cooperation, Real-time information sharing and Outscoring strategy are the major determinant drivers relevant for manufacturer exporters in Dubai. Opinions and responses are received from 289 merchant exporters in the study area. In this paper, ANOVA and Rank Correlation were used for this study.

Keywords: Logistics Cost, Major Determinants, Manufacturer Exporters

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1. Introduction

International trade involves the exchange of products and services across international borders. It includes the exchange of capital between the nations as well. Global trade involves multi-parties, and thus, the participation of multiple nations makes it even more vibrant and equally complicated. However, it cannot be refuted that in many countries, the contribution of foreign trade represents a significant share of their respective GDP. International Trade practices play a pivotal role in pushing globalization, and Dubai is highly determined to derive the maximum out of the international trade and tourism sector. Dubai is riding high on its commitment to make it a 'numero uno' tourist destination in the world in the years to come as its oil deposits cease to exist and may not continue to safeguard its economy in the future. The stupendous skyscrapers, mega malls, and a long list of 'first of its kind' investment projects implemented by the Dubai government are testimony to their commitment. At this juncture, it is essential to remember that the central idea behind all the infrastructure projects is to improve international trade and tourism in Dubai. Over the past decades, international trade agreements and an array of regional trade integration blocs have significantly curtailed the tariff-based barriers to international trade. Not limited to the above, the helping hand rendered by the ports and ocean shipping as facilitators of international trade cannot be overshadowed.

Moreover, a country's international trade performance determines its overall productivity, as it decides the fate of attracting foreign investments.

Inefficiency in the logistics front leads to a rise in the cost of doing business and, in turn, plummets the potential for both international and domestic market integration.

2. Review of Literature

Bokor (2010), in his bid to ascertain the determinants of logistics cost and the concomitant calculation methodology, reiterated the relative importance of the Analytical Hierarchical Process (AHP) model with a determined focus on establishing a concrete theoretical fabric on the cost-driving factors in the logistics sector. For the same, the researcher measured the relevance of logistics costing and charted out the exact determinants. The research finding grounded the inevitable fact that optimising the cost matrix is a burning issue for any firm as it imposes a real-time challenge on businesses which rely exorbitantly on logistics and transportation. Thus, the activity-based costing (ABC) approach is a handy tool for mediocre firms to check the exact logistics cost constantly.

their research analysis. Combes In et al. (2016) developed a model in an urban logistics context with the optimal distribution centre. It focuses on fixing the cost function by carefully scrutinising the problems and the few associated assumptions. The researcher argued that the emergence of logistics sprawl leads to an increased demand for deliveries within city nodal points. Not limited to the above, the model also addresses why warehouses tend to be located farther on the city's outskirts and its association with realising the benefit of the economies of scale.

Edirisinghe and Jayathilake (2017) argued in their paper that customs plays a pivotal role in augmenting logistics performance phenomenally. The researcher expounded that the economic achievements of Sri Lanka are expected from five major hubs, namely, *maritime*, aviation, commercial, knowledge, and energy hubs. The determinants of the logistics cost structure identified in the research include border management clearance, customs efficiency, quality transport infrastructure, cost-effective shipments, and tracking technologies.

Havenga et al. (2017), in their research, substantiated that the collaboratively challenging congestions in the port, the problem of bureaucratic delay and the hinterland feeder system will expose new avenues for the stakeholders. Having researched South African ports, they have documented that the port system has undergone sea changes before attaining its present form under the aegis of the Ports Regulator of South Africa to achieve equitable access and economic regulation in the national logistics system. However, they have yet to rule out the suggestion of attempting further reform by establishing a strategic infrastructure in the long run to sustain the revenue to the national exchequer.

In their case-based research approach, Katsela and Pålsson (2020) highlighted the burgeoning issue of attaining lucrative city logistics ingenuities. Using diligently exploring the determinants such as concomitant cost structure, revenue variables and the economies of scale in Sweden, the researchers presented a detailed cost-benefit analysis through a six-month pilot programme. The research results reveal a non-linear relationship between goods volume and profitability; instead, it follows a logarithmic curve. Similarly, the sensitivity analysis expounded on the impact of pricing on financial performance. However, the study suffers a notable limitation of its inability to predict the exact changes in revenues and the cost at the time of complete implementation.

Kovtun and Yushchenko (2021) critically evaluated Ukraine's prospects and potential in the green energy export sector in their investigation. This study is carried out against the backdrop of the everincreasing cost of silver owing to the inability of the mining companies to cater to the growing demand in the marketplace. Not limited to the above, the research findings spotlight some facts crucial to the contributing factors and their invariants in determining the exact logistics cost, the models of regulating stocks, and the supply management methods.

3. Statement of the Problem

Manufacturer exporters face a different set of challenges. To achieve cost competitiveness, they have to effectively manage an array of activities such as facilities management, vendor management, human resources management, operations management, quality control, warehouse and distribution management, cargo and maritime logistics management, etc., to name a few. Despite the challenges mentioned above, the most significant advantage the manufacturer exporter can exploit over the merchant exporter is the economies of scale. Venturing into large-scale manufacturing, they can take an array of formative steps to cut down the unit cost of their product. Suppose the product can fulfil the expectations of the foreign customer. In that case, they can expand their profit margin to a greater extent by effectively supplying the goods. In other words, they can levy premium pricing for their product to a foreign customer.

In contrast, the same sophistication could be more conducive for many merchant exporters owing to rigorous competition. The general problems faced by manufacturer exporters revolve around the outbound logistics arena: Issues relating to vehicle routing, cargo handling, port management, multimodal transit risk, containerisation, export-import documentation procedure-related challenges. customs clearance, packing credits, bank guarantees and letter of credit-related issues, insurance, unusual delay in tracking and tracing consignments, nonavailability of necessary cold storage facilities in ports, infrequent shipping and above all unforeseen uncertainties and timely delivery of goods to the foreign customers.

