A NEW DOMINENT FACTOR IN DEFINING LOGISTICS STRATEGIES WITH A MAJOR IMPACT ON INDUSTRIAL CHARACTERISTICS

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ABSTRACT: *The essence of this paper is to suggest and correlate industrial product quantum with supply chain management. This paper provides an in-depth insight however, it also reflects basis for futuristic look for the concerned people to apply and reveal further improvement in supply chain techniques.*

The paper is based on Pakistan 12 exports trading partner's countries. The outcome already indicates industrial behavior impact on logistics. It has also been observed that global manufacturers are more inclined to move their cargo through air freight and relegate, sea and inland transportation modes. The faster movement ensures meeting higher targets in terms of demand and computation.

The conclusion indicates significant lessons for logistician planners. Though the carriage fare is a significant aspect but manager of the operation should look into other factors as well, like cost involved, other competitors and strategies in getting the work. These all factors should contribute and help in decision making. Based on the type and nature of products, the logisticians should help industry in providing corresponding transport. This is the first attempt to have a look and match the industrial outputs against their transportation needs. The paper looks at the type of transportation trends generally prevalent at national and international level and then based on this extensive information, create awareness and suggest morel ideas concerning present air, sea, and inland handling of freight and how is it being carried out at global level.

Keywords: Logistics Strategies; Global supply chain; Transportation mode; Industry characteristics; Transit time; Demand Variation; Value-to-weight Ratio; National; International.

INTRODUCTION

Industries in current dynamic and competitive environment face several issues. The successful industries adapt the changes readily and immediately employ the creative and modernized approaches in business management. Continuously they update their functions and processes according to these approaches. Supply chain management (SCM) is relatively a new approach in business of Pakistan. Multinational organizations, initially, implemented the approach of supply chain management in their processes in Pakistan followed by other local businesses. Initially, procurement and management of materials were the major functions of supply chain management, but with the passage of time SCM converted to an integrated concept involving the sourcing, procurement, and management of materials, and supporting functions and very important transportation process [1].

Transportation process is the basic of SCM strategic decisions involving the time and equipment. Its linking role completes the chain of operational processes from suppliers and shippers to distributor and consignees across originating point to consumption point. So, selecting the modes of transportation is related to logistics costs as well as satisfactory completion of projects. Hence, choosing the appropriate transportation mode has now become an important strategic aspect in global SCM [2]. Air, ocean and inland are the common transportation modes in global as well as at national level.

Air cargo is a costly but fast means of transportation, but it is mostly selected for transportation of costly and valued products in very short time with the restrictions of weight and size of cargo. On the other hand, ocean provides a low cost, slow way of transporting the products. Suppliers choose the ocean to transport the higher weights and larger sizes when they need lower costs with lower priority of time [3]; [4]. Inland transportation delivers product of any type, weight, dimension, and size with low prices and with a reasonable transit time from origin to destination ordinarily [5].

From the literature, it is evident that air cargos have increasingly been used due to several reasons. Firstly, air cargo cost have largely been decreased as compared to decrease in ocean and inland due to improved technology like jet engines etc.[6];]7]. Secondly, development and design of technological products of IT and communication having lighter weights and higher value has been making a significant contribution in international trade since the last two decades, consequently increasing the value to weight percentage of products resulting in increasing use of air transportation [8]. Thirdly, increased trend of global sourcing and growing markets of Southeast Asian countries and China's marketing requirements need consistent, efficient and faster transportation across different continents making the increased use of air transportation [9].

For investigation of the said study regarding the choice of transportation modes we develop the followings research questions:

RQ1: What are the means of transportation is linked with the attributes of an industry?

RQ2: What are the major determinants other than value and weight that influence the transportation mode across different industries?

RQ3: How much do these determinants influence the transportation mode in global supply chain?

RQ4: How do the transportation strategies effects the industrial output?

This study focuses on analyzing different modes of transportation aligning with the industry characteristics [10]. Especially highlighting the requirement of higher shipments and investigation of the factors which effects the industrial costs and activities. So, this research addresses this gap and may be considered as an initial study to investigate what are the determinants behind the lack of understanding between the transportation modes and industry characteristics at national and international level [11].

