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FINDINGS

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- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

CONTRIBUTIONS TO BOOKS

• Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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• Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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• Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–23

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FREIGHT FORWARDER'S PERCEPTION TOWARDS MULTIMODAL TRANSPORT OPERATIONS IN CHENNAI AND TUTICORIN

Dr. G. PARIMALA ASST. PROFESSOR Dr. GRD COLLEGE OF SCIENCE **COIMBATORE**

ABSTRACT

Multimodal Transportation is an interesting approach that resolves a large part of cargo mobility problems. This comprise of the employment of more than one means of transport such as a blend of rail-car, truck, airplane, railways or ship in sequence under ownership of one operator who has relevant knowledge, experience and professional competence in cargo handling. In the present study 440 freight forwarders from Chennai and Tuticorin was selected based on convenient sampling technique. An interview schedule was used to collect data and Structural equation modeling was run using SPSS version 21 to find the goodness of fit whereby the factors are found to have positive effect on the perception of freight forwarders towards Multimodal Transport Operation.

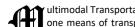
KEYWORDS

multimodal transport, freight forwarder, cargo mobility, professional competence.

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INTRODUCTION



ultimodal Transportation is an interesting approach that resolves a large part of cargo mobility problems. This comprise of the employment of more than one means of transport such as a blend of rail-car, truck, airplane, railways or ship in sequence under ownership of one operator who has relevant knowledge, experience and professional competence in cargo handling.

CONCEPT

Freight forwarders or any logistics service intermediary who pursue MTO license are expected to extend their service arm by the shippers/consignees who give them business. On that focus, apart from the basic freight forwarding services, value added multimodal service are listed on and analyzing the perception of freight forwarders towards MTO services is the need of an hour. Since the competition is more a forwarder (even non asset based 3PL) should focus on rendering services by enhancing their warehousing facilities, offering packing and repacking service on demand, obtaining Quality Control Certificate, Consolidation, and many more. The perception of freight forwarders towards these multimodal services should be assessed to identify the investment opportunity in the logistics field.

LITERATURE REVIEWS

Ying Wang (2016), Currently, high-income countries use multimodal transportation to export large quantities of secondhand vehicles to low-income countries. Secondhand vehicle export has shown its highest growth in recent years, especially in Korea. The problem of transporting secondhand vehicles from Korea to Central Asia is becoming an important issue, but few researchers are interested in it. The objective of this research is to determine the optimal transport network for exporting secondhand vehicles from Korea to Central Asian countries by combining experts' opinions and real data from existing transport networks. The fuzzy Delphi method was applied to obtain factors to evaluate alternative multimodal transport networks for moving secondhand vehicles from Korea to Central Asian countries by judgment from experts. The analysis shows that among the five factors (total cost, total time, reliability, security, and transportation capability), total cost is the most considerable factor, followed by reliability, transportation capability, total time, and security. Additionally, in the mainly three multimodal transport networks, the sea+Trans-China Railway route is ranked first, followed by the sea+Trans-Siberian Railway and sea+truck routes.

Dr.V.Sivakumar (2015), Multimodal transportation is a concept which places the responsibility for transport activities under one operator, who then manages and co-ordinates the total task from the shipper's door to the consignee's door ensuring the continuous movement of the goods along the best route, by the most efficient and, cost-effective means, to meet the shippers requirements of delivery. The research proposed various modes of transportation and the workings of multimodal transportation, which has been extremely helpful to transportation officials. It is believed that freight forwarders can get important outcomes about the main factors affecting their mode choice decisions in general, preference about multimodal transport specifically. Main service provider parties to the shipper and freight forwarding companies such as third party logistics service providers or other carriers can employ the research findings to enhance their service offerings to their customers by understanding their preference about multimodal transportation, areas to be developed and marketing strategies to be followed in order to influence the main stages in the decision-making process.

M. SteadieSeifi et al (2014), Multimodal transportation offers an advanced platform for more efficient, reliable, flexible, and sustainable freight transportation. Planning such a complicated system provides interesting areas in Operations Research. This paper presents a structured overview of the multimodal transportation literature from 2005 onward. We focus on the traditional strategic, tactical, and operational levels of planning, where we present the relevant models and their developed solution techniques. We conclude our review paper with an outlook to future research directions.