4. Objectives of the Study

- 1. To examine the major determinants of logistics cost of manufacturer exporters of Dubai.
- 2. To suggest recommendations to the exporters and policymakers based on the present investigation.

5. Methodology

The present study is based on primary data. Manufacturers who export goods from Dubai have been the respondents of the study. For primary data collection, a well-structured interview schedule was given to the respondents to record their responses on the significant determinants of logistics cost adopted by the manufacturer exporters for reducing logistics costs. The study is based on a field survey with a structured interview schedule. The researcher personally met the manufacturer exporters to collect the required data. A proportionate random sampling technique has been adopted to select the respondents. A total of 9812 manufacturer exporters are available in Dubai. Out of which, the personal respondents met 262 manufacturer exporters. The data collected for the study was analysed using SPSS package version 26 and Microsoft Excel 2016, and in this paper, Analysis of variance, Post hoc test and Rank analysis were used.

6. Data Analysis and Interpretation of Data

(a) Major Determinants of Logistics Cost of Manufacturer Exporters

In this section, the major determinants of the logistic cost of the manufacturer exporters are studied in detail. There are two subsections, and in the first sub-section, the respondents' opinion on the determinants of the logistic costs based on their business profile is analysed using appropriate statistical tools. In the second subsection, the overall major determinants of the logistic cost of the manufacturer exporters, irrespective of the business profile, are found using descriptive statistics and ranking. In this sub-section, the first ANOVA is used to determine whether there is any difference in opinion among the different business groups (comparison of means recorded by the respondents). Then, a detailed rank analysis is carried out using the mean score obtained to identify the significant determinants of the logistic cost based on the business profile.

Table No 1 ANOVA – Opinion on the Determinants of Logistics Cost Based on Size of the Company

ANOVA									
		Sum of Squares	df	Mean Square	F	Sig.			
	Between Groups	28.257	3	9.419	3.670	.013			
Nature of business	Within Groups	662.201	258	2.567					
	Total	690.458	261						
	Between Groups	4.220	3	1.407	.891	.446			
Size of company	Within Groups	407.185	258	1.578					
	Total	411.405	261						
	Between Groups	2.072	3	.691	.408	.748			
Human factor	Within Groups	437.184	258	1.695					
	Total	439.256	261						
	Between Groups	23.861	3	7.954	4.466	.004			
Range of commodity	Within Groups	459.513	258	1.781					
	Total	483.374	261						
	Between Groups	2.572	3	.857	.568	.636			
Property of product	Within Groups	389.218	258	1.509					
	Total	391.790	261						
	Between Groups	10.793	3	3.598	2.108	.100			
Infrastructure	Within Groups	440.367	258	1.707					
	Total	451.160	261						
	Between Groups	4.164	3	1.388	.850	.468			
Tax and tariff	Within Groups	421.302	258	1.633					
	Total	425.466	261						

 H_{o} : There is no significant difference in the determinants of logistic cost with respect to the size of the company.

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	Between Groups	2.806	3	.935	.486	.692
Currency exchange	Within Groups	496.049	258	1.923		
	Total	498.855	261			
	Between Groups	8.024	3	2.675	1.291	.278
Customs clearance	Within Groups	534.434	258	2.071		
	Total	542.458	261			
	Between Groups	5.444	3	1.815	.727	.537
Law and regulation	Within Groups	644.011	258	2.496		
	Total	649.454	261			
	Between Groups	4.943	3	1.648	.859	.463
Demand variability of	Within Groups	494.752	258	1.918		
	Total	499.695	261			
Cultural difference in	Between Groups	3.507	3	1.169	.581	.628
payment, delivery and	Within Groups	518.844	258	2.011		
corporate culture	Total	522.351	261			
Application of	Between Groups	4.441	3	1.480	.808	.491
information and communication	Within Groups	472.887	258	1.833		
technology	Total	477.328	261			
	Between Groups	10.292	3	3.431	1.846	.139
Cost of ICT	Within Groups	479.525	258	1.859		
	Total	489.817	261			
	Between Groups	4.579	3	1.526	.812	.488
Warehouse and	Within Groups	484.993	258	1.880		
	Total	489.573	261			
	Between Groups	1.167	3	.389	.224	.880
Inventory model	Within Groups	448.283	258	1.738		
	Total	449.450	261			
	Between Groups	5.097	3	1.699	.966	.409
One-stop service	Within Groups	453.900	258	1.759		
	ereaps					

Service capacity	Between Groups	4.749	3	1.583	.761	.517
	Within Groups	536.522	258	2.080		
	Total	541.271	261			
	Between Groups	23.161	3	7.720	4.400	.005
Alliance and cooperation	Within Groups	452.671	258	1.755		
	Total	475.832	261			
	Between Groups	3.365	3	1.122	.538	.657
Real-time information	Within Groups	537.814	258	2.085		
Sharing	Total	541.179	261			
	Between Groups	2.145	3	.715	.475	.700
Outscoring strategy	Within Groups	388.378	258	1.505		
	Total	390.523	261			

The estimated significance value of almost all the statements reveals that the respondents agree about the determinants of the logistics cost since the calculated significance value is greater than 0.05, implying that the null hypothesis is accepted except for three determinants, namely, Nature of business [0.013], Range of commodity [0.004], Alliance and cooperation [0.005]wherein the calculated p-value is less than 0.05 implying the null hypothesis rejected. This implies that the respondents significantly differ in opinion concerning these determinants. The rank analysis is performed to identify the major determinants based on the company's size.

