Low Carbon Freight Services Analysis: A Review Study

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ABSTRACT_ **The analysis of Low Carbon Freight Services is relatively recent. However, the topic has become one of the most popular in freight services research literature. A review of 80 Low Carbon Freight Services papers, published in the literature during the period 1995-2015, was undertaken to provide Freight Services researchers with a reference guide to the context, method and focus of previous studies. The outcome of these papers show there is some benefits to employ low carbon freight logistic include Economic benefits, Environmental benefits, Operational benefits and Intangible benefits. The study describes opportunities and contributions in relation to an increase in a competitiveness and flexibility of enterprise and all of participating supply chain segments**.

Key words_ *Low Carbon. Freight Services. Supply Chain. Transportation. Climate change*

1. Introduction

Recently climate change has become a disputable issue since it has major effects on our lives. Climate change has reached to its critical point and is an important environmental issue. There are a number of studies stressing on climate change as an important and real concern [21]-[40]-[27].

The reason is the amount of gases in atmosphere has reached a shocking level, maximizing the natural greenhouse influence. The greenhouse effect is a kind of procedure through which greenhouse gas (CO2), occurring naturally in the atmosphere, absorbs radiation of surface of earth making the atmosphere warm and our planet a place of living. However, great amount of greenhouse gas intensifies this effect. Built in the atmosphere it forms a blanket surrounding the earth. This process gradually heats the earth up causing global warming and climate change [102].

Thus, Climate change is caused by emission of greenhouse gases (GHGs) into the atmosphere [28]. Carbon dioxide (CO2) is the most important anthropogenic greenhouse gas [20]. CO2 is the primary greenhouse gas emitted through human activities that is considered as the most important greenhouse gasses keep increasing and its cumulative emission will exceed in period of the next two decades [46]. Thus, Standardized low carbon practice with accuracy and reliability is needed for managing and controlling the GHG emissions.

Following the Protocol of Kyoto in 1997 many made attempts to find a solution for the climate change [97]-[8]. Protocol of Kyoto encouraged all countries to cut down on the emission of CO2 by 2012. According to this protocol each country was supposed to lower 5% of emission of CO2 against levels of 1990 in a period of five years from 2008 to 2012 (UNFCC). Many of the countries that signed the Protocol of Kyoto have followed some programs to fulfill the goals of the protocol in the agreed duration.

Many authors in the literature suggest that reducing a firm's overall carbon emission level requires a fundamental transformation in its supply chain practices [45]. CO2 emission can be caused by different supply chain activities

International Journal of Supply Chain Management
IJSCM, ISSN: 2050-7399 (Online), 2051-3771 (Print)

[15]. [71] argued that Carbon trading mechanisms are integrated within the supply chain network design phase and the problem formulated as a multi-objective mixed integer linear optimization program to decide on the supply chain configuration.

Logistics industry consumes a lot of energy and plays an influential role in carbon emission both in its own operations and through broader supply chain optimization. According to the Council of Logistics Management (1998), logistics is a subset of supply chain management [52]. Practitioners and educators have variously addressed the concept of supply chain management (SCM) as an extension of logistics, the same as logistics, or as an all-encompassing approach to business integration [17].

Logistics implies that a number of separate activities are coordinated. In 1991 the Council of Logistics Management, a trade organization based in the United States, defined logistics as: "the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements. Logistics industry is recognized as high-end service industry, must focus on the low-carbon, green logistics service, and intelligence informatization of low-carbon logistics. This industry, poses a problem for consideration of economic, environmental, operational and intangible benefits of freight logistics industry that is becoming a critical issue.

In almost three decades since this early work, the topic has become one of the most prevalent in literatures. Researchers now have a wealth of low carbon freight service literature at their disposal. A review of 80 low carbon freight service papers, published in the literature, was undertaken to produce a synthesis of key characteristics. It was felt that such a summary would provide supply chain managers with a useful reference guide.

Their review concluded that researchers had not yet been successful in operationalizing Low carbon freight services. They also found that researchers held a strong preference for quantitative techniques, with few involving consumers in unstructured methods.

The current review was limited to the following issues:

• How many studies examined Low carbon freight services in an explicit logistic context?

• How many studies used a structured approach?

• How many studies utilized qualitative methods in either the measurement of Low carbon freight services or in the development of attribute lists?

• Apart from measuring Low carbon freight services, what other research foci or moderating variables have been of interest?

2. Literature Review

There are many options available at all stages of the supply chain (product design options, process options, transportation options, etc.), and a comprehensive sustainable supply chain design framework that combines economic decision-making strategies with GHGs reduction options and the options provided by the various regulatory carbon market-based mechanisms would be very useful [71]. Supply chain design decisions usually include the selection of suppliers and subcontractors, product allocation to the various sites, capacity utilization, and transportation configuration. In addition to these decisions, a make or buy decision must now be made so that total GHGs emissions are either below the cap or the exceeding amount compensated by buying carbon credits [12].

Logistics plays a key role of any given product through proper transportation, storage and handling within the supply chain, until it reaches its final destination. An environmentally responsible logistics approach expands the manager's horizon by adding another objective to the system: minimizing total environmental impact. It can help preserve the environment while simultaneously meeting cost and efficiency objectives [104]. As the global climate is getting worse, global "low-carbon revolution" is on the rise, human beings are coming to a new low-carbon era that is based on "low energy consumption, low pollution, and low emissions".

It is believed that the pressure from commercial buyers who require their suppliers to adopt environmental practices (certified by external auditors) drives firms in the supply chain to be more environmentally responsible. Market pressure from commercial buyers, suppliers of goods and services and consumers (supply chain) is another essential determinant that motivates firms to adopt environmental practices [50]-[87]. Several studies have suggested that, the commercial chain pressures are considered as a potential driver to adopt environmental activities [87].

Furthermore, Governments can advance technical innovation through encouraging policies, such as providing financial incentives, technical resources, pilot projects, and training programs [49]. It can increase its assistance by

providing governmental subsidies or tax incentives for alternative energy technologies, bank financing at lower rates for environmentally friendly technologies, and lower insurance premiums for lower environmental risks [5].

With increased pressures for environmental sustainability, it is expected that firms will need to apply the strategies to reduce the environmental impacts of their products and services [107]. At an early stage in the development of a carbon reduction strategy it is necessary to analyze the main sources of CO2 emissions and identify those activities upon which carbon mitigation measures should be targeted [13]. Therefore, we need a good carbon reduction strategy that may provide new opportunity for competition and new ways to add value to core business programs, otherwise, firms will lose their competitiveness in the market. Low Carbon Freight Services antecedents are Multi-modal transportation, Low carbon Vehicle, Low carbon warehousing, Low carbon packaging and Low carbon supply chain management which are categorized by Suppliers, Retailer Pressure, Educate Employee, Proper Management, and Freight Modal Split, Vehicle Utilization Carbon Intensity of Fuel, Energy Efficiency, Information System & Computer Modes Stakeholders Pressures.

Multi-modal freight transport for road-rail or road-ship could decrease negative environmental impact in terms of CO2 and other hazardous gas emissions. Nevertheless, Multi-modal freight transport inevitably requires mode changes at connecting points or terminals. It requires huge investments for constructing and maintaining intermodal terminals and entails added cost during transshipments but the functions and efficiency of these terminals are crucial for successful intermodal operations [65]. As part of integrated advanced logistics and supply chain management, multi-modal logistics is defined in terms of seamless door-to-door freight transport operations using at least two or more different modes of transport. In general, the initial/terminal portions are short and by road, and the main long haulage of containers, swap bodies, trailers or trucks is by rail, waterway, sea or air. Multi-modal logistics is also characterized by the absence of or minimal handling of goods during transfers. Instead, load units like containers or transport units, such as swap bodies, are interchanged between modes [29]. Likewise, load units designed for the convenience of multi-modal transshipment could be further modified so that they could be utilized in intercity transport as well. Second, in environmentally-sensitive or highly congested areas, alternative short-distance intermodal systems to replace trucks are being experimented in several countries with governmental supports. It is necessary to evaluate the experiments at this moment [65].