Konstantin Makukha and Richard Gray (2004), Although logistics partnerships are common, incentives for entering into strategic arrangements and the determinants of their success are not well researched. Many logistics partnerships, being operational in nature, are often designated as "strategic" without real understanding of the term, and the influence of a logistics partnership on a shipper's strategic moves and competitive positioning has not been researched thoroughly. A Delphi investigation reveals that although large companies form logistics partnerships, the perceptions of partnership formation motives, inhibitors and orientations by shippers and logistics service providers (LSPs) are likely to differ. In particular, shippers tend to avoid close integration with LSPs, whereas LSPs claim to be true strategic partners but remain unable to provide the service required. The failure to integrate on a strategic level suggests a lack of strategic management knowledge by relevant managers. The study suggests that most existing logistics partnerships are still operational rather than strategic in nature.

Bart W. Wiegmans, et al (1999), Intermodality has become a major goal in modern transport policy. The improvement of combined transport within the European Union includes the refinement of freight terminal services. A freight terminal is a nodal place where goods are transshipped between any two or more transport modes. In this paper the researcher had analyzed the freight terminal market with the help of Porter's model of five competitive forces. The central question is: who are the stakeholders in the terminal market? We will particularly address the critical decision factors faced by terminal operators in terms of strategic importance, location and network configuration of freight terminals by employing Porter's competitive focus. First, the industry competitors in the freight terminal market will be analysed. Second, the buyers of the freight terminal services will be described, followed by the suppliers of the terminal infrastructure. Other competitive forces are the potential entrants into the terminal market and the substitutes for the use of freight terminals. An additional competitive force is added to our conceptual model in the form of the terminal environment. After the outline of this analytical framework of the freight terminal market, it is possible to identify where the economic power is located in the terminal market and how the positions of the different players in the market can be enhanced. The analysis will further address (de)regulation competences for different governmental levels involved in terminal activities.

OBJECTIVES OF THE STUDY

- 1. To identify the various Multimodal Transportation services offered by Freight forwarders in the study area.
- 2. To analyze the perception of freight forwarders towards MTO in study area.

RESEARCH AND SAMPLING DESIGN

The study is mainly based on primary data, however, the secondary sources are also registered with theoretical overview and literature reviews. For this purpose, a pilot Study was conducted with 50 members (approx. 11% of the sample). The field survey was conducted in two areas viz. **Chennai (276)** and **Tuticorin (244)**, using a well-framed questionnaire using Census method. Primary data was collected from 520 respondents, but only 441 respondents had filled all the questions without error. The remaining 79 respondents omitted many parts of the questionnaire. Hence, the researcher finally selected only 441 respondents of this study.

TABLE A: AREAS SELECTED FOR THE STUDY

Area	No. of Respondents	Percentage
Chennai	226	51.25%
Tuticorin	215	48.75%
Total	441	100.00%

Source: Primary data

The questionnaire covers 1. Demographic profile of the freight forwarders, 2. Level of awareness towards procedures and operations of the service institutions during imports and exports, 3 Selection of liners for multimodal operational services, 4. Problems faced by the freight forwarders in the study area and international environment

VALIDITY

After pretest, an investigation is taken-up by the researcher conducting the study considering the respondents involved in logistic operations in Chennai and Tuticorin (service sector). Census sampling method is applied. The purpose of the study is to test the role of freight forwarders and the problems faced by them in the selected areas for which 1) Frequency on Selection of Liner, Container, Stuffing & Payment, 2) Multimodal Transport Operations 3) Problems Focused Based on International Environment and 4) Problems Focused with regards to Study Area that comprises the questionnaire to confirm the feasibility of the study. The normal distribution and Hotellings' t-test in cronbach alpha method is used to identify the quality of each item of the questionnaire in 5-point scale and the following results were obtained.