Determinants of Logistics Cost	50-100		100-300		300-500		More than 500	
Determinants of Logistics Cost	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Nature of business	3.65	1	2.71	21	3.24	13	3.4	11
Size of company	3.6	2	3.32	7	3.59	4	3.6	3
Human factor	3.44	6	3.42	4	3.61	2	3.6	3
Range of commodity	3.14	16	2.99	18	3.18	15	3.83	1
Property of product	3.3	13	3.03	16	3.05	20	3.17	16
Infrastructure	2.86	20	3.18	13	3.25	11	3.53	6
Tax and tariff	3.58	3	3.32	7	3.61	2	3.43	10
Currency exchange	3.49	5	3.51	2	3.51	5	3.25	13
Customs clearance	2.86	20	3.12	15	3.37	7	3.25	13
Law and regulation	3.23	14	2.99	18	3.29	9	3.36	12
Demand variability of logistic Services	3.58	3	3.21	10	3.29	9	3.47	8

Table No 2 – Determinants of Logistics Cost Based on Size of the Company

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Cultural difference in payment, delivery and corporate culture	3.33	11	3.38	6	3.25	11	3.06	19
Application of information and communication technology	3.33	11	3.41	5	3.12	18	3.13	18
Cost of ICT	3.23	14	3.19	11	3.65	1	3.49	7
Warehouse and inventory management	3.35	10	3.19	11	3.46	6	3.15	17
Inventory model	2.95	18	3	17	3.13	17	3.04	20
One-stop service	2.88	19	2.88	20	3.18	15	2.92	21
Service capacity	3.42	8	3.15	14	3.03	21	3.25	13
Alliance and cooperation	3.14	16	3.6	1	3.09	19	3.79	2
Real-time information sharing	3.44	7	3.25	9	3.19	14	3.45	9
Outscoring strategy	3.37	9	3.45	3	3.37	7	3.6	3

Source: Primary data

The major determinants of logistics costs based on the size of the company are given below.**50-100 employees:** With respect to this group, the major logistics costs are as follows: Nature of business [Mean: 3.65; Rank:1], Size of company [Mean: 3.6; Rank:2], Tax and tariff [Mean: 3.45; Rank: 3], Demand variability of logistic services[Mean: 3.58; Rank: 3], and Currency exchange[Mean: 3.49; Rank:5]. **100-300 employees:** Concerning this group, the major logistics costs are as follows: Alliance and cooperation [Mean: 3.6; Rank:1], Human factor [Mean: 3.51; Rank:2], Tax and tariff [Mean: 3.58; Rank: 3], Human factor [Mean: 3.42; Rank: 3], and Application of information and communication technology [Mean: 3.41; Rank:5]. **300-500 employees:** With respect to this group, the major logistics costs are as follows: Cost of ICT [Mean: 3.65; Rank:1], Size of company [Mean: 3.61; Rank:2], Tax and tariff [Mean: 3.61; Rank: 2], Demand Size of company [Mean: 3.59; Rank: 4], Currency exchange [Mean: 3.51; Rank:5]. **More than 500 employees:** Concerning this group, the major logistics costs are as follows: Alliance and cooperation given such as a follows: Range of commodity [Mean: 3.83; Rank:1], Alliance and cooperation [Mean: 3.79; Rank:2], Outscoring strategy [Mean: 3.6; Rank: 3], Size of company [Mean: 3.6; Rank:3].

Table No 3 ANOVA – Opinion on the Determinants of Logistics Cost Based on Volume of Annual Sales

H₀: There is no significant difference in the determinants of logistic cost with respect to the volume of annual sales.

ANOVA								
		Sum of Squares	df	Mean Square	F	Sig.		
	Between Groups	8.788	4	2.197	.828	.508		
Nature of business	Within Groups	681.670	257	2.652				
	Total	690.458	261					
	Between Groups	4.502	4	1.125	.711	.585		
Size of company	Within Groups	406.903	257	1.583				
	Total	411.405	261					

	Between Groups	7.418	4	1.855	1.104	.355
Human factor	Within Groups	431.838	257	1.680		
	Total	439.256	261			
	Between Groups	.904	4	.226	.120	.975
Range of commodity	Within Groups	482.470	257	1.877		
	Total	483.374	261			
	Between Groups	8.671	4	2.168	1.454	.217
Property of product	Within Groups	383.119	257	1.491		
	Total	391.790	261			
	Between Groups	5.715	4	1.429	.824	.511
Infrastructure	Within Groups	445.445	257	1.733		
	Total	451.160	261			
	Between Groups	7.921	4	1.980	1.219	.303
Tax and tariff	Within Groups	417.545	257	1.625		
	Total	425.466	261			
	Between Groups	10.138	4	2.534	1.333	.258
Currency exchange	Within Groups	488.717	257	1.902		
	Total	498.855	261			
	Between Groups	3.740	4	.935	.446	.775
Customs clearance	Within Groups	538.718	257	2.096		
	Total	542.458	261			
	Between Groups	19.192	4	4.798	1.956	.102
Law and regulation	Within Groups	630.262	257	2.452		
	Total	649.454	261			
	Between Groups	6.175	4	1.544	.804	.524
Demand variability of logistic Services	Within Groups	493.519	257	1.920		
	Total	499.695	261			
Cultural difference in	Between Groups	4.679	4	1.170	.581	.677
payment, delivery and	Within Groups	517.672	257	2.014		
corporate culture	Total	522.351	261			