This paper contributes to the literature in three ways. Firstly, this study incorporates an extensive data set collected at the industrial level in a way to discover and investigate the relationship between transportation modes in different industries. Secondly, this paper uses an innovative theoretical framework for incorporating industry determinants other than freight costs and weights. Thirdly, this paper explains the modern air transportation approaches in global supply chain and its findings may provide guidance to supply chain managers in order to use optimal transportation requirements [12].

LITERATURE REVIEW

Linking transportation modes with industry characteristics has become a concept of focus in a few years. Several business entities are taking it at their boards level due to its significance after about 30 years of its introduction [13]; [14]. This significance of concept is making it difficult to answer how to implement it i.e. how it can be integrated into the existing processes of operational and strategic levels of decision making. Within an industry, this subject is studied under the umbrella of logistics management [15], and outside the industry, the effects related to the distribution means and supply networks are studied under transportation management [16]; [17].

Findings of some researches show that industries that incorporate appropriate transportation means in their SCM with products features have shown improved performances [18]. The selection of transportation mode according to products, improves the transit time, cost, and delivery reliably, but not the quality of product [19]. A study of 12 Pakistan's trading partners suggested that above two thirds of the them use a combination of transportation strategy to get efficiency as well as responsiveness. It shows that responsive and efficient strategies of supply chain are not mostly mutually exclusive [20].

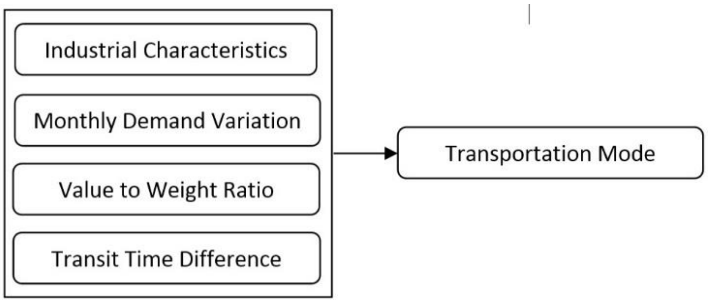
The above studies analyze the connection between transportation strategy of supply chain management and the features of products in industry. Keeping in mind that the transportation decision as the basic decision of logistics management, industry features are likely to influence the combination of means of transportation in inter-continental supply chain.

Supply chain managers are key players in converting the industrial goal into its operations because they find the balance between the developing industrial goals and developed supplier selection standards like transportation mode, fright costs, quality of products etc. [21].

At this point, study of logistics planers has entered steadily in current year [22] investigating the success determinants of transportation [23] as well as addition of supply chain constituents with product characteristics [24]. Researchers have also emphasized on measuring the industry satisfaction through transportation means as well as strategy of supply chain [25] and effects on performance with sustainability impacts [26]; [27].

Furthermore, this study has investigated many determinants that affect to change the supply chain objectives and help the managers of choosing the transportation mode at the right time and save the time and address all matters like pressure from the customers, management response, release of products from suppliers, and complete all the matters with regulatory authorities [28]; [29].

PROPOSED MODAL



HYPOTHESES DEVELOPMENT

The greater margins generally contribute to a greater profits/losses or due to inflated costs, the desired requirements are not met. To offset this imbalance and to realize the high transit time, fastest means of transportation are adapted. An industry with high transit time will feel the pressure of higher customer demands. Such industries are likely to give priority to air transportation. Some portion of the profit can be earmarked for air freight charges. Therefore, we develop this hypothesis.

H1: Higher transit time industry will use higher air transportation.

The Industrial features and aspects will affect and help in choosing the transportation mode. Out of all the industrial sources, weighted average is the most prominent in determining the capital costs. Some of the factors that are more visible and mainly contribute towards a higher capital costs within an industry are, higher business and monetary hazards [30]. Ocean and internal movement with more transit times and huge equipment sizes require bigger inventories than air transportation. Air transportation has a distinct advantage of time, thus having a positive impact on the industrial performance. We conclude therefore that any industry with higher capital costs will prefer air transportation. Giving rise to this hypothesis;

H2: An industry having reliable characteristics will use increased air transportation then others way of transportation mode.