TABLE B: NUMBER OF ITEMS AND CRONBACH'S CO-EFFICIENT VALUE OF RELIABILITY

Statement	Number of Items	Cronbach's Alpha	Sig
Frequency on Selection	12	0.812	.000
Multimodal Transport	26	0.915	.000
Problems in International Environment	18	0.891	.000
Problems in Study Area	30	0.941	.000

From the above table it is ascertained that the items in Problems in Study area of the questionnaire is found highly reliable and the samples satisfies the normal distribution rationally. So, the items in the questionnaire were used further for conducting the study.

PERIOD OF THE STUDY

- Required primary data have been collected from freight forwarders in Chennai and Tuticorin during the year 2013-2015.
- The secondary data have been collected from various journals with theoretical overview and literature reviews during the year 2012-2015.

COLLECTION OF DATA

Primary and Secondary data have been used in this study. Required primary data have been collected with the pre-tested, well-structured questionnaires from Freight Forwarders or logistics operators in Chennai and Tuticorin. The Secondary data relating to the theoretical portions have been collected from various books, journals, magazines and websites. The libraries of ICFAI University, Hyderabad, Coimbatore Marine College, International Maritime Academy, Chennai and Bharathiar University, Coimbatore have been visited for collection of required information from previous studies.

TOOLS AND TECHNIQUES PROPOSED

The objectives framed for the present study formed the basis of the identification of the relevant statistical techniques. Here we use factor analysis.

STATISTICAL HACK

The perception of the logistic operators towards multimodal transport operations has been measured related to various aspects such as type of assistance provided, facilities considered important in overseas shipment, company's core business areas in logistics and the opinion towards the factors considered in Indian market when compared with other emerging markets.

PERCEPTION OF THE LOGISTIC OPERATORS TOWARDS MULTIMODAL TRANSPORT OPERATIONS- STRUCTURAL EQUATION MODELLING

As the first step in Structural equation modeling, factors analysis has been carried out to measure the underlying dimensions that exist in the study variables.

FACTOR ANALYSIS: MULTIMODAL TRANSPORT

Factor Analysis technique has been applied to find the underlying dimensions (factors) that exists in the 25 variables relating to perception of the logistic operators towards multimodal transport operations.

TABLE 1: PATTERN MATRIX (a)						
	Factor					
	1	2	3	4		
X7	.668	.052	067	116		
X8	.628	155	045	002		
X13	.503	057	020	171		
X19	.495	.140	.262	109		
Х9	.487	076	.193	.016		
X16	.458	110	.022	136		
Х6	.456	301	061	046		
X14	.415	198	.137	175		
X15	.342	.051	.109	272		
X10	.275	204	.145	094		
X4	094	990	098	101		
Х3	.280	528	.157	.063		
X21	.265	317	.209	.050		
X2	102	299	.232	222		
X20	.220	.029	.569	.005		
X18	205	.030	.517	102		
X12	.166	210	.490	007		
X11	.234	144	.434	006		
X17	.136	074	.295	121		
X5	.129	195	.238	217		
X25	.007	.075	.108	769		
X23	.336	.009	149	654		
X1	.262	121	036	495		
X24	107	077	.131	436		
X22	.198	142	062	408		

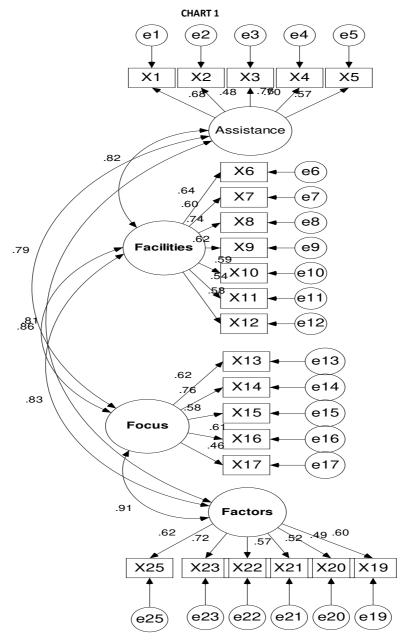
Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization. a Rotation converged in 15 iterations.

