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Green Supply Chain Management Practices among Large Global Corporations

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Abstract

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Nowadays, environmental problems are continually increasing through uncontrolled business activities. As long as businesses are under huge pressure by the environmental corporations, they should adopt green supply chain management practices in order to minimize their adverse effects on the environment. In this framework, the green supply chain is considered as an essential and important factor that aims at securing an effective, successful and smooth cooperation between the stakeholders and the different stages among them. The scope of this study is to realize the situation of sustainable supply chain management practices among the global large corporations. Many organizations have initiated green sustainability practices in their strategic management activities in order to become more competitive and acquire great benefits. Large global corporations with their customers and suppliers have huge societal environmental and economic effects. Due to this fact the comprehension of their green supply chain practices will help us understand what is necessary to be done according to the current corporate sustainability management.

Keywords: Green Logistics, Green supply chain management, environmental practices

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Introduction

The concept of environmental protection is becoming increasingly important, which means that businesses are increasingly turning to the redesign of logistics systems for the supply chain to make a positive contribution to reducing environmental degradation while reducing costs and maintaining the best level of customer service. Furthermore, the starting point of any supply chain is the consumer, who apart from the need to obtain quality goods and services at the right time, the right place and the amount it wishes, has the need to satisfy the above this need in a sustainable and safe environment.

Making a throwback to the '90s, the decade was characterized as the "decade of the earth" because it was a period of acceptance of the importance of the natural environment for business and society, we observe that the one side studies that introduced the concept of sustainable development in public debate and provided practical environmental management tools and on the other hand, focused exclusively on issues of ecological sustainability and conservation of natural resources. Consequently, not all grappled with wider economic, social and political issues, which are closely linked to the objective of environmental protection. It is a decade research on environmental issues in logistics is minimal but with potential to extend, as in the literature before the 1990s there was practically an investigation (McKinnon, 1995).

Essentially the transport industry was limited to issues of finding and developing new markets while the traditional logistics of that era transitioned into new areas such as those in the recycling and waste management, without emphasis is based on environmental issues during the design of systems thereof (Poist, 1989). It is expected, the transport industry and businesses to overlook issues related to environmental pollution, traffic congestion, waste of natural resources are committed to the economic interests and the ways in which they could increase their profits.

Considering the above, we conclude that in the 21st century, the logistics sector was far from designated "green." Environmental surveys usually met on issues related markets (Carter and Dresner, 2001) while significant steps were made in the upcoming years with the introduction of the concept of reverse logistics and especially recycling products. It is

noteworthy that in the late 90s it was developed the allegation that the reverse logistics can be used to increase the competitiveness of the business to gain a competitive advantage in the market (Marien, 1998). This theory suggests that actions and practices that adopt business and that are environmentally friendly (eg. Reverse Logistics) can be a source of a competitive advantage (Menon and Menon, 1997). Yet even today, as it will be explained below there are several areas which are called upon to meet the green logistics.

“Green logistics is defined as a logistics system compatible with the environment, environmentally friendly and efficient” (Jean-Paul Rodrigue et al, 2001). In recent years, even in our country, industries administrations and commercial companies have begun to integrate their strategy on a broader strategic environmental policy. These administrations, as Third Party Logistics companies and Transporting ones, are asked to identify the sources of pollution throughout the supply chain and to deal effectively not only because they are obliged to, but also because it is more economical through saving money, or through the competitive advantage that they gain in terms of corporate governance (Remko I. Van Hoek, 1999). The purpose of this study is to investigate and determine the rate of implementation of green practices in the Greek industry as well as to highlight the evaluation of such practices from companies that apply them.

In the current modern business environment an enterprise cannot be isolated and operate independently. It is necessary to be informed on the consumers' needs and be flexible under current economic fluctuations. An additional critical factor that should be taken into consideration by corporations is the transport cost of their raw materials and products to the final consumer. This is crucial to improve the management of their cash funds and to meet the challenges arising from the globalization of the economy and the global division of labor. Large global corporations intend to establish an initial measurement of the explanation of the current supply chain management practices and expect that future companies will use better practical performance reports. This research investigates how some large global corporations are contributing to the sustainability movement and how significant are their efforts in the framework of green supply chain management.

Chapter 1: Literature Review

The supply chain is the subject of interdisciplinary research. Sustainable Supply Chain is defined as the flow of materials, information and services from raw material suppliers through the installation of the factory to end customers. It is trying to improve the supply chain partners of the company and its long-term performance. It is obvious that from the time when societies started to trade, the sense of logistics support of the traded goods was developed between them. Although supply chain practices have been used for thousands of years, the appropriate prominence and relevance to these practices was given only in the recent past and thus the term “supply chain management” was created. In the global literature there is a large number of studies on the green supply chain management practices and how they are applied at the corporate level. The factors that drive businesses to adopt environmental practices in logistics, as well as the obstacles that have adverse impacts on the environmental business progress are analyzed in this study.

1. Global warming and Supply chain management

Global warming is widely known as the global temperature increase due to the continuously rising levels of infrared radiation trapped in the atmosphere, the so-called "greenhouse effect". The impacts of global warming are both social and economic. The social impacts involve water and food shortages along with significant health implications. Water shortages are mainly due to the reduction of rainfalls, and the accelerated evaporation due to global warming. Food shortages are mainly due to the extreme weather events that destroy crops. Finally, health implications involve heat stress, injury and deaths from natural disasters, vector as also water and food borne diseases (Earthwatch, 2013).