Additionally, the reduction of freight vehicle trips during peak hours has been a common policy goal. To this end, policies have been implemented to shift logistics operations to night times hours. The purpose of such policies has generally been to mitigate congestion and environmental impacts [78].

Similarly, Product design and packaging influence the efficiency and effectiveness of the supply chain activities, and later logistics cost, waste and GHG emissions. The “plan” process contains activities performed at the strategic level. It includes product lifecycle management (PLM) and supply chain network design optimization. Life cycle management takes into account that products need to be managed through design, production, operation, maintenance and end of life reuse or disposal [15]. Because the nature of logistics management is cross-functional and integrative and since so many logistical activities impact on the environment, it makes sense for logistics managers to take the initiative in this area [104].

Due to the way the data has been summarized, the following explanatory notes are provided:

Table 1 shows the variables frequencies of Low Carbon Freight Services in the related studies. Column A, B, C, D and E list the number of factors under commodity group with the frequencies of 12, 12, 4, 3 and 7. Suppliers, Retailer Pressure, Educate Employee, Proper Management, and Freight Modal Split are listed on column F, G, H, I and J with the frequencies 9 of 4, 3, 6, 17 and 46. Column K and L list the number of factors under Vehicle Utilization with the frequencies of 40 and 42. Column M, N, O and P incline Carbon Intensity of Fuel with the frequencies of 26, 12, 7 and 3. Column Q, R and S slope the number of subjects of Energy Efficiency with the frequencies of 4, 13 and 27. Column T and U lists the Information System & Computer Modes variables with the frequencies of 22 and 26. Column V, W, X, Y, Z, A1, B2 and C3 list the number of Stakeholders Pressure subjects with the frequencies of 35, 13, 8, 21, 8, 10, 8 and 3.

(INSERT TABLE 1 ABOUT HERE)

3. Results

Relatively half of the papers attempted to measure Low Carbon Freight Services in the global context. In fact, global context was explicit in 39 of the 80 papers. The most popular region for study was European Union, which were 36 papers included in United Kingdom by19 papers. This was followed by Asian countries (23) and United States

(16). The outcome of these 80 papers show there is some benefits to employ low carbon freight logistic include Economic benefits, Environmental benefits, Operational benefits and Intangible benefits.

It is clear that road freight transport yields enormous economic and social [59]. The economic outcome represents the impact of enablers of supply chain sustainability practices, in terms of productivity, profitability, revenue, cost reduction, and market share and this construct was measured based on seven items that came from the [74] study. Here supply chain economics is taken into consideration by minimizing the total logistic cost or maximizing the profit over the different supply chain activities (purchasing, production, warehousing, distribution, recycling, etc). Foster Freight Logistics as a value-adding economic activity and emerge as a new growth driver in the national strategy to move the economic up the value chain.

Including environmental and social impacts with the traditional financial impact allow companies to reduce the harmfulness to the environment while still achieving the strategic financial targets [15]. The environmental outcome represents the impact of enablers of supply chain sustainability in terms of compliance with environmental standards, reduced air emissions, decreased resource consumption, and lower consumption of hazardous materials. This construct is measured using six items used in studies such as [74].

Efficient logistics extends market reach by giving manufacturers access to a wider range of raw materials and supplies from different sources and consumers' access to a wider range of manufactured goods and services, both domestic and international which are all about operational benefits of low carbon freight services. It reduces waste, both in production and in the deployment of capital through the ability to exploit economies of scope and scale and to spread the advantages of "Just-In-Time" (JIT) practices widely throughout the manufacturing and retailing sectors (UK Department of the Environment, Transport and the Regions, 1999). However, Logistics is just not about lifting and shifting, claims [16] but has an important contribution to make to gaining competitive advantage [4].

Moreover, there are some intangible benefits in low carbon freight services. According to the [32], success in addressing environmental items may provide new opportunity for competition and new ways to add value to core business programs. So it is essential for the industries to react and transform the way production systems operate towards sustainability. Indeed, competitive markets, pressure to reduce inventory and costs, merger activities, rising energy and fuel costs are the most common incentives for a corporate to examine the supply chain network and define the number, type, location of manufacturing and distribution facilities and the transportation channels and modes used to serve customers. Including environmental and social impacts with the traditional financial impact allow companies to reduce the harmfulness to the environment while still achieving the strategic financial targets [15]. Therefore, industries are trying to be green and decrease influence of the environmental issues in the world.

A review of 80 papers in the Low Carbon Freight Services literature was undertaken. Table 2 presents a summary of the findings, where studies have been presented in chronological order. First column lists (Authors), second (Year), third (Purpose of Study), fourth (Global Issues), fifth (Country), sixth (Industry), seventh (Theory Building/ Verification), eighth (Classifications by Methodologies), ninth (Journal Published) and tenth (Classifications by Content).

(INSERT TABLE 2 ABOUT HERE)

4. Discussion

Environmental sustainability means that permanent environmental damages should not be allowed and GHGs emissions regulations enforced [71]. To respond to new market trends and demands, companies are pursuing a set of strategies that are common among major firms. The most related strategy is the implementation of a global perspective in their supply chain operations [76].

Within the last decade, several changes have stimulated interest in developing logistics and supply chain management, in which several trends have taken place. First, companies have now realized that logistics function could play a prominent role as a strategic tool in gaining competitive advantage. Consequently, the tendency towards keeping low inventories to reduce the cost of storage, as underlined by the production concepts such as Just-In-Time and Zero-Inventory became obvious [4].The primary objective of the Low Carbon Freight Logistics strategy would be to ensure that the users of transportation and logistics services enjoy a higher level of service at lower costs.

5. Conclusion

A total of 80 Low Carbon Freight Services papers from the literature during the period 1995-2015 were reviewed. It was felt that a summary of key characteristics would provide researchers with a useful reference guide to previous studies. The summary provides references to an array of techniques that Low Carbon Freight Services marketers may use to measure whether they have been successful in this regard or not. Action must be taken on many fronts, by government, industry, science, academia and most of all, in the attitudes and behaviors of individuals. These agenda can be achieved through sustainable business models that are not just within the scope of environmental protection but also in more holistic ways to address the world's social, economic and environmental challenges [86].

To achieve such reductions, the federal government should also expand R&D in renewable energy and advanced fossil fuel technologies, provide targeted tax and financial incentives for new zero-carbon technologies, expand programs to increase the supply of low-cost natural gas, and develop technologies to extend the operating lifetimes of existing nuclear plants [77].

A graduate level research institution, Linked into other global centers through the Research Network, the Institute will become a center of excellence, spinning off ideas and technologies. This will drive the next phase of economic and industrial development [64]. According to the [32]. Success in addressing environmental items may provide new opportunity for competition and new ways to add value to core business programs. So it is essential for the industries to react and transform the way production systems operate towards sustainability. To gain a competitive advantage, many organizations are seeking to manage their logistics operations strategically, but realize that they lack the core competencies and are increasingly seeking to outsource their logistics activities [90].