Application of	Between Groups	13 462	4	3 366	1 865	117
information and	Between Gloups	13.402	4	3.300	1.805	.117
communication	Within Groups	463.866	257	1.805		
technology	Total	477.328	261			
	Between Groups	7.528	4	1.882	1.003	.407
Cost of ICT	Within Groups	482.289	257	1.877		
	Total	489.817	261			
Warehouse	Between Groups	4.486	4	1.122	.594	.667
and inventory	Within Groups	485.086	257	1.887		
management	Total	489.573	261			
	Between Groups	4.110	4	1.027	.593	.668
Inventory model	Within Groups	445.341	257	1.733		
	Total	449.450	261			
	Between Groups	5.073	4	1.268	.718	.580
One-stop service	Within Groups	453.924	257	1.766		
	Total	458.996	261			
	Between Groups	3.791	4	.948	.453	.770
Service capacity	Within Groups	537.480	257	2.091		
	Total	541.271	261			
	Between Groups	5.537	4	1.384	.756	.555
Alliance and	Within Groups	470.295	257	1.830		
	Total	475.832	261			
	Between Groups	5.534	4	1.383	.664	.618
Real-time information	Within Groups	535.646	257	2.084		
	Total	541.179	261			
	Between Groups	8.262	4	2.065	1.389	.238
Outscoring strategy	Within Groups	382.261	257	1.487		
	Total	390.523	261			

By looking at the estimated significance value of all the statements, it is clear that the respondents agree about all the determinants of the logistics cost since the calculated significance value is greater than 0.05, implying that the null hypothesis is accepted. Therefore, it is revealed that there is no significant difference in opinion on the determinants of the logistics cost with respect to the volume of sales. Rank analysis is performed to identify the major determinants based on the sales volume.

Table No 4 Rank Analysis – Determinants of Logistics Cost Based on Volume of Annual Sales

Determinants of Logistics Cost	Less than AED 1 million		AED 1 to 5 million		AED 5 to 10 million		AED 10 to 25 million		Above AED 25 million	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Nature of business	3.42	9	3.46	6	3.22	15	3.01	19	3.02	19
Size of company	3.85	1	3.6	5	3.42	5	3.41	5	3.54	6
Human factor	3.69	5	3.24	13	3.69	1	3.46	4	3.63	1
Range of commodity	3.38	12	3.3	9	3.25	14	3.19	14	3.23	12
Property of product	2.69	21	3	20	3.16	17	3.11	16	3.37	8
Infrastructure	3.42	9	3.36	7	3.33	9	3.07	17	3.06	17
Tax and tariff	3.08	16	3.7	1	3.38	7	3.54	2	3.56	4
Currency exchange	3.73	2	3.68	2	3.33	9	3.21	13	3.56	4
Customs clearance	3.46	7	3.04	19	3.11	20	3.24	11	3.23	12
Law and regulation	3	18	3.62	4	3.28	11	3.24	11	2.79	21
Demand variability of logistic Services	3.73	2	3.3	9	3.45	3	3.26	10	3.21	14
Cultural difference in payment, delivery and corporate culture	2.88	19	3.22	14	3.28	11	3.33	8	3.37	8
Application of information and communication technology	3.35	13	2.78	21	3.28	11	3.34	7	3.42	7
Cost of ICT	3.58	6	3.26	11	3.2	16	3.56	1	3.58	3
Warehouse and inventory management	3.31	14	3.36	7	3.5	2	3.19	14	3.17	16
Inventory model	3.08	16	3.2	15	3.13	19	2.86	21	3.04	18
One-stop service	2.81	20	3.26	11	2.98	21	2.9	20	2.98	20
Service capacity	3.42	9	3.08	17	3.14	18	3.07	17	3.31	10
Alliance and cooperation	3.46	7	3.16	16	3.36	8	3.36	6	3.62	2
Real-time information sharing	3.23	15	3.08	17	3.39	6	3.47	3	3.21	14
Outscoring strategy	3.73	2	3.68	2	3.44	4	3.27	9	3.29	11

Source: Primary data

The major determinants of logistics costs based on annual sales volume are given below. Less than AED 1 million: With respect to this group, the major logistics costs are as follows: Size of company [Mean: 3.85; Rank:1], Currency exchange [Mean: 3.73; Rank:2], Demand variability of logistic Services [Mean: 3.73; Rank: 2], Outscoring strategy [Mean: 3.73; Rank: 2], and Human factor [Mean: 3.69; Rank:5]. AED 1 to 5 million: With respect to this group, the major logistics costs are as follows: Tax and tariff [Mean: 3.7; Rank:1], Currency exchange [Mean: 3.68; Rank:2], Outscoring strategy [Mean: 3.68; Rank:2], Outscoring strategy [Mean: 3.68; Rank: 2], Human factor [Mean: 3.62; Rank: 4], and Size of company [Mean: 3.6; Rank:5]. AED 5 to 10 million: With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.69; Rank:1], Warehouse and inventory management [Mean: 3.5; Rank:2], Demand variability of logistic Services [Mean: 3.45; Rank: 3], Outscoring strategy [Mean: 3.42; Rank:5]. AED 10 to 25 million: With respect to this group, the major logistics costs are as follows: Cost of ICT [Mean: 3.56; Rank:1], Tax and tariff [Mean: 3.54; Rank:2], Real-time information sharing [Mean: 3.47; Rank: 3], Human factor [Mean: 3.46; Rank: 4], Size of company [Mean: 3.47; Rank: 3], Human factor [Mean: 3.46; Rank: 4], Size of company [Mean: 3.47; Rank: 3], Human factor [Mean: 3.46; Rank: 4], Size of company [Mean: 3.47; Rank: 3], Human factor [Mean: 3.46; Rank: 4], Size of company [Mean: 3.47; Rank: 3], Human factor [Mean: 3.46; Rank: 4], Size of company [Mean: 3.47; Rank: 3], Human factor [Mean: 3.46; Rank: 4], Size of company [Mean: 3.41; Rank:5]. Above AED 25 million: With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.62; Rank: 4], Cost of ICT [Mean: 3.58; Rank: 3], Tax and tariff [Mean: 3.56; Rank: 4], Currency exchange [Mean: 3.56; Rank:4].