The economic impacts of global warming are mainly due to extreme weather events and involve (i) destruction of private property and infrastructure, such as buildings, airports, railways, roads, sea walls, power lines etc. (ii) losses in productivity due to disruptions in trade, transportation, energy production, fisheries, agriculture and tourism and (iii) mass migration of refugees forced to leave their homes due to droughts, flooding and other extreme events (Climate Hot Map, 2011).

Global warming and its associated social and environmental impacts, along with the extremely high resource depletion rates resulting from the consumption attributed to recent economic growth, have drastically changed society's perception on the role of companies. As a result, companies are now not only evaluated by their profitability or the quality of their products and services, but also by their environmental and social responsibility (Ministry of Labor and Social Security, 2008).

The last decade, a vast number of detractor campaigns were made against multinational companies, forcing them to recognize and accept that they are not so socially and environmentally sensitive. Societies have started realizing the necessity for the sustainable development of corporations, and as a result, companies gradually employed a systemic and strategic approach towards CSR (Ministry of Labor and Social Security, 2008).

In 2001 the EU established the basis for promoting an EU framework for corporate social responsibility through the proposal of the Green Paper (European Commission, 2001). The purpose of the Green Paper was to: (i) provide an EU framework, that promotes the quality and coherence of CSR practices, through the development of broad principle approaches and tools, while promoting better practices and innovative ideas, and (ii) support the best practice approaches to the cost-effective evaluation and independent verification of CSR practices, ensuring thereby their effectiveness and credibility. As a result, numerous EU countries obliged their companies to publish data on the environmental and social issues associated to their operations

The EU defines CSR «as a concept whereby companies integrate social and environmental concerns into their business operations and into their interaction with their stakeholders on a voluntary basis». Another definition of CSR is provided by the benchmark foundation. They state that: «CSR is the decision-making and implementation process that guides all company activities in the protection and promotion of international human rights, labor and environmental standards and compliance with legal requirements within its operations and in its relations to the societies and communities where it operates CSR involves a commitment to contribute to the economic, environmental and social sustainability of communities through the on-going engagement of stakeholders,

the active participation of communities impacted by company activities and the public reporting of company policies and performance in the economic, environmental and social arenas» (Emmet and Sood. 2010).

Consumers are also interested in the social and environmental impact of the products and services provided by corporations. In Europe, a vast number of consumers state that the CSR of a company significantly affects their purchasing decisions and one in five consumers are willing to pay more for more environmentally and socially responsible products. On the same basis, employees are more interested in the social behavior of their employers. It is a fact that socially responsible companies also manage to retain their best employees compared to other companies (Ministry of Labor and Social Security, 2008).

To this end, and as the economic crisis has significantly affected consumer trust in companies, the EU has developed a renewed 2011-2014 strategy for CSR, that aims to favor sustainable growth, responsible business behavior and durable employment in the medium and long term and therefore restore consumers trust in companies (European Commission, 2011).

1.1 Environmental impact of supply chain operations

The worldwide economic growth of the last century along with globalization, has altered significantly the traditional landscape of global trade, contributing significantly to the amount and nature of the physical distribution of goods (Hesse and Rodrigue, 2004). This has resulted in the development of extensive and complex supply chain networks that connect distant production locations with various demand points around the world. Cost minimization of supply chain operations is undeniably the most important objective for supply chain network design today. Large container vessels, port facilities, distribution centers, as well as block trains and barges, are employed to minimize transportation and storage costs per unit through the exploitation of economies of scale. However, the increasing transportation volumes, due to the worldwide economic growth, have resulted in the release of large amounts of greenhouse gases affecting climate change globally. Between 1990 to 2007 global CO₂ emissions from transport have grown by 45% (OECD/ITF, 2010). These emissions contribute to global warming resulting in various

external costs. Specifically in the EU these costs amounted to more than €115 billion, or 0.92% of the total GDP in 2008.

Road transport modes have by far the largest share in these costs. To be more specific, trucks have a 13% contribution, aviation has about 5%, although only intra-EU flights are taken into account, rail transport is responsible for less than 2% and inland shipping for only 0.3% (Essen et al , 2011). Based on this, greener transportation modes could be employed and intermodal transportation concepts could be applied along with the use of renewable fossil fuels such as biogas, in order to minimize the environmental impact of the transportation and distribution operation of global supply chains.

Moreover, the mass consumption of products along with the need for innovative, and better quality products that are characterized by continuously decreasing life cycles, has resulted in the production of huge product quantities (Xanthopoulos et al, 2010). This has in turn resulted in the generation of larger amounts of greenhouse gas emissions along with the depletion of a large amount of natural resources.

Another very important issue involves the pollution generated from the uncontrolled disposal of these products at the end of their lifecycles, since they could include hazardous and toxic substances that could be harmful to human health (i.e. lead, cadmium, chrome and barium). Based on the above, the development of non-polluting production processes, the design of products with environmental (recyclable) components and the development of techniques and processes for their recovery and waste management is imperative.

1.2 The usability of “Green” in Logistics

In recent years the situation of the global economy is changing dramatically. From an optimistic it is directed towards an aggravation and an extremely severe recession. In this challenging economic climate, businesses engage in coordinated procedures optimization of processes and strict control of expenditure, with a view to adapting them to the changes underway. So the activities and programs that reduce costs play an important and crucial role. As time passes there is a moving interest form the “green consumer” to “responsible retailer”, where the retailer / service provider and owner of a company takes

responsibility to ensure that consumers can buy products and services with confidence that the company meets the correct specifications in their production.

2. Green Logistics

The introduction of the concept of green logistics came from the need to expand the business into new markets and thereby expanding consumer requirements have become more environmentally conscious and sensitive than before (Hoek, 1999). The ever increasing pressure from various environmental organizations, the tightening of international environmental law, the "explosion" of environmental regulations in the transport and delivery of products combined with the undeniable impact of logistics to phenomena such as climate change, analyzed in the previous section have made necessary and immediate need for introduction of ecological awareness in the industry of transportation and goods' distribution (Cooke, 1991).