An efficient logistics center structure may lead to a significant profit and return on investment as well as a significantly increased competitive advantage in the market place by meeting strategic commercial objectives [48]. Efficient Freight Logistics therefore is important to the manufacturing industry in ensuring more effective (and efficient) market outreach as well as in providing a wider choice of inputs and products and reducing waste within the economy. It offers immense opportunities to the economy to move up the economic value chain by reducing wastes and offering a higher customer service at competitive cost. Therefore, Freight Logistics play a very important role in the national development. Hence, public authorities should consider the importance of this topic by any given decision in terms of strong economic, social and environmental implications before announcing an area as a logistics center [48].

Table 1. Summary of Low Carbon Freight Services Studies 1995 – 2015 Based on Variables Frequencies

Factors	electronic recycling/automated disassembly-distribution	Design of products and packaging/ batch size	defect products in shipment/return product in reverse	Use a particular substance in product (indirect	Eco design/ lightweight materials (indirect pressure)	suppliers(indirect)	retailer pressure	Educate employee	Proper management /inventory management /backhaul	different transport modes/ intermodal method	Improving the loading of vehicles/reducing no of	ratio of freight movement(longer freight haul)/delivery	Efficiency of power plants(exploiting renewables)	Fuel type/fuel choice	Facilities (warehouses, ports and terminals/intermediate	primary source of electricity power)indirect) electricity	R&D partnership(technology)	fuel efficiency /improvement of fuel efficiency	vehicle characteristics(type)/Low combustion	Intelligent transport system/coordinated	Information system & computer modes(inventory control	Policy pressures& standarsation of government	City authorities & planning agency(local government)	investment/ investment on R&D of government	tax& subsidiaries of government	Fuel price	competitor pressure	Customer pressure	Educate customer/customer preference
Item	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A1	B2	C3
Frequencies	12	12	4	3	7	4	3	6	17	46	40	42	26	12	7	3	4	13	27	22	26	35	13	8	21	8	10	8	3

Table 2. Summary of Low Carbon Freight Services Studies 1995 - 2015

No	Authors	Year	Purpose of Study / Focusing on	Global Issues	Country	Industry	Theory Building/ Verification	Classifications by Methodologies	Journal Published	Classifications by Content
1	Wu & Dunn,	1995	To provide an overview of environmentally responsible logistics activities in the entire supply chain,	Yes	-	Manufacturing	-	Conceptual	International Journal of Physical Distribution & Logistics Management	logistics issues relative to the natural environment
2	Schipper et al	1997	Carry out a decomposition of changes in freight energy use to identify the relative contribution of activity, modal structure, and energy intensity to the rise in energy use observed in each country.	No	U.S, Japan, EU8,France,Germany,Italy,U.K,Norway,Sweden,Denmark and Finland	Transportation Sectors	-	Empirical (survey and exploratory cross-sectional)	Transportation Research Part D: Transport and Environment	Energy Use and Carbon Emissions From Freight
3	Pastowski, A.	1997	Takes a look at the development of freight transport and its further perspectives in the light of environmental sustainability	Yes	Germany	Transport Sector	-	Perspective	Wuppertal papers	Sustainable Freight Transport
4	Romm et al	1998	A road map for US carbon reductions	No	US	The energy supply sector, industrial sector, transportation sector & building	-	Review	Science-New York Then Washington	A road map for carbon reductions

5	Van Hoek, R. I.	1999	looks at challenges for research on green steps to take, and green supply chains to make in practice, as a step up to lowering the ecologic footprint of supply chains	Yes	-	Logistic Industry	-	Conceptual	Supply Chain Management: An International Journal	reversed logistics to green supply chains
6	Forsberg, G.	2000	Investigate the environmental load of selected bio energy transport chains.	No	Sweden and Holland	Transportation Industry	-	Empirical (case study)	Biomass and Bio energy	Biomass energy transport
7	Vanek&Morlok	2000	Review the recent trends and future prospects for these mode-based approaches, despite substantial improvement in the technological efficiency of freight modes	No	US	Transport Sector	coalition theory	Reviews	Transportation Research Part D: Transport and Environment	Energy efficiency of freight
8	Rodriguee t al	2001	Considering how the term of green logistic has been developed and applied in the transportation industry.	Yes	-	Transportation Industry	-	Conceptual	The Handbook of Logistics and Supply-Chain Management	Green Logistics
9	Schipper et al	2001	Expand the analysis of energy use and carbon emissions to 13 IEA countries	No	Australia, Canada, Denmark, France, Finland, West Germany, Italy, Japan, Netherlands, Norway, Sweden, United Kingdom and United States	Manufacturing Sectors	-	Empirical (exploratory longitudinal)	Energy Policy	Carbon emissions from manufacturing energy
10	Hesse	2002	Addressing the implications of electronic commerce (e-	Yes	US/UK/ Netherland	Transportation industry	Marxian theory	Empirical (survey and	Resources, Conservation	Electronic commerce for

			commerce) for logistics and freight transport operations.					exploratory cross-sectional)	and Recycling,	logistics and freight transport
11	Hesse, M.	2002	Investigate e-commerce more comprehensively, in relation to the entire distribution system and to its application in firms and households.	Yes	France, Germany, Netherlands, UK, US and Sweden	transport sector	Marxian theory	Conceptual	Resources, Conservation and Recycling	electronic commerce for logistics and freight transport
12	Saldanha &Gray	2002	investigates the potential for the development of coastal shipping services between ports of the main island of Great Britain by focusing on the scope for improved multimodal links	No	United Kingdom	Transport industry	-	Empirical (case study)	Maritime Policy & Management	coastal shipping in a multimodal chain
13	Sarkis, J.	2003	Focus on the components and elements of green supply chain management and how they serve as a foundation for the decision framework.	Yes	-	-	-	Empirical (modelling)	Journal of cleaner production	green supply chain management
14	Hesse, &Rodrigue	2004	Providing an overview of the emerging transport geography of logistics and freight distribution	Yes	-	Transportation industry	-	Conceptual	Journal of transport geography	transport of logistics and freight distribution
15	Sheu et al	2005	Presents an optimization-based model to deal with integrated logistics operational problems of green-supply chain management	No	Taiwan	Notebook computer manufacturer	-	Empirical (case study)	Transportation Research Part E: Logistics and Transportation Review	logistics model for green-supply chain management
16	Rao& Holt	2005	To identify potential linkages between green supply chain management, as an initiative for environmental enhancement, economic	Yes	South East Asian	Manufactures	-	Conceptual model followed by structural equation	International Journal of Operations & Production Management	Green supply chains

			performance and competitiveness amongst a sample of companies in South East Asia.					modelling.		
17	Gerolimin is&Dagan zo	2005	Presents several examples of sustainable city logistics and green logistics schema that have been used in various cities around the world.	Yes	Copenhagen/s weden/UK/bru ssel/rotterdam/ osaka/zurich/b erlin/stockhol m/barselona/pa ris/rome/londo n/germany/ne wyork/vancou ver/tokyo/amst erdam/venic	-	-	Review	UC Berkeley Center for Future Urban Transport: A Volvo Center of Excellence UC Berkeley	Green Logistics Schemes
18	Capineri et al	2006	First discusses the concept of seamlessness, and then examines some of the consequences of the lack of seamlessness in terms of freight transport inefficiencies	Yes	-	Transport Sector	Institution al structures and manageme nt theory	Conceptual	European Journal of Transport and Infrastructure Research	Freight transport sustainability
19	Nemoto et al	2006	To build a research framework on intermodal transport in the context of city logistics	Yes	European Union (EU), the United States and Japan.	Transport Sector	-	Descriptive	The 4th International Conference on City Logistics.	Intermodal transport
20	Srivastava , S. K.	2007	Present a comprehensive integrated view of the published literature on all the aspects and facets of GrSCM, taking a ‘reverse logistics angle’ so as to facilitate further study, practice and research.	Yes	Mainly Europe and North America	Manufacturing	Game theory	Empirical (Modeling)	International journal of management reviews	Green supply-chain management
21	Quak&	2007	Focuses on the impact of	No	Dutch	Retailers in	-	Empirical	Journal of	Retailers'