TABLE 2: CLUSTERING OF VARIABLES INTO FACTORS

Factor	Multimodal Transport Operations	Rotated Factor Loadings
I. (33.80 %)	X7	.668
	X8	.628
	X13	.503
	X19	.495
Facilities	Х9	.487
	X16	.458
	X6	.456
	X14	.415
II. (6.652%)	X15	.342
	X10	.275
	X4	990
Assistance	X3	528
	X21	317
	X2	299
III. (5.749%)	X20	.569
	X18	.517
	X12	.490
Factors	X11	.434
	X17	.295
	X5	.238
IV. (5.027%)	X25	769
	X23	654
Focus Area	X1	495
rocus Area	X24	436
	X22	408

From the Table, it could be seen that four factors were identified as being maximum percentage variance. The types of facilities based on the ten variables viz., X7, X8, X13, X19, X9, X16, X6 and X14 were grouped together as Factor I and they accounted for 33.80 per cent of the total variance towards facilities realized during logistic operations. The six variables towards multimodal transport operations viz., X15, X10, X4, X3, X21 and X2 constituted Factor II and they accounted for 6.625 per cent of the total variance revealed the type of assistance provided to the logistic operators. Another six variables based on multimodal transport operations viz., X20, X18, X12, X11, X17 and X5 constituted Factor III and they accounted for 5.749 per cent of the total variance towards Types of factors that assisted during logistic operations. Finally, five variables viz. X25, X23, X1, X24 and X22 constituted Factor IV and they accounted for 5.027 per cent of the total variance towards assistance provided in the focus area during logistic operations. Thus the factor analysis condensed and simplified the twenty-five factors related to perception towards multimodal transport operations practiced by the logistic companies and grouped them into four factors explaining 51.237 per cent of the variability of the twenty-five variables.

STANDARDIZED RESULT



It is clearly understood from the above model that the values were measuring the regression based on its latent variables which shows the source of influence of the respondents towards celebrity endorsement which revealed that majority (76%) was the highly regressed value towards Focus Area (X14) and Asssistance (X3). Whereas, considering the lowest (46%) values regressed towards by X-17 in the Focus area. ELIMINATION: X18 and X24

TABLE 3: REGRESSION WEIGHTS: (Group number 1 - Default model)

TABLE 3: REGRESSION W	EIGI	iis: (Group	number 1 - I	perduit i	nouel)	
			Estimate	S.E.	C.R.	Р
Q21_Lorry	<	Assistance	1.000			
Q21_Trailer	<	Assistance	.622	.070	8.923	***
Q21_Container_Train	<	Assistance	1.096	.082	13.442	***
Q21_Ocean_Transport	<	Assistance	.887	.070	12.602	***
Q21_Air_Transport	<	Assistance	.771	.073	10.558	***
Q21_WareHouse_Facilities	<	Facilities	1.000			
Q21_Packing_Repacking_Facilities	<	Facilities	1.050	.097	10.826	***
Q21_Obtaining_QC_Certificate	<	Facilities	1.272	.100	12.692	***
Q21_Advice_of_financial_matters	<	Facilities	.887	.080	11.034	***
Q21_Obtaining_Marine_Insurance	<	Facilities	.951	.090	10.535	***
Q21_Advance_Vessel_Schedule	<	Facilities	.947	.097	9.799	***
Q21_Online_Shipment_Status	<	Facilities	1.148	.111	10.382	***
Q21_Air_Ocean_Cargo	<	Focus	1.000			
Q21_Consolidation	<	Focus	1.213	.096	12.643	***
Q21_Warehousing_Facility	<	Focus	.922	.090	10.297	***
Q21_Consignment_Handling	<	Focus	.935	.088	10.636	***
Q21_Freight_Management	<	Focus	.895	.105	8.499	***
Q21_Transport_Infrastructure	<	Factors	1.000			
Q21_Technological_Advancement	<	Factors	.867	.101	8.618	***
Q21_Market_Competition	<	Factors	.900	.099	9.045	***
Q21_Working_Condition	<	Factors	.849	.086	9.821	***
Q21_Economic_Status	<	Factors	1.182	.102	11.571	***
Q21_Cultural_Impact	<	Factors	1.038	.099	10.436	***