The management of "green" supply chain (Green Supply Chain Management, GSCM) aims to all those environmentally friendly management processes such as input of raw materials and products that can be reused at the end of their life cycle in such a way so as to create a sustainable integrated supply chain (Patrick Penfield, 2007).

The Green supply chain embraces systems of the "green" logistics (Green Logistics) which are not aimed at reducing the total cost of the system, such as supply chain, but reduce operating costs. This objective is carried out through the design, implementation and controlling the effective flow and storage of materials and products, operating ecologically and using environmentally friendly means and practices. The green logistics, being the result of the union between the environmentally friendly and compatible business practices, have been developed largely because through minimizing costs and offering benefits to the environment. As is only natural, the green logistics mainly affect two main functions of a logistics system: the storage and transport of raw materials and finished products, through the adoption of ecological and economic practices.

In addition to the main processes that are included a logistics system such as the transportation of goods, warehousing, inventory management and ordering, there have been added other important processes in the most recently Green Supply Chain. The procedures that have been added to the new type of supply chain involve recycling, remanufacturing, reuse, dismantling and return of products.

Essentially, green supply chain is to integrate environmental thinking of consumers caused by the ongoing environmental degradation and linked to product design, selection of non-harmful materials for the environment as raw materials to produce finished products, the contribution of industrial treatment aimed at reducing the negative consequences for the environment, better planning of the transmission system and product management and after their end of life. Therefore, the human need for a cleaner environment with better living conditions and the growing demand for control of the ways in which the globalized supply chains affect the environment contributed to the creation of the industry of the Green Supply, known as Green Logistics. For this reason, the Green Logistics integrates environmentally conscious transport, the management of dangerous goods and the returned goods, the use of appropriate packaging, energy consumption and the use of natural resources.

2.1 Reverse Supply Chain and Environment

The trends of the time imposed in modern productive enterprise, both to ensure continuous and reliable competitive advantage and create a strategic development and operation friendly to the customer. The simple logic and international customer service standards, say that if a product does not meet customer requirements whether they are expressed or not, then the company must take action and rectify (Xanthopoulos, 2010). Most customers the remedial actions they wish to include the return and replacement of unsatisfactory product. This requires on the part of enterprise the responsibility for the collection and transport of returned products, storage and logistics settlement as well as their decisions about further handling. It is estimated that these costs can reach up to 7% of the sales of a business. Many companies attempt to costing the management assumption of the returned products have decided not to accept returns. Others to have controlled cost appealed to their partners in the supply chain and asked for coverage with fixed costs. Within this context the term of the Reverse Logistics was born (Reverse Logistics) covering the activities and practices regarding the recovery and exploitation used products, parts and materials (Rogers et al, 1999).

The features include the Reverse Supply Chain is chronologically the collection, testing, sorting, storage, volume reduction (condensation), processing and reconstruction. In other words the term Reverse Supply Chain mean the opposite direction of the flow of goods starting from production and storage points of final destination consumers, now carried by consumers to businesses and warehouse.

Companies applying the reverse logistics can achieve several direct or indirect profits. The indirect profits come from the reduction of costs. This is because there is no longer the need, to a certain extent, of capital allocation to raw materials, other parts and components. Therefore, these amounts of capital remain in the company and can be spent for other purposes. On the other hand, direct profits come from the direct product sales. Apart from the direct and indirect profits of enterprises, the application of reverse supply chain leads to benefits for the natural environment. Environmental management is gaining interest in the field of logistics. The green image of environmentally friendly production products became an important marketing element which incited a group of companies to explore options to recover and restore their products. In addition, the introduction of a structural grid that requires manufacturing companies to engage more strongly in the reverse part of the supply chain is essential. The aim of the legislation on a global scale is the protection and improvement of environmental quality (Zikopoulos & Tagaras, 2015). Placing both unwanted products and waste is becoming a more and more controlled activity.

2.2 Green Vs Reverse logistics

At this remarkable point there is the reference to the distinction between the reverse and green supply chain taking into account what has been said about the functions of each. Reverse logistics, essentially includes all efforts to move the goods from the consumer to the manufacturer, in order to recover the value of the product. Green logistics relates to understanding and minimizing the environmental impacts of logistics as well as to measure the environmental impact of transport modes, certification to ISO 14001, which will be analyzed in the next chapter, the energy use reduction of logistics and reduce activities material use. Nevertheless, some activities can be classified as part of reverse logistics. For example, the use of reusable packaging materials and recycling are two

issues combined green and reverse logistics. But not the same in many activities of green logistics, such as reducing energy consumption, or the design of a package that requires less Package and, factually not reverse logistics activities.

2.3 How the Green Logistics work

The imbalance of the natural environment from human activities was the result of the term development. Objective governments, politicians, citizens and business was ongoing and unequivocal economic growth, in light of the well-being of human societies and entities operating within them. Through this perspective the economy being considered as an autonomous system and each criticism was, concerned the results of the economy in society, without regard to the effect it would have the policy applied to the natural environment. Undoubtedly, the emergence of phenomena such as global warming, air pollution in major urban centers, mainly due to the growth in road transport through which 44% of products and 78% of people traveling and the depletion of natural resources, was the trigger revision of the concept of development and the means by which this is achieved (Gerolimidis and Daganzo, 2005). The environmental dimension became part of the visa of policies and their objectives. In addition, a growing piece of research, began to turn first to investigate the environmental impact of various activities and secondly to develop technological solutions that could limit or even reverse the destruction of the environment (Emmett and Sood, 2010).