Competition and rivalry in industry also affects the transportation mode preference. The paradigm of Structure Conduct Performance shows that the structure of market develops the industry conduct which ultimately influences its performance [31].

By selecting a particular transportation mode, industries in competing position will lay special emphasis to meet the

demands by using the use of fastest transportation mode. In a declined competitive environments the firm will not only have to compromise with the prices but its production and profit margins will also suffer. Therefore, this hypothesis is developed:

H3: More competitive industries will use increased air transportation then others way of transportation mode.

Demand uncertainty also effects the transportation mode selection. Growing demand uncertainty, based on changes in monthly prices, enhances the chances of air transportation [32]. The quality of product is also a factor in selection of the transportation mode. The consistent demands of any given products will help in choosing not only transportation modes but production targets can also be set depending upon demands. But, industry conflicting demands, would like to first of all win the industry trust.

H4: An industry having more positive transit time with unpredicted demands will use air transportation more. So, this hypothesis is developed:

Proposed that larger demand changes from the four quarters average needs more inventory to maintain [33]. That variation in in demands will result in increased use of air transportation [34]. Analysis suggests that by using air transport, the variable demands shortens the lead time [35]. Air transportation reduces this time, lowering the demand changes allowing the firm to stock minimum inventory levels to meet the unexpected demands. Therefore, this hypothesis is developed:

H5: Industries with larger demand variations will use more air transportation.

METHODOLOGY

As deliberated above, this paper classifies into six distinct categories: Transportation mode, industry characteristics, Monthly demand variation, value to weight ratio and the transit time difference [36]. While transportation mode is the main separate variables in the assumed modal, the other four classes can be considered as control variables. The industry cannot consult all the variables [37]. So corresponding values can be used as allowed in the literature. For industry attributes, this paper includes monthly demand changes in a year, transportation mode. Hummels and Modal characteristics include the differences in freight rates and transit times [38]. For analysis of data the statistical package for the social sciences (SPSS) and Eviews 9 was used. Using the frequencies distribution, descriptive statistics, reliability of measurement and regression analysis to check the significant of data. After applied the statistical tools following results are shown and interpret in the following table(s).

DATA COLLECTION

The data is collected on Pakistan monthly trade data on export to its 12 trading partners on logistics and supply chain were gathered from Pakistan Bureau of Statistics (http://www.pbs.gov.pk) and World Development Indicator (http://data.worldbank.org) for the years 2008-2014. This database helps in understanding the trade between countries, including value, weight, freight charges, transportation mode, and origin to destination transportation strategies. Therefore, the transportation mode and industry attributes of Pakistan manufacturers is understood.

This paper zooms on exports from the Pakistan to its main 12 trading partners. China, European Union, United Arab emirate, India, Saudi Arabia, United States, Kuwait, Japan, Malaysia, Singapore, Taiwan, united kingdom and Iran. Air, sea and inland are the only three available transport modes between the Pakistan and its trade partners. The panel data set consisted of 528 observations.

DEFINING OF VARIABLES

To determine a results based on a set of observations, where a number of values are the same across different industries and target countries then the results will load to a biased opinions. To offset this disadvantages, we may incorporate random results based on actual set of values and pitch them against results based on fixed set of values.

Following are our variables:

1. Industry Characteristics ratio
2. Monthly Demand Variation ratio
3. Value-to-weight Ratio
4. Transportation mode
5. Transit Time Difference

Industry Characteristics: All industries like to export, however only quality products with a degree of popularity can be exported. The industry characteristics ratio is therefore calculated on shipment value and the total expenditure i.e. industrial material cost and labor costs etc.

Monthly demand variation: This ratio is worked out by measuring the value of monthly demands against the monthly shipment value.

Value-to-weight ratio: This ratio is measured by calculating the total real trade value by including setting price, all charges in shape of inland freight, insurance and associated port charges etc. but excluding international freight and charges this is divided by Pakistan total export trade value for each industrial unit.