 H_0 : There is no significant difference in the determinants of logistic cost with respect to years of experience in exports.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	4.484	2	2.242	.846	.430
Nature of business	Within Groups	685.974	259	2.649		
	Total	690.458	261			
	Between Groups	2.820	2	1.410	.894	.410
Size of company	Within Groups	408.584	259	1.578		
	Total	411.405	261			
	Between Groups	10.910	2	5.455	3.298	.039
Human factor	Within Groups	428.346	259	1.654		
	Total	439.256	261			
	Between Groups	1.282	2	.641	.344	.709
Range of commodity	Within Groups	482.092	259	1.861		
	Total	483.374	261			
	Between Groups	.779	2	.390	.258	.773
Property of product	Within Groups	391.011	259	1.510		
	Total	391.790	261			
	Between Groups	.082	2	.041	.023	.977
Infrastructure	Within Groups	451.079	259	1.742		
	Total	451.160	261			
	Between Groups	.255	2	.127	.078	.925
Tax and tariff	Within Groups	425.211	259	1.642		
	Total	425.466	261			

		1	1	1	1	
	Between Groups	1.154	2	.577	.300	.741
Currency exchange	Within Groups	497.701	259	1.922		
	Total	498.855	261			
	Between Groups	1.052	2	.526	.252	.778
Customs clearance	Within Groups	541.406	259	2.090		
	Total	542.458	261			
	Between Groups	8.246	2	4.123	1.665	.191
Law and regulation	Within Groups	641.208	259	2.476		
	Total	649.454	261			
	Between Groups	.134	2	.067	.035	.966
Demand variability of	Within Groups	499.561	259	1.929		
logistic Services	Total	499.695	261			
Cultural difference in	Between Groups	.625	2	.313	.155	.856
payment, deliveryand	Within Groups	521.726	259	2.014		
corporate culture	Total	522.351	261			
Application of information	Between Groups	5.460	2	2.730	1.498	.225
and communication technology	Within Groups	471.869	259	1.822		
	Total	477.328	261			
	Between Groups	1.073	2	.536	.284	.753
Cost of ICT	Within Groups	488.744	259	1.887		
	Total	489.817	261			
	Between Groups	1.032	2	.516	.274	.761
Warehouse and inventory	Within Groups	488.541	259	1.886		
Indiagement	Total	489.573	261			
	Between Groups	2.030	2	1.015	.588	.556
Inventory model	Within Groups	447.420	259	1.727		
	Total	449.450	261			
	Between Groups	3.368	2	1.684	.957	.385
One-stop service	Within Groups	455.628	259	1.759		
	Total	458.996	261			
	Between Groups	.496	2	.248	.119	.888
Service capacity	Within Groups	540.775	259	2.088		
	Total	541.271	261			
	Between Groups	.230	2	.115	.063	.939
Alliance and cooperation	Within Groups	475.602	259	1.836		
	Total	475.832	261			

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Real-time information sharing	Between Groups	3.140	2	1.570	.756	.471
	Within Groups	538.039	259	2.077		
	Total	541.179	261			
Outscoring strategy	Between Groups	4.312	2	2.156	1.446	.237
	Within Groups	386.211	259	1.491		
	Total	390.523	261			

Source: Primary data

The estimated significance value of all the statements reveals that the respondents agree about the determinants of the logistics cost since the calculated significance value is greater than 0.05, implying that the null hypothesis is accepted except for one particular determinant, namely, Human factor [0.039], wherein the calculated p-value is less than 0.05 implying the null hypothesis rejected. This implies that the respondents significantly differ in opinion concerning this particular determinant. The rank analysis is performed to identify the major determinants based on the company's years of experience in exports.

Determinents of Logistics Cost	Below	5 years	5 to 10	o years	Above 10 years		
Determinants of Logistics Cost	Mean	Rank	Mean	Rank	Mean	Rank	
Nature of business	3.02	19	3.17	17	3.37	7	
Size of company	3.7	1	3.48	4	3.43	4	
Human factor	3.54	2	3.71	1	3.23	11	
Range of commodity	3.37	8	3.24	12	3.17	15	
Property of product	3.21	13	3.07	18	3.09	20	
Infrastructure	3.19	16	3.23	15	3.23	11	
Tax and tariff	3.49	3	3.46	5	3.53	1	
Currency exchange	3.48	4	3.5	3	3.35	8	
Customs clearance	3.21	13	3.24	12	3.09	20	
Law and regulation	3.29	12	3.03	20	3.44	3	
Demand variability of logistic Services	3.33	10	3.34	9	3.39	5	
Cultural difference in payment, delivery and corporate culture	3.21	13	3.24	12	3.33	9	
Application of information and communication technology	3.03	18	3.38	7	3.17	15	
Cost of ICT	3.32	11	3.43	6	3.49	2	
Warehouse and inventory management	3.38	7	3.32	10	3.21	13	
Inventory model	2.9	21	3.06	19	3.15	18	
One-stop service	2.95	20	2.91	21	3.17	15	
Service capacity	3.1	17	3.2	16	3.19	14	
Alliance and cooperation	3.43	6	3.35	8	3.39	5	
Real-time information sharing	3.44	5	3.32	10	3.15	18	
Outscoring strategy	3.35	9	3.57	2	3.29	10	

Table No 6 Rank Analysis – Determinants of logistics cost based on years of experience

Source: Primary data

The major determinants of logistics costs faced by companies with years of experience are given below. **Below 5** years: With respect to this group, the major logistics costs are as follows: Size of company [Mean: 3.7; Rank:1], Human factor [Mean: 3.54; Rank:2], Tax and tariff [Mean: 3.49; Rank: 3], Currency exchange [Mean: 3.48; Rank: 4], and Real-time information sharing [Mean: 3.44; Rank:5].**5 to 10 years:** Concerning this group, the major logistics costs are as follows: Human factor [Mean: 3.71; Rank:1], Outscoring strategy [Mean: 3.57; Rank:2], Currency exchange [Mean: 3.5; Rank: 3], Size of company [Mean: 3.48; Rank: 4], and Tax and tariff [Mean: 3.46; Rank:5]. **Above 10 years:** With respect to this group, the major logistics costs are as follows: Tax and tariff [Mean: 3.53; Rank:1], Cost of ICT [Mean: 3.49; Rank:2], Law and regulation [Mean: 3.44; Rank: 3], Size of company [Mean: 3.39; Rank: 3], Size of company [Mean: 3.43; Rank: 4], Demand variability of logistic Services [Mean: 3.39; Rank:5].