The various environmentally friendly technologies are an integral part of life in developed countries. Often develops the illusion that their adoption is the only means with which to preserve the environment. Similarly, the creation of a "green" logistics system seen as a challenge to integrate green technology into existing systems. While it is obvious that new technologies are needed to achieve various environmental objectives, while clearly not sufficient to maximize the environmental benefit. Necessary to achieve the best possible result is to change mindsets and integrating the environmental dimension at every stage of the supply chain. In other words, it suffices to use new tools and technologies for the operation of the supply chain, but it is necessary to redesign this with a different approach, that encapsulates the environment as isobaric with the objective of financial gain. The development of reverse supply chain was perhaps the

clearest example of incorporating green concepts in philosophy of logistics. While in a classic supply chain case study is the flow of goods and information from the producer to the final consumer in a reverse supply chain provision is made for value recovery through the flow from the consumer to the producer.

Where the reverse logistics are integrated in a classic supply chain, the term closed loop supply chain is used (Dekker et al, 2012). The backflow may concern a wide range of goods, from packaging materials to products that have completed their life cycle. This option although may incorporate new technologies, is not due or based entirely on them. It is the "product" of a different treatment of things that is a different philosophy that can give spectacular results in the effort to protect the environment. It is accepted that technological developments offer stakeholders (businesses, government and consumers) a great "privilege" to fight for a better environment. In general, the technology that can be used can be divided into two broad general categories. The first concerns the improvement of conventional and widely used technologies. Indicatively, this category includes the improved internal combustion engines that consume less fuel and emit reduced emissions without reducing their power (Beltramello, 2012).

The second major category includes new, "exotic" technological developments. Examples of such developments are the various "metamaterials" and hydrogen technologies. Metamaterials are materials with properties not found in nature. Made first theoretically and then in the laboratory. Hydrogen technologies, although known for decades, only recently became the subject of thorough research, and offer the ability to store large amounts of energy in a practically inexhaustible medium, hydrogen, which together have zero emissions. Often referred predicting that the current century will be the century of hydrogen (Golinska et al, 2012).

Despite many different ways to create logistics systems are environmentally correct, the first and crucial step to create them is the decision. The choice of ways and means, implementation, monitoring and evaluation post and specialized according to each organization. The stage of the decision, however, largely determines the whole process, and this includes the motivations and objectives that will determine the form of

intervention. The reasons that lead to the adoption of a green logistics system can be divided into three major categories:

- Cost reduction / recovery value
- Consumer Requirements / Competition
- Government policy

3. Green practices

3.1 Green products

The design of green product focuses on production processes in an environmentally-friendly standards. Manufacturers of products must adopt green production methods and take into account environmental factors during selection of raw materials. On the part of the retailer must take into account in the process of supply of products not only the extent to which a product is green and whether environmentally friendly is the packaging. The retailer who must stimulate the producer to move towards "green street", choosing mainly products are a result of a green supply chain (Xuezhong, Linlinb, Chengbo, 2011). It is possible to separate the green product design methods in the following categories:

- Products made from recycled or remanufactured materials
- Products that can be reused or reconstructed
- Products with packaging environmentally friendly
- Products that are suitable to be handled in reverse supply chains as well as in their design process followed the optimum assembly procedure in order to provide the desired degree of recovery of their value (Mallidis & Vlachos, 2010).

The implementation of green logistics to green procurement is related to the selection of supply chain stakeholders in order to "move" based on environmental credentials and environmental standards. The main objective is to create environmental consumer awareness to increase demand for green products. This will allow mobilization of the industry towards the implementation of more environmentally friendly production and distribution processes. It has been observed that the consumer demand for green products gradually pushes large number of producers and intermediary parties in adopting environmental management standards such as ISO 14001 (Mallidis & Vlachos 2010).

3.2 Green transportation and distribution

In light of the green network, the effect of locating production units and distribution centers, in relation to the emission of the transmission system. For example, the operation of a distribution center near a demand point, minimizing the distances to travel are called environmentally unfriendly road vehicles. In turn, this practice contributes to the reduction of various emissions from the system. The parts mounting practice of the production process close to the markets they serve, called near-shoring, in contrast to the term off shoring describing the production process in remote locations. The near-shoring offers the advantage of smaller distances traveled and therefore smaller emissions from the transport process (Mallidis & Vlachos 2010).

The product distribution network comprises four transport directions: from the producer to the retailer, from the producer to the retailer through 3PL, from the retailer to the final consumer and the retailer to the final consumer through 3PL. Manufacturers, retailers and 3PL normally follow a common agreement in order to achieve better coordination of transport of goods (Xuezhong et al, 2011).

3.3 Energy efficient transportation

The modern internal combustion engine technology and hybrid systems contribute significantly to reducing pollutants, the PMs, and greenhouse gases. Procurement of vehicles having such properties can both reduce the negative impact of logistics on the environment and to reduce fuel consumption. Alternatively, the uptake of vehicles with improved aerodynamic characteristics can reduce fuel consumption by 10 to 20% (Beltramel, 2012). Promoting the use of "green vehicles" depends not only businesses but also from government support as the cost of acquiring energy efficient fleet is much larger than that for the purchase of conventional transport vehicles. Governments must not only enforce environmental standards in transport fleets and control of pollutants emitted by them but also to allow subsidies of vehicles, and to strengthen the incentives for market-friendly transport environment (Xuezhong et al, 2011).