	De Koster		governmental time window pressure on retailers' logistical concept and consequential financial and environmental distribution performance.			different sector		(case study)	Operations Management	sensitivity to local sustainability policies
22	Hickman, R., & Banister, D	2007	Reports on a recently completed study for the UK government on the options available to meet a 60% CO2 reduction target by 2030 in the UK transport sector.	No	UK	transportation industry	-	Empirical (exploratory longitudinal)	Transport Policy	Sustainable transport
23	Shimada et al	2007	Aims at developing a method, designed specifically for prefectures in Japan, to envision a low carbon economy with a long-term perspective (setting 2030 as the target year) and to formulate scenarios for realizing it.	Yes	Japan	-	-	Empirical (survey and exploratory cross-sectional)	Energy Policy	low-carbon economy
24	Piecyk& McKinnon	2007	Assesses the degree to which the external costs of road freight transport such as environmental costs (comprising climate change, air pollution, noise and accidents) in the UK are currently being internalized by taxation.	No	UK	Road freight sector	-	Perspective	Logistics Research Centre: Heriot-Watt University, Edinburgh	external costs of road freight transport
25	Chapman, L.	2007	Investigated ways in which technological and behavioral change can	Yes	-	Transport Sector	-	Reviews	Journal of transport geography	Transport and climate change

			reduce the combustion of fossil fuels, and thus greenhouse gas emissions.							
26	Behrends et al	2008	Review definitions of sustainability, freight transport into a definition of sustainable urban freight transport.	Yes	-	Transportation industry	-	Review	Transportation planning and technology	The Impact of Urban Freight transport
27	Chaabane et al	2008	Developing an integrated logistics mathematical model for green supply chain network design with the environmental impact (CO2 emissions)caused by transportation activities	Yes	-	-	-	Mixed integer linear programming modeling technique	AMCIS 2008 Proceedings	Logistics model for environmental conscious supply chain network design
28	Ramudhin et al	2008	Propose a novel approach for Green Supply Chain Management (GSCM) by tying GHGs emissions to carbon trading	Yes	US, Canada and European countries	Steel product manufacturer	-		IEEE International Conference	Carbon Market Sensitive Green Supply Chain Network Design
29	Walker et al	2008	explores the factors that drive or hinder organizations to implement green supply chain management initiatives	Yes	-	Public and private sectors	-	Conceptual	Journal of purchasing and supply management,	Drivers and barriers to environmental supply chain management practices
30	Winebrake et al	2008	Discusses the environmental impacts of freight and presents a model that allows analysts to evaluate tradeoffs in an intermodal freight transportation context.	No	U.S	Transport Sector	-	Empirical (case study)	Journal of the Air & Waste Management Association	Intermodal freight transportation
31	Quak, H.	2008	Improving sustainability of urban freight transport in urban areas	No	Netherland	Transport Industry	Grounded Theory	Empirical (case study)	Erasmus Research Institute of Management	Sustainability of freight transport

32	Nader, S.	2009	Illustrate the way governments can, through targeted investment, regulation and policies, create a framework for the transition to a low carbon, environmentally friendly, sustainable economic future	No	Masdar,(an initiative of the Government of Abu Dhabi, in the United Arab Emirates)	-	-	Empirical (case study)	Energy Procedia	Paths to a low-carbon economy
33	McKinnon &Piecyk	2009	Examines the difficulties encountered in trying to compile adefinitivenationalsetofCO2 emission values for road freight transport.	No	UK	Trucking operations	-	Review	Energy policy	CO 2 emissions from road freight transport
34	Kamakaté &Schipper	2009	Compares the energy intensity of truck freight in Australia, France,Japan,theUnitedKingdomandtheUnitedStatesfrom1973tothepresent.	No	Australia, France, Japan, United Kingdom and United States	Truck freight industry	-	Empirical (exploratory longitudinal)	Energy Policy	Truck freight energy use and carbon emissions
36	Timilsina &Shrestha	2009	Reviews existing governmentpoliciestolimitCO 2 emissions growth, such as fiscal instruments, fuel economystandardsandpoliciestoencourageswitchingtolessemissionintensivefuelsand transportation modes.	No	Asian countries	Transport Sector	-	Empirical (exploratory longitudinal)	Energy Policy	Transport sector CO 2 emissions
37	Sorrell et al	2009	Conductingaformaldecompositionanalysisofenergyuseforukroadfreightusingtenindividual key ratios plus GDP	No	United Kingdom	Transport Sector	Economic theory	Empirical (exploratory longitudinal)	Energy Policy	Road freight energy
38	McKinnon, A.	2010	Presents a framework for the decarbonisation of logistical activities based on five key freight transport parameters	No	UK	Warehouses & Logistics	-	Review	Electronic Scientific Journal of Logistics ISSN.	Green Logistics
39	Piecyk, &	2010	To determine the baseline	No	UK	Enablers	-	Empirical	International	Forecasting the

	McKinnon,		trends in logistics and supply chain management and associated environmental effects up to 2020.			,Retailers Academics, Trade Bodies, Policy Makers, Logistics Service Providers n Manufacturers		(exploratory longitudinal)	Journal of Production Economics	carbon footprint of road freight transport
40	Hickman et al	2010	Develops various policy packages, scenarios and pathways aimed at reducing transport CO2 emissions.	No	London/UK	Transportation industry	Game theory	Descriptive	Transport Policy	Transport and climate change
41	Rodrigue &Nottebo om	2010	Investigated dimensions comparatively with the implication for the respective functional freight regions.	Yes	North America and Europe	logistics	-	Empirical (survey and exploratory cross-sectional)	Journal of Transport Geography	Freight distribution
42	Gerolimini s, et al	2010	A new procedure for Regional Energy Clustering has been developed and demonstrated with a case study on CFP minimization and regional energy management	No	Hungary	Manufactures	-	Empirical (case study)	Resources, Conservation and Recycling	Biomass transportation network
43	Hua, H.	2010	Indicated the magnitude of the challenge confronting logistics managers as some organizations prepare their freight transport systems for a very low carbon world	No	China	logistic industry	-	Perspective	In E-Product E-Service and E-Entertainment (ICEEE), 2010 International Conference	Low Carbon Logistics in Railway period
44	Arıkan, Á., &Kovács	2010	To investigate the current and future implications of climate change, and in particular, energy efficiency	Yes	-	Road freight transport	-	Conceptual	International Journal of Physical Distribution &	Sustainable agenda and energy efficiency

			for logistics and supply chain management						Logistics Management	
45	Lam et al	2010	presents a new method for regional energy targeting and supply chain synthesis	No	Hungary	manufacturing firms	-	Empirical (modeling)	Computers & Chemical Engineering	Regional energy supply chains utilizing renewable
46	Sundarakani et al	2010	The objective of this article is to contribute to the knowledge and practice of measuring and controlling the carbon footprint across supply chain	Yes	-	Manufacturing Firms	Multi-Attribute Utility Theory	Empirical (modeling)	International Journal of Production Economics	Carbon footprints across the supply chain
47	McKinnon, A. C.	2010	Examine the practical problems and costs associated with highly disaggregated analyses of greenhouse gas emissions from supply chains.	Yes	-	Food industry	-	Review	Journal of Physical Distribution & Logistics Management	Product-level carbon auditing of supply chains
48	Lee et al	2010	This paper proposes a stochastic programming based approachtoaccountforthedesignofsustainablelogisticsnetwork underuncertainty.	No	Asia Pacific region	International electrical company	-	Empirical (case study)	International Journal of Production Economics	Sustainable logistic network
49	Lindholm, M.	2010	Investigates sustainable freight transport in urban areas from the perspective of the local authorities	No	Sweden	-	-	Review and Empirical (survey and exploratory cross-sectional)	Procedia-Social and Behavioral Sciences,	Urban freight transport
50	Bauer et al	2010	breaks away from such an approach by addressing the issue of incorporating environment-related costs (greenhouse gases, to be specific) into freight transportation planning	No	Belgium, France, Netherlands & Norway	shippers	-	Empirical (modeling)	Journal of the Operational Research Society	Intermodal freight transport