Transportation Mode: The transportation mode ratio is calculated from total export divide to all transportation mode, since air freight is of primary importance and a used for measuring our progress, this weight ratio is therefore compared with all other inland weight ratios.

Transit time difference: This variable is time oriented. The time taken by all modes is measured. The factors of speed, frequency of movement between different destinations is also kept in mind.

RESULTS AND INTERPRETATION

Table I suggests the descriptive data of the paper. Table I describe that, the study was based on 528 observations. Which are vary from 372.52 to 278.02. Mean of the different item range is 0.282 to 0.035 and also the value of standard deviation range from 0.079 to 0.029.

Table II describe that the an increasing tendency for the part of export and monthly demand variation from 0.058 percent in 2008 to 0.078 percent in 2014, irrespective of the financial crises in 2008 and 2009. The perpetual decrease in the air, ocean and inland price ratio may extend some explanation for the growing trend of transportation in exports.

Table I: Destriptive Statistics

Variables	Obs.	Unit	Min.	Mean	SD	Max.
Industry Characteristics	528	Ratio	0.123	0.282	0.079	0.377
Monthly demand Variation	528	Ratio	0.107	0.052	0.116	0.298
Value to weight Ratio	528	Ratio	0.069	0.146	0.101	0.369
Transportation mode	528	Ratio	0.037	0.035	0.029	0.138
Transit time difference	528	Hours	372.52	236.02	341.43	278.02

In 2008, the transportation mode like air, ocean and inland freight mean rate was 14.01 times that of ocean and inland freight. By 2014, this ratio had declined to 11.14. The increased trend of the value to weight ratio could be another factor for the enhancement in transportation freight. The value to weight ratio enhanced by 0.29 percent from 15.84/kg in 2008 to 16.13/kg in 2014.

Table II: Presents the Trend Variables (2008-2014)

Variables	2008	2009	2010	2011	2012	2013	2014
Industry Characteristics	0.082	0.087	0.097	0.089	0.113	0.117	0.113
Monthly demand variation	0.058	0.066	0.069	0.074	0.078	0.087	0.078
Value to weight ratio	15.84	13.014	15.39	16.269	16.03	17.03	16.13
Transportation mode	14.01	15.37	14.34	16.002	14.04	15.02	11.14
Transit time difference	373.02	338.05	389.62	321.032	372.07	387.02	403.08

Working out the shares between different transportation modes i.e., air, ocean and inland, the top price ratio is (0.243). The portion concerning industry attributes has a prominent plus correlation with others, monthly changes in requirements, time factor, value to weight ratio. These correlations are non-changing with the research hypotheses.

The correlation table also reflects that none of the changes are correlated above the 0.7 limit suggested for different modes [39]. Additionally, all the Variance Inflation Factor (VIF) scores are less than suggested threshold of 10 [40].

Correlation with others, monthly demand variation, transit time difference, value to weight ratio. These relationships are consistent with the research hypotheses. Other notable correlations are between air, ocean and inland price ratio and the transit time difference ratio (positive), high-concentration industries and demand variation (positive).

Thus implying that multicollinearity may not be a serious concern in our study.

Table III: presents the correlation among the variables.

Variables	1	2	3	4	5
Industry Characteristics	1.0000				
Monthly demand variation	0.3987***	1.0000			
Value to weight ratio	0.3280*	0.1120**	1.0000		
Transportation mode	-0.1713**	0.1234**	0.2436**	1.0000	
Transit time difference	-0.3442**	0.1247**	0.4023**	0.2365**	1.0000

Note: *p<0.1; **p<0.05

Table IV presents the regression results. Column 2 add the explanatory variables of interest according to their correlations to the dependent variable. The β coefficients for standardized explanatory variables are reported in Table IV also. Variables having larger β coefficients are considered to be stronger predictors. The coefficients do not vary significantly across model.

Table IV: presents the regression results.