Much of the freight is carried by road. The problem of organization and routing a fleet so as to reduce transport costs and increase the level of service is called vehicle routing and

scheduling problem. A wide variety of software packages that generate schedules and programs, including information about the location of vehicles, the time of arrival, the staff use, the type of vehicle and information about entering, while achieving substantial reduction of overall transport costs. This cost reduction is achieved mainly through the reduction of unnecessary distances traveled by vehicles. Correspondingly, reduces fuel consumption and gas emissions while the entire system of logistics can be controlled via the electronic information system. In addition, "difficult" routes, such mainly through traffic congested urban centers are planned for periods during which the time, cost and environmental impact of transportation is minimized (Mallidis & Vlachos 2010).

3.4 Green warehousing

The heating of warehouses is achieved predominantly through oil or gas usage, while cooling through electricity consumption. The energy needs for heating and cooling are mainly determined by two factors:

- The temperature required for the preservation of stored goods in satisfactory condition. This need can specify maximum and minimum levels of temperature as well as humidity control.
- The ambient temperature inside of the warehouse so that the staff can work in conditions of comfort in relation to the nature and location of his duties. Significant savings can be achieved:
- By using doors and partitions 'tight' application, leaving no crevices, and rapid response to frequent door entry and exit positions of forklift trucks. With the separation of inlet and outlet positions from positions other activities.
- By creating zones controlled by different thermostats and using time-controlled thermostats.

Additionally, efficient lighting in terms of cost, energy consumption and emissions is the most important energy management sector in a warehouse. The lighting has a significant impact on the environment is based on electricity and regular cleaning of ceiling lights can greatly improve the lighting efficiency of warehouses. Moreover, the adoption of a strategy to change the bulbs on the average life and not the end of the shelf life

recommended, as it improves energy efficiency. Finally, the use of high-efficiency lamps may generate benefit even more than 20% (Mallidis & Vlachos 2010).

Green storage includes all those practices that aim to reduce the adverse environmental impact caused by the warehouse processes. More specifically, the most important points that should be given special attention is the consumption of energy and the management of technical waste. Desirable practices that can be applied are those that maintain the temperature and humidity inside the warehouse within desired levels, actions that make the lighting more efficient, that improve the energy efficiency of warehouse equipment and manage to manipulate the obsolescence pallets.

One of the best practices that can be easily implemented, especially in our country is the exploitation of natural lighting. The above practice is easily applied by constructing large windows around the warehouse. The use of Solatube is still an economical way to let adequate light enter into the warehouse throughout the day. The special design of the Solatube (Low Reflection Surface) and the quality of the crystal contribute to the smooth collection of sunlight, even under adverse weather conditions (cloudy) regardless of time and angle of the sun (www.solarlight.gr). Besides the Solatube, solar energy can also be exploited by technologies that exploit the thermal and electromagnetic radiation, using mechanical means for its collection, storage and distribution. The photovoltaic effect is the direct conversion of solar radiation into voltage (Supply Chain & Logistics, 2011). Photovoltaic panels are a long term investment as long as their use is achieved energy independence and should not be regarded as an opportunity of easy enrichment. The application of bioclimatic techniques is another modern way of utilizing the temperature difference between the sides of the building to create a circuit air outside the main shell of the building, which cools the hottest sides throwing the overall temperature of the building, thus reducing any requirements for air conditioning. The use of geothermal applications instead of classical air conditioning systems for cooling and heating of the building is another smart way to reduce energy that is used. By this way, a company can exploit the fact that the temperature of the subsoil is constant throughout the year and permits us to create a constant temperature both in warehousing and office spaces, which results in significantly reduced consumption in electricity.

3.5 Green packaging

Dispose of pallets is a very important problem for many storage administrators. From an environmental point of view 12% of timber processed in the United States used to build pallets. One way to reduce this volume is to create websites disposal of used pallets. This practice has been used in the United States with very encouraging results (Mallidis & Vlachos 2010). The product packaging is an issue that concerns not only manufacturers and retailers and 3PL, as the one, the manufacturers are the ones who decide on the material and shape of the packaging, but retailers as auditors purchasing power must select products marketed in environmentally friendly packaging to enable recycling. Additionally, the correct choice of packaging contributes to smooth transportation and storage of products, provided that it adequately protects the interior and not altered or damaged products. Given that the transport and storage are two recurring processes in a 3PL or carrier it is easy to understand how important the choice of safe packaging materials to reduce the cost of the destruction of products during transport and storage and thus reducing the volume of waste resulting from these processes (Xuezhong et al, 2011).

Chapter 2: Methodology

The chapter of methodology embraces the methods that have been used to approach the literature review. Moreover, since a secondary research is conducted, the reasons to justify the rationale of the methodology chosen are explained. In addition, more details about the aims and objectives of the methodology and in parallel the sampling method are clarified. This chapter also includes more details concerning the conduction of the research. The following chapter refers to the data analysis which takes place in order to support and justify the findings of the present thesis.

Literature review constitutes one of the main parts of the research. The starting point for the author was to realize and discover what is already known and has been written and published in the particular research area. The author searched upon the existing literature by using keywords and phrases in order to reach as many as possible relevant articles and books. Several articles and other sources were obtained through the exploration, thus the author had then to read and evaluate every single article. The purpose was to select only the appropriate one that would provide fruitful insights and enhance the research findings.

Subsequently to this process the articles that marked as important were listed and assessed again according to their relevance. Next stage for the researcher was to read once more the articles and the other sources and record all relevant concepts and ideas. Furthermore, the process of critical review provided the author with the ability to reveal key points, major controversies and methodologies. Valuable instruments to achieve the journal research included many online Journal databases such as EMERALD and JSTOR.

2.1 Research questions

The research questions should be investigated and solved. A secondary literature survey aims at the identification and explanation of the following research questions:

- What is the relation between organizational performance and Green Supply Chain Practices?