51	Evangelista et al	2010	To explore the range of initiatives that 3PLs are implementing to reduce the environmental impact of transport and logistics activities.	No	Spain and Ireland	Transport and Logistics Service Industry	-	Empirical (case study)	Conference papers in National Institute for Transport and Logistics	Green Supply Chains Initiatives in Transport
52	Čepinskis &Masteika	2011	Analyze the impacts of globalization, to emphasize the changes of green logistics centers in Lithuania.	Yes	Lithuania/Soviet Union	Transportation Industry	-	Empirical (survey and exploratory cross-sectional)	Environmental Research, Engineering and Management	Globalization on Green Logistics
53	Diabat&Govindan	2011	Identifying the various drivers of green supply chain management (GSCM)	No	India	Aluminum products manufacturing company	NA	Empirical (case study)	Resources, Conservation and Recycling	Green supply chain management
54	Ubeda et al	2011	Paper studies the decisions made at an operational level to reduce the environmental impact of transport activities at Eroski Group	No	Spain	Food distribution sector	-	Empirical (case study)	International Journal of Production Economics	Green logistics
55	Hua et al	2011	Examines the operations decisions in inventory management with a view to managing a firm's carbon footprints under the carbon emission trading mechanism	Yes	-	Production, transportation, and inventory operating companies	-	Empirical (modelling)	International Journal of Production Economics	Carbon footprint in inventory management
56	Lee, K. H.	2011	Improve understanding of carbon footprint within the context of automobile supply chain management.	Yes	Korea	Automobile industry	-	Empirical (case study)	Journal of Cleaner Production	Carbon footprint into supply chain management
57	Martinsen, U.	2011	To describe the extent to which green categories are taken into account in the logistics market	No	Sweden	Shippers	-	Empirical (exploratory longitudinal)	LiU-Tryck, Linköping	Green Supply and Demand on the Logistics

			and suggest explanations							Market
58	Wahab et al	2011	Develop the optimal production–shipment policy by minimizing the total expected cost per unit time in an international coordinated vendor–buyer green supply chain	No	Thailand	Electronics industry	-	Empirical (modeling)	International Journal of Production Economics	International supply chain and environmental impact
59	Bonney&Jaber	2011	Examines the relation of inventory to the environment and ,in particular, whether it is possible to create environmentally responsible inventory planning systems	Yes	-	International organizations	-	Empirical (modeling)	International Journal of Production Economics,	Environmentally responsible inventory models
60	Hitchcock , T.	2012	Discuss the growing supply chain pressures, both legal and commercial, the background to them and their implications	Yes	UK & China	Manufacturing companies	-	Review	Supply Chain Management: An International Journal	Low carbon and green supply chains
61	Geels, F. W.	2012	Introduce the multi-level perspective into transport studies and to show its usefulness through an application to the auto-mobility system	Yes	United Kingdom & the Netherlands	Transportation industry	Neo-institutional theory	Perspective	Journal of Transport Geography	A socio-technical analysis of low-carbon transitions in transport studies
62	Lai, & Wong,	2012	Making several important contributions to the literature on managing logistics with environmental considerations. First	No	China	Chinese manufacturing exporters.	Theory of structuration	Empirical (survey and exploratory cross-sectional)	Omega,	Green logistics management and performance:
63	Hassini et al	2012	To review sustainable supply chain management research, propose a unified conceptual frame- work for it, highlight the	Yes	Canada and US	Canadian electric utility	Performance management theory	Empirical (case study)	International Journal of Production Economics	Sustainable supply chains

			importance of reliable supply chain performance							
64	Tavasszy et al	2012	Focus is on the service and cost drivers of changes in logistics networks and how these affect freight transport	No	France and sweden	Ship industry	Neoclassical equilibrium theory	Conceptual	Transport Reviews,	logistics in freight transport demand
65	Dekker et al	2012	Presents a review that highlights the contribution of Operations Research to green logistics, which involves the integration of environmental aspects in logistics	Yes	-	Transportation Industry	Queuing theory	Empirical (survey and exploratory cross-sectional)	European Journal of Operational Research,	Green logistics
66	Bouchery et al	2012	to include Sustainable development criteria into inventory models	Yes	-	Production, Manufacturing and Logistics companies	-	Empirical (modelling)	European Journal of Operational Research	Sustainability into inventory models
67	Lammgård	2012	To examine the experiences of a large logistics provider in offering intermodal road-rail transport services, especially in connection with the company's environmental strategies.	No	Nordic countries	Bring Frigo transport company	Stakeholder theory, Institutional theory	Empirical (case study)	Research in Transportation Business & Management	Decarburization for logistics service providers
68	Liu et al	2012	Indicate high participation ratios of pre-classified ESAs even with weak regulation and limited support from industrial associations at present	No	China	Energy-consuming companies	institutional theory	Empirical (survey and exploratory cross-sectional)	Journal of Cleaner Production	Energy saving activities of industrial companies
69	Abdallah et al	2012	To develop a mixed integer program for the carbon-sensitive supply chain that minimizes emissions throughout the supply chain	No	US	Computer manufacture	-	Empirical (case study)	Applied Mathematical Modelling	Green supply chains with carbon trading

			by taking							
70	Absi et al	2013	Study multi-sourcing lot-sizing problems with carbon emission constraints.	Yes	-	Transportation Industry	-	Empirical (modelling)	European Journal of Operational Research	Lot sizing with carbon emission constraints
71	Benjaafar &Daskin	2013	To highlight the types of issues that arise when carbon footprint considerations are incorporated in supply chain management	Yes	-	Manufacturing Firms	-	Empirical (survey and exploratory cross-sectional)	Automation Science and Engineering, IEEE Transactions	Carbon footprint and the management of supply chains
72	Craig et al	2013	Providing useful guidance for shippers to estimate the potential reductions through modal shift and identify areas for intermodal operators to improve service.	Yes	North America	shippers	Market Areas and Central Place Theory	Empirical (modelling)	Transportation Research Part D: Transport and Environment	Intermodal Freight Transportation
73	Ye et al	2013	Study investigates the antecedents and outcomes of reverse logistic implementation through a large-scale study.	No	China	Manufactures	Institution al theory	Empirical (survey and exploratory cross-sectional)	International Journal of Production Economics	Top managers' posture and reverse logistics on performance
74	Suk et al	2013	Measures industrial energy saving activities (ESAs) in the Republic of Korea and identifies their determinant factors by a questionnaire survey to the energy-intensive companies	No	Korea	Energy-intensive companies	-	Empirical (survey and exploratory cross-sectional)	Journal of Cleaner Production	Energy saving activities of industrial companies
35	Walker et al	2014	Interaction of telematics and road vehicles and networks	Yes	-	Transport Sector	Graph Theory	Descriptive	Journal of Transport Geography	Road Vehicles And Networks
75	Arıkan et al	2014	To investigate the interrelationbetweenuncertaintyandtheeconomicandenvironm	Yes	UK	Shipper, a manufacturer or a retailer,	-	Empirical (survey and exploratory	International Journal of Production	Impact of transportation on the