Table No 7 ANOVA – Opinion on the Determinants of Logistics Cost Based on the Type of Industry

ANOVA Sum of Squares df Mean Square F Sig. **Between Groups** 11.049 4 2.762 1.045 .385 2.644 Nature of business Within Groups 679.409 257 Total 690.458 261 .741 **Between Groups** 4.694 4 1.173 .564 Size of company Within Groups 406.711 257 1.583 Total 411.405 261 7.113 4 1.778 1.058 .378 **Between Groups** Human factor Within Groups 432.142 257 1.681 439.256 Total 261 **Between Groups** 3.728 4 .932 .499 .736 Range of commodity Within Groups 479.646 257 1.866 Total 483.374 261 **Between Groups** 4.896 4 1.224 .813 .518 Property of product Within Groups 386.894 257 1.505 Total 391.790 261 Between Groups 3.163 4 .791 .454 .770 Within Groups 447.998 257 1.743 Infrastructure Total 451.160 261 Between Groups 6.816 4 1.704 1.046 .384 Tax and tariff Within Groups 418.649 257 1.629 Total 425.466 261 **Between Groups** 13.122 4 3.281 1.736 .143 257 1.890 Currency exchange Within Groups 485.733 498.855 261 Total Between Groups 2.080 4 .520 .247 .911 Within Groups 540.378 257 2.103 Customs clearance Total 542.458 261

 H_{a} : There is no significant difference in the determinants of logistic cost with respect to the type of industry.

By looking at the estimated significance value of all the statements, it is clear that the respondents agree about almost all the determinants of the logistics cost since the calculated significance value is greater than 0.05, implying that the null hypothesis is accepted except for the Application of information and communication technology [0.046] wherein p-value is less than 0.05.

	Mineral	nerals Gems		Plastics		Electricals		Others		
Determinants of Logistics Cost	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Nature of business	3.47	5	3.35	7	3.25	14	2.96	19	2.88	20
Size of company	3.72	2	3.60	3	3.43	3	3.37	5	3.65	2
Human factor	3.44	7	3.31	10	3.72	1	3.49	3	3.77	1
Range of commodity	3.44	7	3.36	6	3.18	18	3.19	14	3.08	14
Property of product	2.84	20	3.07	20	3.19	16	3.16	16	3.31	8
Infrastructure	3.23	16	3.33	8	3.32	10	3.09	18	3.08	14
Tax and tariff	3.35	12	3.75	2	3.38	7	3.56	1	3.27	10
Currency exchange	3.88	1	3.53	4	3.38	7	3.20	13	3.42	5
Customs clearance	3.35	12	3.09	19	3.13	19	3.24	12	3.15	12
Law and regulation	2.67	21	3.47	5	3.32	10	3.26	9	3.12	13
emand variability of logistic Services	3.53	4	3.27	12	3.43	3	3.26	9	3.27	10
Cultural difference in payment, delivery and corporate culture	3.16	17	3.24	13	3.31	12	3.36	6	3.08	14
Application of information and communication technology	3.47	6	2.75	21	3.31	12	3.34	8	3.42	5
Cost of ICT	3.58	3	3.31	10	3.22	15	3.54	2	3.58	3
Warehouse and inventory management	3.26	14	3.24	13	3.50	2	3.17	15	3.38	7
Inventory model	3.07	18	3.20	17	3.12	20	2.86	20	3.00	18
One-stop service	2.95	19	3.22	16	2.99	21	2.86	20	3.00	18
Service capacity	3.40	11	3.24	13	3.19	16	3.13	17	2.73	21
Alliance and cooperation	3.44	7	3.33	8	3.38	7	3.36	6	3.46	4
Real-time information sharing	3.26	14	3.13	18	3.40	6	3.47	4	3.04	17
Outscoring strategy	3.44	7	3.76	1	3.41	5	3.26	9	3.31	8

Table No 8 Rank Analysis – Determinants of Logistics Cost Based on Type of Industry

Source: Primary data

The major determinants of logistics costs faced by the respondents concerning the type of industry are given below. **Minerals:** With respect to this group, the major logistics costs are as follows: Currency exchange [Mean: 3.88; Rank:1], Size of company [Mean: 3.72; Rank:2], Cost of ICT [Mean: 3.58; Rank: 3], Demand variability of logistic Services [Mean: 3.53; Rank: 4], and Nature of business [Mean: 3.47; Rank:5]. **Gems:** With respect to this group, the major logistics costs are as follows: Outscoring strategy [Mean: 3.76; Rank:1], Tax and tariff [Mean: 3.75; Rank:2], Size of company [Mean: 3.60; Rank: 3], Currency exchange [Mean: 3.53; Rank: 4], and Law and regulation [Mean: 3.47; Rank:5]. **Plastics:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.72; Rank:1], Warehouse and inventory management [Mean: 3.50; Rank:2], Size of company [Mean: 3.43; Rank: 3], A Demand variability of logistic Services [Mean: 3.43; Rank: 3], and Outscoring strategy [Mean: 3.41; Rank:5]. **Electricals:** With respect to this group, the major logistics costs are as follows: Tax and tariff [Mean: 3.56; Rank:1], Cost of ICT [Mean: 3.54; Rank:2], The Human factor [Mean: 3.49; Rank: 3], Real-time information sharing [Mean: 3.47; Rank: 4], and Size of company [Mean: 3.37; Rank:5]. **Others:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.76; Rank:1], Cost of ICT [Mean: 3.54; Rank:2], The Human factor [Mean: 3.49; Rank: 3], Real-time information sharing [Mean: 3.47; Rank: 4], and Size of company [Mean: 3.37; Rank:5]. **Others:** With respect to this group, the major logistics costs are as follows: Human factor

[Mean: 3.77; Rank:1], Size of company [Mean: 3.65; Rank:2], Cost of ICT [Mean: 3.58; Rank: 3], Alliance and cooperation [Mean: 3.46; Rank: 4], and Application of information and communication technology [Mean: 3.42; Rank:5]

Table No 9 ANOVA – Opinion on the Determinants of Logistics Cost Based on Export Destination

 H_{α} : There is no significant difference in the determinants of logistic cost with respect to the export destination.