- What are the dimensions and elements that are essential for the implementation of Green Supply Chain Practices?
- What are the variables, coefficients and sub variables for the implementation of Green Supply Chain Practices?

2.2 Research design and strategy

To reinforce the findings of the existing literature, it was also important to perform secondary research and for this purpose the suitable research methodology had to be chosen. Choosing the correct methodology for the research is an important step in order to achieve the expected results throughout the research. The secondary data research is dedicated to the collection, recording, evaluation and analysis of secondary data, i.e. data that is ready to be retrieved from some source. The secondary data should be relevant and reliable. This means that there is always published recoverable data anywhere. The main categories of secondary data are literature, statistics, previous studies and interviews. A large amount of global companies use green supply chain management practices in retailing, manufacturing and transportation. This study provides information about the dimensions of the large corporations' engagement in sustainable supply chain management practices, the specific things that they are doing and what else they should do in order to meet the stakeholders' expectations about the harmonization of organizational practices with environmentally friendly operation regarding supply chain management.

Chapter 3: Review of relevant studies

3.1 Factors that determine GSCM

It is expected that more research relating to environmental matters have been conducted in industrial sectors that are considered "more dirty", causing greater amounts of waste while requiring more resources. Such sectors are indicative of the power plants and chemical plants, automotive, paper and electronics industry. The sectors related services are considered to have lower environmental impact in relation to the above fields (Ramus and Montiel, 2005) and are less likely to adopt environmental practices, such as businesses associated with production expected to do that require more resources while creating serious pollution problems (Hutchinson, 1996).

However, services of the logistics sector, contribute to air pollution, the discharge of hazardous waste in the environment, fuel consumption and other types of waste (Rondinelli and Berry, 2000). So we conclude that it is necessary to focus on environmental issues of logistics, as those are the most harmful to the environment sector belonging to services (Skjoett-Larsen, 2000). It is easy to understand that customers and other stakeholders is not easy to distinguish the responsibility of a company towards the environment and their respective suppliers (Bacallan, 2000), which is why many businesses make significant efforts to implement a green supply chain (Zhu et al, 2008). The concept of green supply chain management involves taking green initiatives at all levels of the supply chain, sourcing, production, product distribution and reverse logistics chain, involving suppliers, 3PL companies, dealers, distributors and consumers are the final link in the supply chain. In order to limit the negative effects of the logistics procedures in the natural environment is the cooperation of all of the aforementioned parties (Vachon and Klassen, 2006). The management of logistics plays a key role in the management of green supply chain (GSCM), whose continuous development has helped to characterize the environmental management of paramount importance for the field of logistics (Skjoett Larsen, 2000). Besides the distribution of products and services in a friendly environment way, logistics managers should give increasing emphasis on environmental issues while the integration of environmental management in logistics

services. It has become a very important issue for the "Industry of Logistics". Nevertheless, the development of environmental issues in logistics services is still at an early stage with regard to what should and could be achieved, which is why the adoption of green practices can be considered a process in an innovative logistics service. By innovation we mean the use of new technical and managerial knowledge that will result in the creation of new products and services for consumers. It can be any practice that is new to a business (technical equipment, products, services, processes, policies and projects) (Kimberly and Evanisko, 1981). It is very important to be perceived with the providers of logistics services, the factors that may influence the adoption of environmentally friendly practices not only to achieve the best implementation but also to understand the environmental problems it addresses.

While there are researchers who argue that organizational factors are those that affect the adoption of technological innovations (Kimberly and Evanisko, 1981), others believe that the adoption and implementation can be affected by technological, organizational and external environmental factors (Tornatzky and Fleischer, 1990). Analyzing one by one these factors we find that technology is knowledge and that the companies in which easily transmitted knowledge are best placed to innovate (Tsai and Ghoshal, 1998). Innovation in technology can only be realized when the knowledge of technology easily transmitted and there are ways to get into the business (Teece, 1996). Apart from how easy it is to transmit the knowledge within a company, the cumulative knowledge of a company created through extensive experience and showing how easily incorporated a new technology to the existing knowledge and resources that owns, is another a contributory factor in the adoption of technological innovations (Tornatzky and Fleischer, 1990).

After all, innovation usually follows a technological example (Teece, 1996), which is why a company that has rich experiences in adopting and implementing technologies has simultaneously increasing potential to innovate in this area (Simonin, 1999). The corporate culture can also affect the adoption of innovations (Kimberly and Evanisko, 1981; Tornatzky and Fleischer, 1990). More specifically, the skills of those who govern,

strengthening incentives and support resources required to achieve an innovation help to improve technological innovation adoption process.

According to Tornatzky and Fleischer (1990), informal institutions and communication among employees, the quality of human resources and the attitude and behavior of senior management within the company, greatly influence the adoption of technological innovations. More specifically, a business with high-quality human resources, providing better education and training, will have a greater capacity in technological innovations.

In addition, the external environment in which a company operates and functions directly affect the intention and ability to adopt innovations (King and Anderson, 1995). Companies focus more on innovation when the environment in which they are characterized by instability, and in general the environment when there is great uncertainty strengthens the relationship between organizational structure and technological innovation (Damanpour, 1991). Moreover, another reason to strengthen business incentives for innovation is the uncertainty in demand (Zhu and Weyant, 2003).

