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The role of green supply chain management on organizational productivity and excellence

Mohammad Khorasani Amoli[1], Foad Eshghi[2], ImanValaei[3], Fateme Noori[4]

[1]Department of Management, Shomal University, Amol, Iran; [2]Department of Agricultural Economics, Sari University of Agricultural and Natural Resources, Sari, Iran; [3]Industrial Engineering – System Management and Productivity, Shomal University, Amol, Iran; [4]Industrial Management, Shomal University, Amol, Iran

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Abstract

Regarding the competitive market at present age and the importance of environmental problems, green supply chain management is converted into one of the problems for the organizations and companies. Green supply chain management will be useful in respect of the improvement of environmental performance of advantage (benefit) supply chain and will be followed by many benefits such as saving in energy resources, decreasing the pollutants, omission or decreasing the wastes, value creation (production) for the customers and ultimately, and finally improving productivity for the companies and organizations. This research addressed to supply chain and its effect on the organizational elevation and productivity. Statistical population of the present research consists of the staffs of Fooladin Zob Amol Company who are 28 persons. Some questions based on the questionnaire are available for the staff of this company and out of this number, 19 persons answered the questionnaire. The collected data were statistically analyzed by SPSS software and T-test was used for this reason. Research result represents that all of the components implemented in the questionnaire, have a direct relationship with the organizational excellence and productivity in Fooladin Zob Amol Company.

Keywords: supply chain management, green supply chain management, productivity, organizational excellence

Introduction

Supply chain consists of all activities related to the flow and conversion of goods from the stage of raw material extraction to the stage of ultimate consumer delivery as well as information flows related to them. In supply chain, the raw materials are prepared; different products are built (manufactured) in one or several Factories and then, they are transferred to the warehouses for middle maintenance and then, they are carried by vendors or ultimate customers, and as a result, in order to decrease the cost and improve the service levels of effective strategies of supply chain, interaction at different levels of supply chain should be considered. Supply chain which is also referred as logistic networks, includes the providers (producers), production centers, in addition to raw materials, inventory in the manufacturing flow and ultimate (Final) products which flow between the Facilities. Therefore, supply chain management includes consolidation process of supply chain activities as well as information Flows related to it through the improvement and coordination of the activities in supply chain of product production and delivery. Therefore, to study an organization in the general state, supply chain consists of two or several organization which formally separates each other and is connected (related) to each other by materials Flows, information and financial Flows. Theoretical Essentials and Research Background During past decades, supply chain management was recognized as a science and it

Corresponding author: Foad Eshghi, Department of Agricultural Economics, Sari University of Agricultural and Natural Resources, Sari, Iran E-mail: fesh.foad@gmail.com

was largely studied and was systematically applied in each industry in order to achieve the efficiency and stability (durability). By enormous changes in enterprise environment, today's organizations encounter with severe world competition which makes them to focus more and more on their main competencies and capabilities which its result is spending slighter activities of the company outside (Sinha, 2011). Supply chain management includes collaboration of companies to enhance strategic situation and the effective improvement of the complex's performance. This consolidated value-creating process should be managed from materials preparation to goods/services delivery to the ultimate (Final) customer (Bowersox *et al,* 2002). Supply chain is defined by Christopher in 1998 as follows : a network of organizations where are entangled through inferior and superior communications in different processes and activities which produce the value, in products and services which are delivered the ultimate (Final) customer (Peterson& segerstedt, 2012). In 1997, Farley showed the aspects of supply chain management such as cooperation with the providers, implementation of new technology for management of this cooperation which is effective on the competitive advantage (Birasnav, 2013). Supply chain includes all stages (steps) related to pursuing and performing the customer request which are performed directly and indirectly. Supply chain includes not only the producers and providers, but also involves transportation, Warehouses, Vendors, and customers.

Supply chain is a network of the possibilities and distribution options which perform some tasks such as preparing raw materials, converting (changing) these materials into the intermediate (middle) products to the customers (Hugos, 2006).Supply chain management considers a set of practices in the production of products and services. One of these practices is the production of products and services which are environment-Friendly and their use doesn't damage the environment. For this reason, a concept titled as green supply chain management was used in the production products and services. Green supply chain management is the integration of environmental thinking into supply chain management. Executive trends of green supply chain management in the activities of distribution and dissemination include: energy efficiency, decrease in the production of greenhouse gases, protection of water and water resources and refinement of them, decreasing the wastes, decreasing the package/ increasing the use of environment-destruction packages, the products and package before revival / reuse and green purchasing methods (Kumar *et al,* 2013). Green supply chain is a set of supply chain management policies which all the activities and communications existing in it are for answering the concerns related to environmental problems and involves some sectors such as designing, production, distribution, use, reuse and the (Wastes) debris of products (Zsidisin & siferd, 2001); (Hazen *et al,* 2011); (Tseng & Chiu, 2013). Green supply chain includes a set of internal and external (domestic and foreign) practices of the agency throughout the supply chain which results in improvement of environment and prevention of pollution (Naseri Taheri, 2006). During recent years, green supply chain management (GSCM) is important among the producers regarding to the following reasons:

- Decreasing the original materials for production
- Destruction and deterioration of environment
- Lands where were accumulated by debris (garbage)
- Increasing pollution level

Green supply chain management is the integration of environmental management and supply chain management, which identifies the inappropriate environmental effect on the supply chain processes in the organization. Generally, the pollution and wastes represent the useless and inefficient use of raw materials. Green supply chain management is an opportunity to revise the processes, the original materials and operational concepts which are performed in the company. Green supply chain management analyzes the following goals:

- Waste materials; The wasted energy;
- The used resources;
- Green process improvement approach

Today, original equipment manufacturers encourage their providers to make green approaches and environmental management systems. Focus on the content (combination ingredient) of materials and environment was addressed more than in the past (Ravishankar, 2011).

Figure 1. Ravishankar (2011), p.7

Strategies of green supply chain management

Risk-based strategies

Regarding to the development of intra-organizational resources, the simplest strategy of green supply chain management is to minimize the risk. The companies choose this strategy to answer the needs (requirements) of the beneficiaries. Such a strategy is ideal for organizations where are seeking to maintain the minimum domestic environmental management resources and / or it is recently considered as an introduction to green supply chain plan (program) by itself. This strategy is based on minimization of intra-organizational interaction.

Efficiency-based strategies

During recent years, a more complex and developing strategy is the strategy compatible with environment and efficiency or the pure and green strategy with green supply chain management. This kind of environmental performance for the supply chain and operating to achieve the operation-based efficiency goals is beyond the needs of providers. The differential aspect of efficiency-based strategy from risk-based strategy is availability of double economic advantages and environmental performance for interaction between the customers and providers.

Innovation-based strategies

Innovation-based strategy of green supply chain management is different from the efficiency-based strategy due to using it as the environmental performance strategy of supply chain which has more compatibility with the environment. Movement from the efficiency-based strategy of green supply chain management to a higher level of innovation or integration into the environmental performance of supply chain and designing the product needs the specialized environmental resources which are adapted from the heart of the environment. Adaptation with the changes in environmental rules and teaching (training) of the providers in process changes related to the environment needs more allocation of environmental resources, the specialized personnel and designing. Development of these resources provides some conditions for the organization to change the efficiency-based strategy into innovation-based strategy.

The developed resources can be used for the products for combination of innovative environmental planning for special designs of the product, properties (characteristics), capabilities or activities related to life cycle (For example, service, repair and maintenance and revival). At the level of processes, they can spread to develop solid methods compatible with the environment and some systems for production, distribution and using the products.

Closed-loop strategies

In its simplest form, this strategy refers to the reversed logistics. Closing the loop includes the absorption and revival of materials for each reconstruction (valuable) or revival (low value). These materials are produced during the production process as the returned goods, the consumer goods and goods which their shelf lives expired (Simpson &Samson, 2008).

By establishment of a successful green supply chain in the company and correct management of it, it can be prevented some kind of reworking and imposing undesired costs as well as some pressures which are incurred from the environment friendly organizations on the organizations which their products are harmful for the health of the environment and in this way, we can help the organizational elevation and productivity. Generally, the productivity is defined as

the measurement of the produced output value in each input unit. In 1995, Prichard presented three distinguished categories (classes) of definitions for productivity.

1- In economic approach, the productivity is measuring the output or efficiency (output/input).

2- Productivity is a combination of efficiency and effectiveness (output/input/output/goal).

3- It is a comprehensive approach which includes all things which make the performance of organization better (Linna *et al,* 2010).

The productivity shows whether the organizational activities are efficient and effective or not. The productivity entails to have the efficiency and effectiveness together, since the productivity will not be in special activities; if it is just efficient, but it is not effective, or it has effectiveness, but it has no efficiency. The productivity is defined as the relationship between the input and output in economic situations. The input element in an organization includes the resources used in product creation (generation) process including labor force, materials and energy. The output includes one product, one service and a combination of them (Rutkau Skas & Paulaviciene, 2005). Definition of organizational elevation by European Foundation of Quality Management includes achieving and maintains high levels of organizational performance or exceeding from the expectations of all beneficiaries. The organizational elevation focuses on the following cases:

1- Identifying and satisfying the customer's needs.