Variables	Regression Results	β
Industry Characteristics	0.4475*** (0.1361)	0.0098
Monthly demand variation	0.3654*** (0.1258)	0.0119
Value to weight ratio	0.001421*** (0.000238)	0.0750
Transportation mode	−0.000718*** (0.000117)	−0.016 77
Transit time difference	0.000065 (0.000071)	0.0038
Constant	−0.0388 (0.0471)	
Observations	528	

The use of transportation mode is, as seen, positively linked with the use of industrial attributes share in model at the 1 percent important level. One standard deviation higher contribution high transit time is associated with a 0.0038 percentage point higher share of air freight. Therefore, H1, which suggests that a higher transit time industry will use higher air transportation is maintained.

The output relating to the cost of capital are as suggested. The coefficient is plus and important at the 1 percent importance level, pointing that a more spending of capital means more share of air freight. The conclusion from the results, a one normal deviation increase in the cost of capital results in an increase in air freight share of 0.718 percentage points. Thus, we conclude that H2 is supported.

The coefficient for concentration ratio is negative as expected at a 1 percent significance level. This result supports H3 that the share of air freight is positively associated with industry competitiveness.

The variable positive sales surprise has a positive sign and is significant at the 1 percent level. When the monthly demand variation, product value, and margin are held constant, an increase of one standard deviation in positive sales surprise results in an increase in the air freight share. This lends support to H4 that the share of air freight is positively associated with positive sales surprise.

The effect of monthly demand variation within a year is also significant at the 1 percent level. Demand variation has a β coefficient of 0.0119 indicating that an industry with high-monthly demand variation uses more air freight compared to an industry that has low-demand variation. This provides support for H5 that the share of air freight is positively associated with monthly demand variation.

The Table IV presents the results across regression techniques. These results are generally consistent with the results observed in our previously estimated multilevel fixed effect regression model. Table IV also indicates that our model have a strong goodness of fit.

DISCUSSION

Our discoveries throw light as to how the industrial attributes have affected the transportation mode in global supply chains. Historically, the transportation mode decision has been characterized as a trade-off between cost and time [41]; [42]. Though air freight is expensive but fast mode for shipping goods, ocean freight and inland freight is cheaper but takes time in deliverance. Therefore, industry prefers air freight for expensive products and/or products whose requirement is urgent and ocean freight for heavy products with lesser priority. Accordingly, previous studies have included modal characteristics, shipment characteristics, and regional characteristics in their estimation models. Only a few studies have analyzed the impact of industry characteristics on the freight transportation mode [43]. Our study indicates that the freight transportation mode is a result of the strategic alignment between industrial characteristics and supply chain strategies, as proposed by [44]. We find that several industry characteristics (i.e. the transit time ratio, the industry characteristics, competition, and demand uncertainty) have a significant impact on the freight transportation mode.

While older papers suggested that the product value is a primary attribute in choosing a particular modal, these results further point out that the transit time is yet another important factor. So, the logisticians could recommend a more effective and rapid transportation mode for industries with more low transit time. Historically supply chain management has zoomed on the incorporation of the actual flow of products and information side by side the supply chain. Few industries regard the management material flows as an important element of supply chain management [45]. Our findings gives support and establishes a relationship between material flow, and the transportation choice. This result suggests that supply chain manager must not only incorporate the movement of goods and information but also monetary flows into their supply chain strategies.

Our results indicate that more competition is associated with an increased use of air freight. The S-C-P paradigm states that firms in highly concentrated industries can have significant market power, resulting in higher prices and allocative inefficiency [46]. Oligopolistic industries are under less pressure to meet demand in a timely manner and may be able to negotiate a later delivery date at lower costs without fear of losing business to a more aggressive competitor.

As against, industry with greater competitions must work on quick answers to heavy demands in order to attract shipments. Finally, this study suggests that extensive demand uncertainty, in the form of profitable sales surprise and extensive demands, air mode will be used. These findings support Fisher's argument regarding the alignment of demand uncertainty and supply chain strategies [47].