The last factor affecting the adoption of technological innovations are the governments through legislation imposing an important environmental attribute that can encourage or discourage the adoption of innovations. A government can provide financial incentives, projects being piloted and tax breaks to stimulate technological innovations (Chieh-yu Lin, Yi-Hui Ho, 2008). Considering all the above factors affecting the adoption of technological innovations and on the occasion of a survey conducted by Chieh-yu Lin and Yi-Hui Ho (2008), we conclude that the same factors that have a positive influence on the adoption of technological innovations, influence and adoption of green innovations by logistics companies. The survey was conducted in 162 Taiwanese companies, an area of exceptional interest, as a result of the shift towards environmental protection at the global level, organizations, industry and the GOT under pressure in order to give more emphasis on environmental issues aiming sustainable development of the country and compliance in accordance with regulations applicable at international level.

According to Taiwan's logistics companies, the adoption of green innovation is essential in order to gain competitive advantage and to act as an international logistics center. The logistics industry is essentially an association to promote environmentally friendly

products and services to end users and the more environmentally friendly logistics processes are more green products are distributed (Wu and Dunn, 1995).

3.2 Factors for implementing green practices in SCM

Green innovations which could be adopted by a logistics company considered reducing water and energy consumption, proper management of hazardous and solid waste, the use of recycled and reused materials, limiting air pollution. According to Chieh-yu Lin and Li-Hui Ho (2008), companies to adopt green innovations in logistics processes first need to have a strong will. Their desire for new environmentally friendly practices is a measure of the adoption of green innovations. The results of their research showed that technological, organizational and external environmental factors, as mentioned above, have a positive influence on the intention of companies to adopt new green practices in logistics.

How easily knowledge of green technologies can be transmitted within a company, is one of the six relevant factors in order to adopt green innovations. This factor can be determined according to the extent to which a technology can be encoded and "transported" inside a company. The cumulative knowledge of green technologies (accumulation of green knowledge) is calculated based on the degree of ease of integration of new green technologies existing in the company.

Whether there is encouragement within a company (organizational encouragement) to adopt green innovation is a major factor contributing towards it and which depends mainly on the philosophy and mindset of managers. Top management that must provide incentives to employees for adopting environmentally friendly practices and research has shown that in cases of lack of support on the part of top management on environmental issues, this was a major obstacle to the adoption of green policies within a company (Murphy et al, 1996).

The quality of human resources, (quality of HR), can be "measured" according to his knowledge of human resources on environmental issues, as well as their ability to green innovations (Tornatzky and Fleischer, 1990). The best quality is the human resources, the more easily workers implement green practices. The shift to green innovations in

logistics requires a fundamental shift in corporate culture in this direction. To successfully be integrating green technologies in existing in a company, it is essential in all parts of the business (production, marketing department and development and technology) be the adoption and implementation of changes . The fact that green practices make more complex production and distribution processes as those requiring more skills and knowledge of employees at all levels within a company (Groenewegen and Vergrat, 1991).

The support from the government, (government support) is the fifth factor and determined as to the financing of companies that intend to produce and distribute environmentally friendly products through environmentally friendly processes. Moreover, the legislation imposed or the possible tax credits as incentive measures is to determine this factor. Finally, consumer demands and abilities of competitors to innovate identify the last aspect to be mentioned is the uncertainty of the environment in which a company operates (environmental uncertainty).

3.3 Corporate Social Responsibility and GSCM

CSR (Corporate Social Responsibility) includes the expectations that society has from a business as far as cost, ethics and legislation are concerned. Globalization was an additional reason why a large number of companies experienced difficulties to promote their products and services as they were not socially responsible to the extent that they had to. An example is a large number of companies from China during the past decade have lost the ability to accept international orders if they failed to comply with standards relating to both the environment and human rights and security. Additionally, some multinational companies such as Ford, Toyota and GM have forced their suppliers in China to be certified according to standards like ISO 14001 (Adams et.al, 2012). Today, businesses in order to gain a good corporate image and increase their competitive advantage, seek to become more and more socially responsible. That is why more and more companies issue an annual report on corporate social responsibility (Guo et al, 2007). The adoption of green practices in a company can lead to gain a competitive advantage.

The competitiveness of businesses in national level is affected by the regulations imposed through legislation, such as the European Union affects the competitiveness of the private sector requiring companies to implement green practices. In companies that have in their activities logistics practices, on the one hand, the competitive advantage through the implementation of environmentally friendly practices can be achieved by the reduction of costs resulting from the reduction of environmental pollution, and reduced fuel consumption and other natural resources (Lai and Wong, 2011). On the other hand, when a firm focuses on environmental issues and tries to protect natural resources, it strengthens its image to consumers and improves its activities in the field of marketing. An environmentally friendly corporate image help enterprises to have a better reputation than that of their competitors. Considering the fact that the reputation is a source of competitive advantage, the implementation of green practices can lead to improved liquidity and business performance (Eidat, Kelly and Eyadet, 2008). Through environmentally friendly processes in logistics, there can be provided to consumers differentiated services and products which can increase competitiveness.

Companies operating in the sector of logistics must continually improve their knowledge on environmental issues and to build a "green corporate culture" promoting the development of green logistics practices. In this way, taking into account the social responsibility for environmental protection, a logistics company is able to enhance its corporate image (Xuezhong, Linlin, Chengbo, 2011).

In many cases where corporate scandals created (producing contaminated milk, toxic toys), both governments and the state, realized the urgent need to learn and implement practical LSR all companies - links of a supply chain. Thus, the most socially responsible supply chains will be easier to reduce the difficulties which may be created either in the supply of raw materials or in the manufacturing process or by subcontractors (3PL companies) or in the process of transmission and distribution the final consumer (Miao et al., 2010). The socially responsible management processes logistics and supply chains (LSR) has been identified as an area important both theoretical and practical (Carter and Jennings, 2002) despite the lack of uniformity of content. According to Poist (1989) socially responsible management of the logistics process includes education and training

of employees, activities for charity, health, security and diversity in the workplace, improve working conditions, raise awareness of social issues such as hunger and homelessness, actions to protect the environment and natural resources.