			entalperformanceofsupply chains, aserialinventorysystemconsisti ngofamanufacturerwhoworks withoverseassuppliers			who works with overseas suppliers		cross-sectional)	Economics,	economic and environmental performance of inventory systems
76	Ramanath an et al	2014	Focusing on suppliers, logistics and retailers, for the purpose of improving the environmental sustainability of companies' SCs.	No	UK	Logistics and transport companies	-	Empirical (case study)	Journal of Cleaner Production	Green supply chains
77	Lammgård , & Yang	2014	To draw on several perspectives rarely used in reverse logistics (RL) research – such as sustainable development, the natural resource-based view and green innovation	No	Taiwan	Electrical, electronic and information industries, as well as maintenance and retail stores selling computers, communicatio ns and consumer electronics.	Institution al theory	Empirical (survey and exploratory cross-sectional)	Management Research Review	Reverse logistics
78	Zhang et al	2014	To investigate the interaction among the three logistics Players in a complete competitive logistics service market considering the location of logistics park and CO2 emission charge	Yes	-	logistic industry	Classical location theory, queuing theory	Empirical (modeling)	The Scientific World Journal	Decision Model for a Regional Logistics Network
79	Demir et al	2014	Provides a review of recent research on green road freight transportation	Yes	-	Transport Sector	-	Reviews	European Journal of Operational Research	Green road freight transportation

80	Sundarakani et al	2015	Study a lot-sizing problem with an emission constraint under concave cost and emission functions	Yes	-	Production, Manufacturing and Logistics companies	-	Empirical (modeling)	European Journal of Operational Research	lot-sizing problem with an emission capacity constraint

References

[1] Arıkan, E., Fichtinger, J., &Ries, J. M. (2014).*Impact of transportation lead-time variability on the economic and environmental performance of inventory systems.* International Journal of Production Economics, 157, 279-288.

[2] Abdallah, T., Farhat, A., Diabat, A., & Kennedy, S. (2012). *Green supply chains with carbon trading and environmental sourcing: Formulation and life cycle assessment*. Applied Mathematical Modelling, 36(9), 4271-4285.

[3] Absi, N., Dauzère-Pérès, S., Kedad-Sidhoum, S., Penz, B., & Rapine, C. (2013). *Lot sizing with carbon emission constraints.* European Journal of Operational Research, 227(1), 55-61.

[4] Ali, R. M., Jaafar, H. S., &Mohamad, S. (2008, August). *Logistics and supply chain in Malaysia: issues and challenges*. In EASTS International Symposium on Sustainable Transportation incorporating Malaysian Universities Transport Research Forum Conference, Johor (pp. 12-13).

[5] Aragon-Correa, J. A., & Sharma, S. (2003). *A contingent resource-based view of proactive corporate environmental strategy.* Academy of management review, 28(1), 71-88.

[6] Behrends, S., Lindholm, M., &Woxenius, J. (2008). *The impact of urban freight transport: A definition of sustainability from an actor's perspective.*Transportation planning and technology, 31(6), 693-713.

[7] Bauer, J., Bektaş, T., &Crainic, T. G. (2010).*Minimizing greenhouse gas emissions in intermodal freight transport: an application to rail service design*.Journal of the Operational Research Society, 61(3), 530-542.

[8] Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). *Impacts of climate change on the future of biodiversity. Ecology letters*, *15*(4), 365-377.

[9] Bonney, M., &Jaber, M. Y. (2011). *Environmentally responsible inventory models: Non-classical models for a non-classical era.* International Journal of Production Economics, 133(1), 43- Forsberg 53.

[10] Bouchery, Y., Ghaffari, A., Jemai, Z., &Dallery, Y. (2012).*Including sustainability criteria into inventory models*. European Journal of Operational Research, 222(2), 229-240.

[11] Benjaafar, S., Li, Y., &Daskin, M. (2013*). Carbon footprint and the management of supply chains: Insights from simple models.* Automation Science and Engineering, IEEE Transactions on, 10(1), 99-116.

[12] Bloemhuf-Ruwaard, J.M., P. van Beck, L. Hordijk, and L.N. van Wassenhove. 1995.“*Interactions between operational and environmental management*.”European Journal of Operational Research. 85 (2): 229-243.

[13] Čepinskis, J., &Masteika, I. (2011).*Impacts of Globalization on Green Logistics Centers in Lithuania*. Environmental Research, Engineering and Management, 55(1), 34-42.

[14] Craig, A. J., Blanco, E. E., &Sheffi, Y. (2013).*Estimating the CO 2 intensity of intermodal freight transportation*. Transportation Research Part D: Transport and Environment, 22, 49-53.

[15] Chaabane, A., Ramudhin, A., Paquet, M., &Benkaddour, M. A. (2008).*An integrated logistics model for environmental conscious supply chain network design.* AMCIS 2008 Proceedings, 175.

[16] Christopher, M. (2001).Logistics and competitive strategy. Understanding Business: Processes, 149.

[17] Cooper, M. C., Lambert, D. M., &Pagh, J. D. (1997). *Supply chain management: more than a new name for logistics.* The international journal of logistics management, 8(1), 1-14.

[18] Chapman, L. (2007). *Transport and climate change: a review.* Journal of transport geography, 15(5), 354-367.

[19] Capineri, C., Leinbach, T. R., & Gips, D. (2006).*Freight transport, seamlessness, and competitive advantage in the global economy*. European Journal of Transport and Infrastructure Research, 6(1), 23-38.

[20] Change, I. P. O. C. (2007). *Climate change 2007*: The physical science basis. *Agenda*, *6*(07), 333.

[21] Cubasch, U., G. A. Meehl, G. J. Boer, R. J. Stouffer, M. Dix, A. Noda, C. A. Senior, S. Raper, K. S. Yap, 2001: *Projections of Future Climate Change, in Climate Change 2001: The 66 Scientific Basis—Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 525–582, Cambridge Univ. Press, New York.

[22] Diabat, A., &Govindan, K. (2011).*An analysis of the drivers affecting the implementation of green supply chain management.* Resources, Conservation and Recycling, 55(6), 659-667.

[23] Dekker, R., Bloemhof, J., &Mallidis, I. (2012).*Operations Research for green logistics–* An overview of aspects, issues, contributions and challenges.European Journal of Operational Research, 219(3), 671-679.

[24] Demir, E., Bektaş, T., &Laporte, G. (2014). *A review of recent research on green road freight transportation.* European Journal of Operational Research,237(3), 775-793.

[25] Evangelista, P., Sweeney, E., Ferruzzi, G., & Carrasco, J. C. (2010). *Green supply chains initiatives in transport and logistics service industry: an exploratory case study analysis*.

[26] Forsberg, G. (2000). *Biomass energy transport: analysis of bioenergy transport chains using life cycle inventory method*. Biomass and Bioenergy, 19(1), 17-30.

[27] Frich, P., L. V. Alexander, P. Della-Marta, B. Gleason, M. Haylock, A. M. G. Klein Tank and T. Peterson, 2002: *Observed coherent changes in climatic extremes during the 2nd half of the 20th century*, Climate Research, 19, 193-212.

[28] Eijgelaar, E., Thaper, C., & Peeters, P. (2010). *Antarctic cruise tourism: the paradoxes of ambassadorship,"last chance tourism" and greenhouse gas emissions*. Journal of Sustainable Tourism, 18(3), 337-354.

[29] Geels, F. W. (2012). *A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies.* Journal of Transport Geography, 24, 471-482.