ANOVA										
		Sum of Squares	df	Mean Square	F	Sig.				
	Between Groups	1.256	4	.314	.117	.976				
Nature of business	Within Groups	689.202	257	2.682						
	Total	690.458	261							
	Between Groups	1.987	4	.497	.312	.870				
Size of company	Within Groups	409.418	257	1.593						
	Total	411.405	261							
	Between Groups	11.368	4	2.842	1.707	.149				
Human factor	Within Groups	427.888	257	1.665						
	Total	439.256	261							
	Between Groups	5.537	4	1.384	.744	.563				
Range of commodity	Within Groups	477.838	257	1.859						
	Total	483.374	261							
	Between Groups	3.963	4	.991	.657	.623				
Property of product	Within Groups	387.827	257	1.509						
	Total	391.790	261							
	Between Groups	12.432	4	3.108	1.821	.125				
Infrastructure	Within Groups	438.728	257	1.707						
	Total	451.160	261							
	Between Groups	3.364	4	.841	.512	.727				
Tax and tariff	Within Groups	422.101	257	1.642						
	Total	425.466	261							
	Between Groups	11.093	4	2.773	1.461	.214				
Currency exchange	Within Groups	487.762	257	1.898						
	Total	498.855	261							
	Between Groups	.480	4	.120	.057	.994				
Customs clearance	Within Groups	541.978	257	2.109						
	Total	542.458	261							
	Between Groups	2.121	4	.530	.211	.932				
Law and regulation	Within Groups	647.333	257	2.519						
	Total	649.454	261							
	Between Groups	7.766	4	1.942	1.014	.400				
Demand variability of logistic	Within Groups	491.928	257	1.914						
Services	Total	499.695	261							

	Between Groups	2.940	4	.735	.364	.834
Cultural difference in payment,	Within Groups	519.411	257	2.021		
	Total	522.351	261			
	Between Groups	5.164	4	1.291	.703	.591
Application of information and	Within Groups	472.165	257	1.837		
	Total	477.328	261			
	Between Groups	.933	4	.233	.123	.974
Cost of ICT	Within Groups	488.884	257	1.902		
	Total	489.817	261			
	Between Groups	7.604	4	1.901	1.014	.401
Warehouse and inventory	Within Groups	481.969	257	1.875		
Indiagement	Total	489.573	261			
	Between Groups	1.672	4	.418	.240	.916
Inventory model	Within Groups	447.779	257	1.742		
	Total	449.450	261			
	Between Groups	3.744	4	.936	.528	.715
One-stop service	Within Groups	455.252	257	1.771		
	Total	458.996	261			
	Between Groups	4.410	4	1.102	.528	.715
Service capacity	Within Groups	536.861	257	2.089		
	Total	541.271	261			
	Between Groups	7.368	4	1.842	1.010	.402
Alliance and cooperation	Within Groups	468.464	257	1.823		
	Total	475.832	261			
	Between Groups	6.892	4	1.723	.829	.508
Real-time information sharing	Within Groups	534.287	257	2.079		
	Total	541.179	261			
	Between Groups	8.310	4	2.078	1.397	.235
Outscoring strategy	Within Groups	382.212	257	1.487		
	Total	390.523	261			

The estimated significance value of all the statements reveals that the respondents agree about all the determinants of the logistics cost since the calculated significance value is greater than 0.05, implying that the null hypothesis is accepted. This implies that the respondents agree regarding the determinants of logistics cost based on the export destination, revealing that the export destination does not affect the logistics costs.

	North A	merica	South A	merica	Europe		Asia Othe		Others	
Determinants of Logistics Cost	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Nature of business	3.23	10	3.2	17	3.09	17	3.17	14	3.29	9
Size of company	3.58	2	3.52	3	3.36	6	3.58	2	3.58	3
Human factor	3.19	11	3.26	14	3.78	1	3.57	3	3.65	1
Range of commodity	3.54	3	3.43	8	3.19	11	3.17	14	3.11	14
Property of product	3.15	13	3.31	12	3.1	16	2.96	21	3.09	16
Infrastructure	2.96	19	3.48	6	2.95	19	3.17	14	3.44	6
Tax and tariff	3.54	3	3.48	6	3.29	9	3.54	4	3.62	2
Currency exchange	4	1	3.5	4	3.41	4	3.42	8	3.22	11
Customs clearance	3.15	13	3.15	20	3.16	13	3.22	12	3.25	10
Law and regulation	3.38	6	3.3	13	3.09	17	3.19	13	3.2	12
Demand variability of logistic	2 1 2	15	2 5 4	2	2.16	12	2.2	11	2 55	4
Services	3.12	15	3.54	2	3.10	15	5.5	11	3.55	4
Cultural difference in payment,	2.09	16	2.25	10	2 1 2	15	2 22	10	2 2 2	0
delivery and corporate culture	5.06	10	5.55	10	5.12	15	5.52	10	5.55	0
Application of information and	2.25	0	2 4 2	0	2 21	0	2 1 2	10	2.05	10
communication technology	3.35	o	3.43	0	3.31	o	3.13	18	3.05	19
Cost of ICT	3.38	6	3.5	4	3.33	7	3.45	6	3.42	7
Warehouse and inventory	2.00	4.5	2.22		2.44		2.40	_	2.05	10
management	3.08	16	3.33	11	3.41	4	3.48	5	3.05	19
Inventory model	2.96	19	3.06	21	2.93	20	3.14	17	3.07	18
One-stop service	2.73	21	3.17	19	2.93	20	2.99	20	3.04	21
Service capacity	3.5	5	3.24	16	3.17	12	3.04	19	3.11	14
Alliance and cooperation	3.35	8	3.67	1	3.28	10	3.42	8	3.18	13
Real-time information sharing	3.19	11	3.19	18	3.48	2	3.45	6	3.09	16
Outscoring strategy	3.08	16	3.26	14	3.45	3	3.64	1	3.53	5