Carter and Jennings developed a comprehensive framework for the socially responsible management of logistics processes that included environmental protection, business ethics, working conditions and safety, protection of human rights and improvement of social conditions. All studies were performed in order to determine the scope of socially responsible management of logistics processes (LSR) suggest that the management of green supply chains (GSCM) and green logistics are an important subcategory of corporate social responsibility of companies operating in field of logistics (Murphy and Poist, 2003).

It is noteworthy that the corporate culture and the way in which a company is managed mainly influenced by the country in which she operates. More specifically, the content of socially responsible management of logistics processes of Western companies probably differs from that of Asian companies.

Many studies show that Asia will emerge in the coming decades on the continent with the most productive plants worldwide, which means that it will significantly contribute to the negative environmental effects (Rao, 2002). In particular, Chinese enterprises are those that have less favorable environment, as China's economy has the highest rate of growth in the continent. This is one reason we should in coming years to conduct both theoretical and empirical research on the relationship of Chinese logistics enterprises and socially responsible management of their processes.

The socially responsible management of logistics processes and environmental protection sting more and more interest in many regions around the globe. That is why today more and more research conducted on the management of green supply chains, as a matter of corporate social responsibility of logistics companies, focusing in the areas of supply, transport and storage (Ciliberti et al, 2008). In 2006, Gonzalez-Benito and Gonzalez-Benito found two factors to explain the application of environmentally friendly practices in logistics processes through a survey conducted in 186 medium and large Spanish companies of the chemical industry, textile, furniture and industrial electrical and

electronics. These two factors were the government pressure achieved through legislative frameworks and governmental pressures can come from environmental organizations or the community now seeks to consume more environmentally-friendly products (Gonzalez-Benito and Gonzalez-Benito, 2006). After four years of study in supermarkets and their suppliers in the United Kingdom, Hall (2006) concluded that the reason why companies invest in environmentally friendly innovations and practices in their supply chain is due to those suppliers that apply environmental practices in a small extent, and consequently they present a bigger environmental risk (Hall, 2006). After a study of oil and gas companies in Canada, it was concluded that corporate sustainability is influenced by institutional factors (Bansal, 2005) while Rao and Holt (2005) investigated green practices in supply chains of Southeast Asian regions and concluded that gaining a competitive advantage and improved economic performance are the result of the conversion of all parts of the supply chain in environmentally friendly ones, which results in a complete green supply chain. Finally, Zhu (2007) concluded that the implementation and results of the green supply chain differs depending on the type of industry.

Conclusions

Summarizing the existing literature that has been presented about GSCM, we can conclude that the factors that enhance the implementing of green practices in corporate social responsibility of companies, is the culture and ethics of each company. Also, the pressure from suppliers, competitors, customers as well as from the national legislation seem to play a significant role in the top management decision of adopting green practices in SCM. Specifically, the term culture refers to a collective mentally orientated program that distinguishes the members of a group towards another. Culture is an operating system that aims to guide the way people think, feel and act within a company. Moreover, businesses are represented by people, so culture (rules, beliefs, values) that they have adopted, play a key role in shaping the perceptions and attitudes regarding environmental issues in Corporate Social Responsibility practices that are followed by a company.

Additionally, several studies have shown that leadership plays a key role in the implementation of green practices in CSR of logistics companies (Carter and Jennings, 2002). It is generally accepted that the “top management” is not only the symbol of corporate culture, but also a guide to the successful adoption and implementation of green innovations, technologies, programs and activities to protect the environment, which could be incorporated in Corporate Social Responsibility. Another reason for companies to implement socially responsible practices is to exchange views on environmental issues, at all levels within a company, which essentially brings the corporate culture.

Especially the management of green supply chains can contribute to the success of socially responsible management of logistics processes. This is a process that can link not only several separate companies between them, but also the employees from all levels of a single company, through the promotion of values, spirit of cooperation and proper communication among them (Miao Z., Cai S., Xu D., 2012). According to Carter and Jennings (2002), there is a positive relationship between the culture that can inspire a consumer to be sensitive to issues of environment protection and socially responsible management of logistics processes.

Business ethics can also play a major role in whether a company is socially responsible. Especially in companies that operate in the logistics industry, the moral issues relating to environmentally friendly transportation, raw material procurement and storage play a vital role in strengthening the integration of green practices in corporate social responsibility of companies.

In many cases, in order to enable logistics companies to survive in a competitive environment required to comply with the basis of not only domestic but also international regulations have been established to protect the environment. For example, companies in the electric and electronics industry, have to take back the products that have completed their life cycle, which requires the implementation of reverse supply chain leading to the recycling stage.

Additionally, there have been enacted laws on greenhouse gas emissions during transport and maintenance of warehouses that influences the implementation of green practices in the management of socially responsible logistics processes. On the other hand, consumers, competitors and suppliers a company enhance the linkage of green supply chains with corporate social responsibility as they require a certification of company environmental standards and compliance with legislation that protects the natural environment.

Corporate culture and ethics are two factors that most affect the incorporation of green practices in CSR of logistics companies in relation to the others. This is a very important element during the implementation of green logistics in integrating CSR of a company operating in the logistics sector.

Finally, the present thesis essay was intended to highlight all directions and prospects for the development of green practices in supply chain management. This thesis was based on literature review of other researches that have been conducted on this subject. In future, it is proposed to conduct qualitative research using samples of corporations, so as to highlight the green supply chain practices that are used. These researches may be based on interviews with managers that are involved in the supply chain operations of the companies.

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