The above table shows the regression coefficient of the variables and it is observed that the critical ratio of all the variables found to be high and it is significant at 1 per cent level. Out of the selected twenty-five variables after elimination of two variables (X18 and X24) which was found to have low loading the other variables revealed maximum significance based on the perception towards the multimodal transport operations during logistic operations by the companies operating from Chennai and Tuticorin. The model fit summary explains the fitness in the statistical point of view which are as follows:

TABLE 4: COVARIANCES: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	Р	Label
Assistance	<>	Facilities	.293	.034	8.623	***	
Assistance	^ '	Focus	.285	.034	8.383	***	
Facilities	<>	Focus	.244	.029	8.483	***	
Factors	<>	Facilities	.245	.030	8.188	***	
Factors	<>	Focus	.272	.033	8.339	***	
Factors	<>	Assistance	.306	.037	8.284	***	

It is found that there is a significant covariance between the dimensions of mutimodal transport operations taken for the study shows that the Assistance and facilities towards multimodal transport operations was not significant at 1% level is proved through the critical ratio at 8.623, followed by the covariance between Assistance and focus area (8.383), Facilities and Focus (8.483), Factors and Facilities (8.188), and finally, factors and Assistance (8.284) are found to be significant at 1% level. The model fit analysis is given below:

TABLE 5: CMIN

Model	NPAR	CMIN	DF	Р	CMIN/DF
Default model	75	1344.883	224	.000	6.004
Saturated model	299	.000	0		
Independence model	23	4528.061	276	.000	16.406

NPAR is the number of distinct parameters (q) being estimated. Two parameters (two regression weights, say) that are required to be equal to each other count and the value is found to be 75 The CMIN is the minimum value of discrepancy which shows 1344.883 with the degree of freedom of 224 and the χ^2 /df is found to be 6.004 is found to be in the range of acceptable fit between the hypothetical model and the perception of the logistic operators towards multimodal transport operation of the study.

Table 6: RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.104	.865	.752	.557
Saturated model	.000	1.000		
Independence model	.336	.448	.370	.392

The smaller the **RMR** is, the better the result. An **RMR** of zero indicates a perfect fit. The study has been found 0.104 as its root mean square. GFI is less than or equal to 1. A value of 1 indicates a perfect fit. However, the study has been conducted using maximum likelihood and the fit is found that the value has been with majority (86.5%) which supports the model.

TABLE 7: BASELINE COMPARISONS

Model	NFI	RFI	IFI	TLI	CFI
iviouei	Delta1	rho1	Delta2	rho2	CFI
Default model	<u>.703</u>	.634	.740	.675	.736
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RFI and CFI values close to 1 indicate a very good fit. The study shows that the RFI is found to have 0.634 and the CFI is found to be 0.736.

TABLE 8: RMSEA							
Model RMSEA <u>LO 90</u> HI 90 PCLOSE							
Default model	.107	.101	.112	.000			
Independence model .187 .182 .192 .000							

Based on their experience with **RMSEA**, Browne and suggest that a **RMSEA** of .05 or less indicates a "close fit" while 0.10 indicates low fit. The study also shows that the Root Mean Square of Error Approximation was found to be 0.107 and the P-Close was found to be 0.000 gives a test of low fit while **P** gives a test of exact fit. "p value" for testing the null hypothesis that the population RMSEA is no greater than 0.05 level. Hence, it is concluded that the study is found with **low fit** and is proved through the Confirmatory Factor Analysis taken for the study.

DISCUSSION OF THE RESULT AND CONCLUSION

From the path diagram, measured variables based on factors contributing towards perception of the logistic operators with regards to multimodal transport operations is found to have low fit however, was found to have positive significant relationship with 1 per cent levels when considering all the other fitness indexes taken for the study. The analysis of the model, from the view point of the researcher, suggests that all the measured variables significantly associated and have positive effect on the perception towards multimodal transport operations among logistic operators conducting their operations from Chennai and Tuticorin respectively. With this result we could identify the investment opportunity in the field of logistics, the range of service deliverance could be determined based on the logistic asset that a company holds. Multimodalism in India could still be developed with some motivational activities from the part of Government.

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