We also look at industrial attributes. The value to weight ratio is a primary indicator deciding the share of air freight; therefore, computer and electronic product manufacturing, machinery, printing, apparel, and leather manufacturing industries have more air freight shares. Though we concluded that freight rate is a primary factor in the freight transportation modal decision, but other non-economic attributes like competition, transit time, and demand uncertainty are also major factors and should be incorporated in the modal decision.

With the exception of the financial crisis of 2008-2009, the share of air freight has experienced growing trend, which is partially due to downward trend in the fares of air freight. During the financial crisis of 2008 and 2009, the share of air freight dropped from 14.7 percent to 14.2 percent. Because firms were suffering from low demand and tight credit, our data show lower positive sales surprises, lower contribution margins, and a higher cost of capital on average during this period. This may account for the lower share of air freight in 2008.

For air and ocean freight forwarders, this study shows that there exist considerable business opportunities. In most foreign countries, the freight forwarding industry is fragmented and highly competitive.

The findings of this study suggest that freight transportation mode is affected by not only transit time and freight rates but also cost of capital, demand uncertainty, and competitive intensity of an industry. Thus, a capable freight forwarder should not only offer transportation services but also become an integrated supply chain solution provider, who considers all of these factors and suggests a proper mix of transportation modes for his customers.

CONCLUSIONS

Based on trade data between Pakistan and 12 of its associates partners and data of Pakistan manufacturers, this paper studies the aspects linked with the choice of freight transportation mode in global supply chains. Some more industrial aspects have now been examined that were ignored in earlier papers, targeting specially the selection in the Pakistan Asia supply chain are identified. Probably this is the first study that has considered the outcome of industrial aspects on the linkage between industry characteristics and transportation strategy. The transportation modes are better understood in the international environment and logisticians and supply chain managers may use and benefit the information available in the paper.

Following are the number of limitations in our study, as well as opportunities for future research. Firstly, this study uses aggregate industry-level data to estimate modal choice. Firm-level data on modal choice may provide a richer source of information to understand the decision maker's behaviors. For example, Incoterms (International Commercial terms) define the responsibilities of sellers and buyers in international trade, but either shipper or consignee could pay the freight charge and decide the transportation mode. The party that pays the transportation costs may have more influence on the transportation modal decision. Our research does not take this factor into account. Future studies could use disaggregate data (firm level or shipment level) that provide more information about the modal decision maker, including who pays for freight charges.

Secondly, this model is not foolproof and some factors that could impact transportation modal decisions are not included in this model. This study has many dimensions, for example, the target countries/regions may have industry with different nature. Though we were cautious of all these differences yet it is impossible to gather all the relevant input. In addition,

previous studies have indicated that the reliability of transit times could affect the modal decision. Because the actual transit times of air and ocean freight between the USA and Asian trading partners are not reported, we could not measure reliability.

Using trade data between the Pakistan and 12 of its partners and survey data of Pakistan manufacturers, this study examines the factors associated with the decision of freight transportation modal choice in global supply chains. A number of industry characteristics that have not been considered in previous studies and affect freight transportation modal selection in the Pakistan-Asia supply chain are identified. To the best of our knowledge, this study is among the first efforts to examine the impact of industry characteristics on the transportation modal mix and evaluate the relationship between financial flows and transportation strategy. The findings provide a more complete picture of the use of transportation modes in international transportation and may serve as a guide for logistics and supply chain managers to balance the mix of air and ocean freight.

REFERENCES

[1]. Albarune, A. R. B. and D. M. M. Habib (2015). "A Study of Forecasting Practices in Supply Chain Management." *International Journal of Supply Chain Management* ***4(2)***

[2]. Chopra, S. and P. Meindl (2007). Supply chain management. Strategy, planning & operation, *Springer*.

[3]. Stock, J. R. and D. M. Lambert (2001). *Strategic logistics management, McGraw-Hill/Irwin Boston, MA*.

[4]. Bowersox, D. J., D. J. Closs, et al. (2002). *Supply chain logistics management, McGraw-Hill New York, NY*.