[30] Geroliminis, N., &Daganzo, C. F. (2005). *A review of green logistics schemes used in cities around the world.*

[31] Hassini, E., Surti, C., & Searcy, C. (2012). *A literature review and a case study of sustainable supply chains with a focus on metrics.* International Journal of Production Economics, 140(1), 69-82.

[32] Hansmann, K.W. and Claudia, K. (2001), "*Environmental management policies", in Sarkis, J. (Ed.), Green Manufacturing and Operations:* from Design to Delivery and Back, Greenleaf Publishing, Sheffield, pp. 192-204.

[33] Hesse, M., &Rodrigue, J. P. (2004).*The transport geography of logistics and freight distribution.* Journal of transport geography, 12(3), 171-184.

[34] Hesse, M. (2002). *Shipping news: the implications of electronic commerce for logistics and freight transport.* Resources, Conservation and Recycling, 36(3), 211-240

[35] Hickman, R., Ashiru, O., & Banister, D. (2010). *Transport and climate change: Simulating the options for carbon reduction in London*. Transport Policy, 17(2), 110-125.

[36] Helmrich, M. J. R., Jans, R., van den Heuvel, W., &Wagelmans, A. P. (2015). *The economic lot-sizing problem with an emission capacity constraint.*European Journal of Operational Research, 241(1), 50-62.

[37] Huang, Y. C., & Yang, M. L. (2014). *Reverse logistics innovation, institutional pressures and performance*. Management Research Review, 37(7), 615-641.

[38] Hesse, M. (2002). *Shipping news: the implications of electronic commerce for logistics and freight transport.* Resources, Conservation and Recycling, 36(3), 211-240.

[39] Hitchcock, T. (2012). *Low carbon and green supply chains: the legal drivers and commercial pressures.* Supply Chain Management: An International Journal, 17(1), 98-101.

[40] Houghton, J. T., Y. Ding, D. J. Griggs, M. Noguer, P. J. van der Linden and D. Xiaosu, editors, 2001*: Climate Change 2001: The Scientific Basis*, Cambridge University Press, 944 pp.

[41] Hua, G., Cheng, T. C. E., & Wang, S. (2011). *Managing carbon footprints in inventory management*. International Journal of Production Economics, 132(2), 178-185.

[42] Hickman, R., & Banister, D. (2007).*Looking over the horizon: transport and reduced CO 2 emissions in the UK by 2030*. Transport Policy, 14(5), 377-387.

[43] Hua, H. (2010, November). *A study of developing Chinese low carbon logistics in the new railway period.* In E-Product E-Service and E-Entertainment (ICEEE), 2010 International Conference on (pp. 1-4). IEEE.

[44] Halldórsson, Á.,&Kovács, G. (2010). *The sustainable agenda and energy efficiency:* Logistics solutions and supply chains in times of climate change.International Journal of Physical Distribution & Logistics Management, 40(1/2), 5-13.

[45] Ho, J. C., Shalishali, M. K., Tseng, T., & Ang, D. S. (2009). *Opportunities in green supply chain management.* The Coastal Business Journal, 8(1), 18-31.

[46] Jos, G. J. O., Greet. J. M., & Jeroen, A. H. W. P. (2012), *Trends in Global CO2 Emissions* 2012 Report.

[47] Kamakaté, F., &Schipper, L. (2009).*Trends in truck freight energy use and carbon emissions in selected OECD countries from 1973 to 2005.* Energy Policy, 37(10), 3743-3751.

[48] Kayikci, Y. (2010). *A conceptual model for intermodal freight logistics centre location decisions.* Procedia-Social and Behavioral Sciences, 2(3), 6297-6311.

[49] Lin, C. Y., & Ho, Y. H. (2011). *Determinants of green practice adoption for logistics companies in China*. Journal of business ethics, 98(1), 67-83.

[50] Liu, X., Niu, D., Bao, C., Suk, S., &Shishime, T. (2012).*A survey study of energy saving activities of industrial companies in Taicang, China*. Journal of Cleaner Production, 26, 79-89.

[51] Lai, K. H., & Wong, C. W. (2012). *Green logistics management and performance: Some empirical evidence from Chinese manufacturing exporters.*Omega, 40(3), 267-282.

[52] Lambert, D. M., Cooper, M. C., &Pagh, J. D. (1998). *Supply chain management: implementation issues and research opportunities.* The international journal of logistics Management, 9(2), 1-20.

[53] Lammgård, C. (2012). *Intermodal train services: A business challenge and a measure for decarbonisation for logistics service providers*. Research in Transportation Business & Management, 5, 48-56.

[54] Lindholm, M. (2010). *A sustainable perspective on urban freight transport: Factors affecting local authorities in the planning procedures*. Procedia-Social and Behavioral Sciences, 2(3), 6205-6216.

[55] Lam, H. L., Varbanov, P. S., &Klemeš, J. J. (2010). *Optimisation of regional energy supply chains utilising renewables*: P-graph approach. Computers & Chemical Engineering, 34(5), 782-792.

[56] Lee, D. H., Dong, M., &Bian, W. (2010).*The design of sustainable logistics network under uncertainty*. International Journal of Production Economics,128(1), 159-166.

[57] Lam, H. L., Varbanov, P., &Klemeš, J. (2010). *Minimising carbon footprint of regional biomass supply chains*. Resources, Conservation and Recycling,54(5), 303-309.

[58] Lee, K. H. (2011). *Integrating carbon footprint into supply chain management: the case of Hyundai Motor Company (HMC) in the automobile industry.* Journal of Cleaner Production, 19(11), 1216-1223.

[59] McKinnon, A. (2007). *CO2 emissions from freight transport: an analysis of UK data*. Logist.Res. Netw.-2007.

[60] McKinnon, A. C., &Piecyk, M. I. (2009). *Measurement of CO 2 emissions from road freight transport: a review of UK experience*. Energy policy, 37(10), 3733-3742.

[61] Martinsen, U. (2011). *Green Supply and Demand on the Logistics Market.*

[62] McKinnon, A. C. (2010). *Product-level carbon auditing of supply chains: Environmental imperative or wasteful distraction?*. International Journal of Physical Distribution & Logistics Management, 40(1/2), 42-60.

[63] McKinnon, A. (2010). *Green logistics: the carbon agenda. Heriot-Watt University, Edinburgh, United Kingdom*.Electronic Scientific Journal of Logistics ISSN.

[64] Nader, S. (2009). *Paths to a low-carbon economy—the Masdarexample*.EnergyProcedia, 1(1), 3951-3958.

[65] Nemoto, T., Browne, M., Visser, J., &Castrp, J. (2006, August).*Intermodal transport and city logistics policies.In Recent Advances in City Logistics.*The 4th International Conference on City Logistics.

[66] Pastowski, A. (1997). *Decoupling economic development and freight for reducing its negative impacts (No. 79).*Wuppertal papers.

[67] Piecyk, M., & McKinnon, A. C. (2007).*Internalising the external costs of road freight transport in the UK. Logistics Research Centre*: Heriot-Watt University, Edinburgh.

[68] Piecyk, M. I., & McKinnon, A. C. (2010).*Forecasting the carbon footprint of road freight transport in 2020*. International Journal of Production Economics,128(1), 31-42.

[69] Quak, H. J., & De Koster, M. B. M. (2007).*Exploring retailers' sensitivity to local sustainability policies.* Journal of Operations Management, 25(6), 1103-1122.

[70] Quak, H. (2008). Sustainability of urban freight transport: *Retail distribution and local regulations in cities (No. EPS-2008-124-LIS).*Erasmus Research Institute of Management (ERIM Martinsen).