Table No 10 Rank Analysis – Determinants of logistics cost based on export destination

Source: Primary data

The major determinants of logistics costs faced concerning export destinations are given below. **North America:** With respect to this group, the major logistics costs are as follows: Currency exchange [Mean: 4; Rank:1], Size of company [Mean: 3.58; Rank:2], Range of commodity [Mean: 3.54; Rank: 3], Tax and tariff [Mean: 3.54; Rank: 3], and Service capacity [Mean: 3.5; Rank:5]. **South America:** With respect to this group, the major logistics costs are as follows: Alliance and cooperation [Mean: 3.67; Rank:1], Demand variability of logistic Services [Mean: 3.54; Rank:2], Outscoring strategy [Mean: 3.52; Rank: 3], Currency exchange [Mean: 3.5; Rank: 4], and Cost of ICT [Mean: 3.5; Rank: 4]. **Europe:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.78; Rank:1], Real-time information sharing [Mean: 3.48; Rank:2], Outscoring strategy [Mean: 3.41; Rank: 4], and Warehouse and inventory management [Mean: 3.41; Rank:4]. **Asia:** With respect to this group, the major logistics costs are as follows: Outscoring strategy [Mean: 3.54; Rank:1], Size of company [Mean: 3.58; Rank:2], Human factor [Mean: 3.57; Rank: 3], Tax and tariff [Mean: 3.54; Rank:4], and Warehouse and inventory management [Mean: 3.64; Rank:1], Size of company [Mean: 3.58; Rank:2], Human factor [Mean: 3.57; Rank: 3], Tax and tariff [Mean: 3.54; Rank:4], and Warehouse and inventory management [Mean: 3.54; Rank:5]. **Others:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.56; Rank:4], and Warehouse and inventory management [Mean: 3.56; Rank:5]. **Others:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.65; Rank:5]. **Others:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.65; Rank:5]. **Others:** With respect to this group, the major logistics costs are as follows: Human factor [Mean: 3.65; Rank:1], Tax and tariff [Mean: 3.62; Rank:2], Size of company [Mean: 3.58; Rank: 3], Demand variabil

Major Determinants of the Logistic Costs Irrespective Business Profile (Overall)

Determinants of Logistics Cost	N	Mean	Std. Deviation	Rank
Nature of business	262	3.19	1.626	17
Size of company	262	3.52	1.255	2
Human factor	262	3.53	1.297	1
Range of commodity	262	3.25	1.361	12
Property of product	262	3.11	1.225	19
Infrastructure	262	3.22	1.315	14
Tax and tariff	262	3.49	1.277	3
Currency exchange	262	3.45	1.383	4
Customs clearance	262	3.19	1.442	16
Law and regulation	262	3.21	1.577	15
Demand variability of logistic Services	262	3.35	1.384	8
Cultural difference in payment, delivery and corporate culture	262	3.26	1.415	11
Application of information and communication technology	262	3.24	1.352	13
Cost of ICT	262	3.42	1.370	6
Warehouse and inventory management	262	3.31	1.370	9
Inventory model	262	3.05	1.312	20
One-stop service	262	3.00	1.326	21
Service capacity	262	3.17	1.440	18
Alliance and cooperation	262	3.38	1.350	7
Real-time information sharing	262	3.30	1.440	10
Outscoring strategy	262	3.44	1.223	5

Table No 11 Descriptive Statistics – Major Determinants of Logistics Cost

Source: Primary data

The previous subsection has already given a detailed understanding concerning the determinants of the logistics cost of the manufacturer exporters based on the business profile. Now, the major determinants of logistics cost of manufacturer exporters across business profiles are the following: Human factor [Mean: 3.53; Rank:1], Size of company [Mean: 3.52; Rank:2], Tax and tariff [Mean: 3.49; Rank: 3], Currency exchange [Mean: 3.45; Rank: 4], Outscoring strategy [Mean: 3.44; Rank: 5], Cost of ICT [Mean: 3.42; Rank: 6], and Alliance and cooperation [Mean: 3.38; Rank: 7].

Conclusion

This paper will help identify the major determinants of the logistics cost concerning the industry, thereby enabling the readers to understand the logistics cost determinant comprehensively. Exporters should consider the adoption of artificial intelligence and machine learning to automate the logistics system, which, in turn, will enhance its operational performance. Also, automation will lead to a reduction in inventory and an increase in the efficiency of the logistics system. Another major determinant of the logistics cost structure is the foreign exchange reserves. Hence, companies in international trade should engage in some form of arrangement, such as a memorandum with clients abroad, to eliminate the risks associated with foreign

exchange. Regulating, automating and optimizing manual processes can reduce staff requirements, centralize production operations to lower-cost areas and create a more proactive approach to ensuring customer satisfaction, all while providing scale and controlling costs. With an automated, cost-effective transportation and logistics system, a company can implement significant strategic changes to provide visibility, reduce costs and increase customer service. Plus, the emergence of cloud-based technologies has made this considerably easier/more affordable than ever, so even small companies can take advantage.

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