2- Complete development and exploitation of the potential forces (powers) of the staff.

3- Improvement and elevation of organizational level at all dimensions.

Development of hypotheses and conceptual model

First hypothesis

There is a meaningful relationship between green supply chain infrastructures and the organizational excellence and productivity.

Second hypothesis

There is a meaningful relationship between information technology in green supply chain and the organizational excellence and productivity.

Third hypothesis

There is a meaningful relationship between decision-making support systems in green supply chain and the organizational excellence and productivity.

Fourth hypothesis

There is a meaningful relationship between intra-organizational relationships in green supply chain and the organizational excellence and productivity.

Methodology

The statistical population of the present research consists of all the staff of Fooladin Zob Amol Company. The number of the staff in this company is 29 persons who were used as the statistical population. Out of this number, 19 persons answered the questionnaire. Topic (subject) domain of the research is the issues related to the supply chain management. In fact, supply chain management includes all activities and processes which cause to create the value in final goods and services. Supply chain management, as an excellent productive example in order to improve the organizational competitions, became important in 21st century. In fact, some goals such as sale increase, decreasing the costs of innovation and congruity between the suppliers and distributers, achieving the effectiveness and efficiency which in productivity in production of products (goods) and delivery of services and ultimately, it results in the organizational excellence, can be achieved by correct management of supply chain. Time domain of research is consisted of the collected data during the year 2013 and its place domain is Fooladin Zob Amol Company. This applied research is based on the nature and the method of research is of survey research kind. The used tool (instrument) to measure the data is questionnaire. The present research consists of one independent variable (green supply chain management) and two dependent variables (productivity and organizational excellence). After data collection and gathering the required information, all these data and information were encoded through the questionnaire and entered SPSS software to calculate descriptive statistics related to Cronbach's Alpha statistical test and data. To confirm the validity of the questionnaire, we made it available for ten persons of the elite and authorities in the form of the elite questionnaire and its validity was satisfied. The reliability of the measurement tool was measured by Cronbach's Alpha coefficient which its value in the present research was 0.79.

Results

Regarding the test result as well as regarding that the calculated significance level is less than five percent(sig≤0.05; Results of the analysis are illustrated in Table 1); therefore, all of the hypotheses are confirmed.

Table 1. One - sample statistics Descriptive and Correlations

	t	df	Sig. (2-tailed)	Mean Deviation	95% Confidence Interval of the Difference	
					Lower	Upper
Infrastructure	23.100	18	.000	2.42105	2.2009	2.6412
IT	22.122	18	.000	2.55639	2.3136	2.7992
DSS	22.857	18	.000	2.22368	2.0193	2.4281
Organizational relation	24.566	18	.000	2.52632	2.3103	2.7424

Table 2. T-test for assessment of research hypotheses

There is a direct relationship between green supply chain infrastructures and the organizational excellence and productivity.	(sig≤0.05)
There is a direct relationship between information technology in green supply chain and the organizational excellence and productivity.	(sig≤0.05)
There is a direct relationship between decision-making support systems in green supply chain and the organizational excellence and productivity.	(sig≤0.05)
There is a direct relationship between intra-organizational relationships in green supply chain and the organizational excellence and productivity.	(sig≤0.05)

Conclusions

Today, regarding the importance of environment and presenting the products and services which don't damage the environment, implementation of green supply chain management seems necessary. Green supply chain management is regarding as one of the essential components for the organizations and companies where engage in activities at the present age, reading to the pressures resulted from environmental problems on behalf of the related organizations and institutions. Green supply chain management addresses not only to study the ways (methods) to decrease the costs in the processes of preparation, production, goods and services delivery, but also balances between the growing (developing) demands of the customers to present the efficient services as well as paying attention to environmental problems and doesn't ignore fast revolutions which are performed in technology. In supply chain management, the procedures to decrease the costs include to diminish the available goods (inventories) in the warehouse, the manufactured products or raw materials and decreasing the production cycle time along with faster delivery of the products.

The customer is regarded as the focus of initial (primary) attention in this process. If the companies desire to be able not stay behind the competition, and engage in activities parallel to the changes in market and parallel to their competitors, they need a successful supply chain management to be able to overcome the encountering problems. A successful supply chain management needs different decisions related to information flow, products and investment. Therefore, it is suggested (recommended) to the researchers interested in the studied topic (issue) to address other concepts and subsets of the supply chain in the future research; such as, the stable (durable) supply chain management,

pure supply chain management and..... which can provide enough reasons for the organization and will be followed by the productivity and the organizational elevation and ultimately, they can provide the reasons (possibilities) for the organizational improvement and achievement of the competitive advantage.

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