[5]. Pagell, M. and Z. Wu (2009). "Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars." *Journal of Supply Chain Management* **45(2): 37-56.**

[6]. Gordon, R. J. (2007). The measurement of durable goods prices, *University of Chicago Press.*

[7]. Hummels, D. (2007). "Transportation costs and international trade in the second era of globalization." *The journal of economic perspectives* **21(3): 131-154.**

[8]. Hummels, D. (2009). "Trends in Asian trade: implications for transport infrastructure and trade costs." *Infrastructure's Role in Lowering Asia's Trade Costs: Building for Trade:* **17-36.**

[9]. Su, S.-I. I., J.-Y. F. Ke, et al. (2011). "The development of transportation and logistics in Asia: an overview." *Transportation Journal* **50(1): 124-136.**

[10]. Cantor, D. E., P. C. Morrow, et al. (2012). "Engagement in environmental behaviors among supply chain management employees: An organizational support theoretical perspective." *Journal of Supply Chain Management* **48(3): 33-51.**

[11]. Swaim, J. A., M. J. Maloni, et al. (2016). "Motivational influences on supply manager environmental sustainability behavior." *Supply Chain Management: An International Journal* **21(3).**

[12]. Shong-lee Ivan Su, D., J.-y. F. Ke, et al. (2015). "Aligning supply chain transportation strategy with industry characteristics: Evidence from the US-Asia supply chain." *International Journal of Physical Distribution & Logistics Management* **45(9/10): 837-860.**

[13]. Brundtland, G. (1987). "Our common future: *Report of the 1987 World Commission on Environment and Development." United Nations, Oslo*: **1-59.**

[14]. Hopkins, M. S., K. Haanaes, et al. (2011). "New sustainability study: The embracers seize advantage." *MIT Sloan Management Review* **52(3): 23.**

[15]. Gimenez, C. and E. M. Tachizawa (2012). "Extending sustainability to suppliers: a systematic literature review." *Supply Chain Management: An International Journal* **17(5): 531-543.**

[16]. Carter, C. R. and D. S. Rogers (2008). "A framework of sustainable supply chain management: moving toward new theory." *International Journal of Physical Distribution & Logistics Management* **38(5): 360-387**.

[17]. Lamming, R. and J. Hampson (1996). "The environment as a supply chain management issue." *British journal of Management* **7(s1): S45-S62**.

[18]. Selldin, E. and J. Olhager (2007). "Linking products with supply chains: testing Fisher's model." *Supply Chain Management: An International Journal* **12(1): 42-51.**

[19]. Lo, S. M. and D. Power (2010). "An empirical investigation of the relationship between product nature and supply chain strategy." *Supply Chain Management: An International Journal* **15(2): 139-153.**

[20]. Harris, D. C. (2010). *Quantitative chemical analysis, Macmillan.*

[21]. Wolf, C. and S. Seuring (2010). "Environmental impacts as buying criteria for third party logistical services." *International Journal of Physical Distribution & Logistics Management* **40(1-2): 84-102.**

[22]. Ashby, A., M. Leat, et al. (2012). "Making connections: a review of supply chain management and sustainability literature." *Supply Chain Management: An International Journal* **17(5): 497-516.**

[23]. Marshall, D., L. McCarthy, et al. (2015). "Going above and beyond: how sustainability culture and entrepreneurial orientation drive social sustainability supply chain practice adoption." *Supply Chain Management: An International Journal* **20(4): 434-454.**

[24]. Hoejmose, S., S. Brammer, et al. (2013). "An empirical examination of the relationship between business strategy and socially responsible supply chain management." *International Journal of*

Operations & Production Management **33(5): 589-621**.

[25]. Bai, C. and J. Sarkis (2014). "Determining and applying sustainable supplier key performance indicators." *Supply Chain Management: An International Journal* **19(3): 275-291.**

[26]. Lee, S.-Y. (2015). "The effects of green supply chain management on the supplier's performance through social capital accumulation." *Supply Chain Management: An International Journal* **20(1): 42-55**.