[71] Ramudhin, A., Chaabane, A., Kharoune, M., &Paquet, M. (2008, December).*Carbon market sensitive green supply chain network design.*In *Industrial Engineering and Engineering Management, 2008.IEEM 2008. IEEE* International Conference on (pp. 1093-1097). IEEE.

[72] Rodrigue, J. P., Slack, B., &Comtois, C. (2001).*Green logistics (the paradoxes of).* The Handbook of Logistics and Supply-Chain Management, 2.

[73] Rodrigue, J. P., &Notteboom, T. (2010). *Comparative North American and European gateway logistics: the regionalism of freight distribution*. Journal of Transport Geography, 18(4), 497-507.

[74] Rao, P., & Holt, D. (2005). *Do green supply chains lead to competitiveness and economic performance?*. International Journal of Operations & Production Management, 25(9), 898-916.

[75] Ramanathan, U., Bentley, Y., & Pang, G. (2014). *The role of collaboration in the UK green supply chains: an exploratory study of the perspectives of suppliers, logistics and retailers.* Journal of Cleaner Production, 70, 231-241.

[76] Reyes, P., Raisinghani, M. S., & Singh, M. (2002). *Global supply chain management in the telecommunications industry: the role of information technology in integration of supply chain entities.* Journal of Global Information Technology Management, 5(2), 48-67.

[77] Romm, J., Levine, M., Brown, M., & Petersen, E. (1998). *A road map for US carbon reductions*. SCIENCE-NEW YORK THEN WASHINGTON-, 669-670.

[78] Sathaye, N., Harley, R., &Madanat, S. (2010). *Unintended environmental impacts of nighttime freight logistics activities.* Transportation Research Part A: Policy and Practice, 44(8), 642-659.

[79] Schipper, L., Murtishaw, S., Khrushch, M., Ting, M., Karbuz, S., &Unander, F. (2001). *Carbon emissions from manufacturing energy use in 13 IEA countries: long-term trends through 1995*. Energy Policy, 29(9), 667-688.

[80] Saldanha, J., &Gray, R. (2002). *The potential for British coastal shipping in a multimodal chain.* Maritime Policy & Management, 29(1), 77-92.

[81] Sorrell, S., Lehtonen, M., Stapleton, L., Pujol, J., & Champion, T. (2009).*Decomposing road freight energy use in the United Kingdom.* Energy Policy,37(8), 3115-3129.

[82] Suk, S., Liu, X., &Sudo, K. (2013).*A survey study of energy saving activities of industrial companies in the Republic of Korea*. Journal of Cleaner Production,41, 301-311.

[83] Schipper, L., Scholl, L., & Price, L. (1997). *Energy use and carbon emissions from freight in 10 industrialized countries: an analysis of trends from 1973 to 1992*. Transportation Research Part D: Transport and Environment, 2(1), 57-76.

[84] Sundarakani, B., De Souza, R., Goh, M., Wagner, S. M., &Manikandan, S. (2010). *Modeling carbon footprints across the supply chain.* International Journal of Production Economics, 128(1), 43-50.

[85] Shimada, K., Tanaka, Y., Gomi, K., & Matsuoka, Y. (2007).*Developing a long-term local society design methodology towards a low-carbon economy: An application to Shiga Prefecture in Japan*. Energy Policy, 35(9), 4688-4703.

[86] Samuel, V. B., Agamuthu, P., & Hashim, M. A. (2013). *Indicators for assessment of sustainable production: A case study of the petrochemical industry in Malaysia*. *Ecological Indicators*, *24*, 392-402

[87] Sandhu, S., Smallman, C., Ozanne, L. K., & Cullen, R. (2012). *Corporate environmental responsiveness in India: lessons from a developing country*.Journal of Cleaner Production, 35, 203-213.

[88] Sarkis, J. (2003). *A strategic decision framework for green supply chain management*. Journal of cleaner production, 11(4), 397-409.

[89] Sheu, J. B., Chou, Y. H., & Hu, C. C. (2005).*An integrated logistics operational model for green-supply chain management.* Transportation Research Part E: Logistics and Transportation Review, 41(4), 287-313.

[90] Sohail, M. S., &Sohal, A. S. (2003). *The use of third party logistics services: a Malaysian perspective.* Technovation, 23(5), 401-408.

[91] Srivastava, S. K. (2007). *Green supply-chain management: a state-of-the-art literature review.* International journal of management reviews, 9(1), 53-80.

[92] Tavasszy, L. A., Ruijgrok, K., &Davydenko, I. (2012). *Incorporating logistics in freight transport demand models: state-of-the-art and research opportunities*.Transport Reviews, 32(2), 203-219.

[93] Timilsina, G. R., &Shrestha, A. (2009). *Transport sector CO 2 emissions growth in Asia: underlying factors and policy options.* Energy Policy, 37(11), 4523-4539.

[94] Ubeda, S., Arcelus, F. J., &Faulin, J. (2011). Green logistics at Eroski: A case study. International Journal of Production Economics, 131(1), 44-51.

[95] Van Hoek, R. I. (1999). *From reversed logistics to green supply chains.* Supply Chain Management: An International Journal, 4(3), 129-135.

[96] Vanek, F. M., &Morlok, E. K. (2000).*Improving the energy efficiency of freight in the United States through commodity-based analysis: justification and implementation.* Transportation Research Part D: Transport and Environment,5(1), 11-29.

[97] Verweij, M., Douglas, M., Ellis, R., Engel, C., Hendriks, F., Lohmann, S. & Thompson, M. (2006). *Clumsy solutions for a complex world: the case of climate change*. Public administration, 84(4), 817-843.

[98] Tavasszy, H., Di Sisto, L., &McBain, D. (2008). *Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors*. Journal of purchasing and supply management, 14(1), 69-85.

[99] Wahab, M. I. M., Mamun, S. M. H., &Ongkunaruk, P. (2011). *EOQ models for a coordinated two-level international supply chain considering imperfect items and environmental impact.* International Journal of Production Economics,134(1), 151-158.

[100] Walker, H., Di Sisto, L., & McBain, D. (2008). *Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors*. Journal of purchasing and supply management, 14(1), 69-85.

[101] Walker, G., & Manson, A. (2014). *Telematics, urban freight logistics and low carbon road networks.* Journal of Transport Geography, 37, 74-81.

[102] Wee-Kean, F., Hiroshi, M., Chin-Siong, H., and Yu-Fat, L. (2009*), Energy Consumption and Carbon Dioxide Emission Considerations in the Urban Planning Process in Malaysia.*

[103] Winebrake, J. J., Corbett, J. J., Falzarano, A., Hawker, J. S., Korfmacher, K., Ketha, S., &Zilora, S. (2008). *Assessing energy, environmental, and economic tradeoffs in intermodal freight transportation.* Journal of the Air & Waste Management Association, 58(8), 1004-1013.

[104] Wu, H. J., & Dunn, S. C. (1995).*Environmentally responsible logistics systems*. International Journal

of Physical Distribution & Logistics Management, 25(2), 20-38.

[105] Ye, F., Zhao, X., Prahinski, C., & Li, Y. (2013). *The impact of institutional pressures, top managers' posture and reverse logistics on performance—Evidence from China*. International Journal of Production Economics, 143(1), 132-143.

[106] Zhang, D., Li, S., & Qin, J. (2014). *An Optimal Hierarchical Decision Model for a Regional Logistics Network with Environmental Impact Consideration.* The Scientific World Journal, 2014.

[107] Zhu, Q., Sarkis, J., & Geng, Y. (2005). *Green supply chain management in China: pressures, practices and performance*. International Journal of Operations & Production Management, 25(5), 449-468.