[27]. Sancha, C., C. Gimenez, et al. (2015). "Does implementing social supplier development practices pay off?" *Supply Chain Management: An International Journal* **20(4): 389-403.**

[28]. Carter, C. R. and J. R. Carter (1998). "Interorganizational determinants of environmental purchasing: initial evidence from the consumer products industries*." *Decision Sciences* **29(3): 659-684.**

[29]. Kirchoff, J. F., C. Koch, et al. (2011). "Stakeholder perceptions of green marketing: the effect of demand and supply integration." *International Journal of Physical Distribution & Logistics Management* **41(7): 684-696.**

[30]. OMRAN, M. and J. Pointon (2004). "Dividend policy, trading characteristics and share prices: empirical evidence from Egyptian firms." *International Journal of Theoretical and Applied Finance* **7(02): 121-133.**

[31]. Waldman, D. and E. Jensen (2007). Industrial Organization: Theory and Practice**.–3-rd ed**, *Boston, San Francisco, New York, London: Pearson Education, Inc.*

[32]. Hummels, D. L. and G. Schaur (2010). "Hedging price volatility using fast transport." *Journal of International Economics* **82(1): 15-25.**

[33]. Rumyantsev, S. and S. Netessine (2007). "What can be learned from classical inventory models? A cross-industry exploratory investigation." *Manufacturing & Service Operations Management* **9(4): 409-429.**

[34]. Hummels, D. L. and G. Schaur (2010). "Hedging price volatility using fast transport." *Journal of International Economics* **82(1): 15-25.**

[35]. Evers, P. T. (1999). "The effect of lead times of safety stocks." *Production and Inventory Management Journal* **40(2): 6.**

[36]. Coto-Millán P, Baños-Pino J, Inglada V. Marshallian demands of intercity passenger transport in Spain: 1980–1992. An economic analysis. Transportation Research Part E: *Logistics and Transportation Review*. **1997 Jun 30; 33(2):79-96.**

[37]. Oum TH. A cross sectional study of freight transport demand and rail-truck competition in Canada. *The Bell Journal of Economics.* **1979 Oct 1:463-82.**

[38]. Ke JY, Windle RJ, Han C, Britto R. Aligning supply chain transportation strategy with industry characteristics: Evidence from the US-Asia supply chain. *International Journal of Physical Distribution & Logistics Management.* **2015 Oct 5; 45(9/10):837-60.**

[39]. Zhu K, Kraemer KL. E-commerce metrics for net-enhanced organizations: Assessing the value of e-commerce to firm performance in the manufacturing sector. *Information systems research*. **2002 Sep; 13(3):275-95.**

[40]. Kennedy P. A guide to econometrics. *MIT press*; **2003.**

[41]. Lambert DM, Cooper MC. Issues in supply chain management. *Industrial marketing management.* **2000 Jan 31; 29(1):65-83.**

[42]. Bowersox DJ, Carter PL, Monczka RM. Materials logistics management. *International Journal of Physical Distribution & Logistics Management*. **2013 Apr 11.**

[43]. Hummel J, Strehmel N, Selbig J, Walther D, Kopka J. Decision tree supported substructure prediction of metabolites from GC-MS profiles. *Metabolomics***. 2010 Jun 1; 6(2):322-33.**

[44]. Cachon GP, Fisher M. Supply chain inventory management and the value of shared information. *Management science.* **2000 Aug; 46(8):1032-48.**

[45]. Yuan X, Merk W, Stemmler H, Allmeling J. Stationary-frame generalized integrators for current control of active power filters with zero steady-state error for current harmonics of concern under unbalanced and distorted operating conditions. *IEEE Transactions on Industry Applications.* **2002 Mar; 38(2):523-32.**

[46]. Korkola JE, Blaveri E, DeVries S, Moore DH, Hwang ES, Chen YY, Estep AL, Chew KL, Jensen RH, Waldman FM. Identification of a robust gene signature that predicts breast cancer outcome in independent data sets. *BMC cancer*. **2007 Apr 11; 7(1):1.**

[47]. Yu, W., R. Chavez, et al. (2014). "Integrated green supply chain management and operational performance." *Supply Chain Management: An International Journal* **19(5/6): 683-696.**