

# THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

## Investigating Factors Affecting Supply Chain Management in Iran's Automotive Industry (Case Study: Iran Khodro Automobile Company)

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### **Abstract:**

*Today, the concept of sustainable supply chain management in organizations is crucial for managing the supply chain of organizations. The purpose of this study is to investigate factors affecting sustainable supply chain management in Iran's automotive industry. Iran Khodro Co. is one of the largest automobile production companies in Iran. The number of operational managers of the automobile company is 2800 people. Using the Cochran sampling formula, 339 people are selected. To analyze the data, descriptive statistics were used for demographic information and for inferential statistics; linear regression tests and SPSS software were used. The factors affecting supply chain management are the commitment to sustainability and management capability, which these two variables have had on the four common factors, including supplier management, producer management, product monitoring, and logistics management, which, according to this hypothesis and after analyzing the data, all The research hypotheses have been approved and it is suggested that managers who are more important to the sustainability and management readiness of organizations to improve their performance.*

**Keywords:** Sustainable supply chain management, automotive industry, Iran

### **1. Introduction**

Today, supply chain management refers to the integration of key business processes from the first to the final consumer, which includes products, services and information, and creates value for customers and other stakeholders. Iran has many automobile companies, among which is one of the largest companies in Iran Khodro, which has been manufacturing various types of machines. In this research, we have tried to examine the factors affecting supply chain management in this company, as well as providing more economic benefits through improved supply chain management. The supply chain provided the same level of downstream output, from suppliers to distributors and customers. In the early 1980s, supply chain factories were deployed in the same way as concepts of timely production and comprehensive quality management. The supply chain was used as a creative tool produced by Japanese factories to increase efficiency. After that, its focus was not only on increasing internal efficiency, but also taking a step toward achieving more value added. Also, it should not be forgotten that supply chain management has a significant impact on reducing waste and waste produced by the organization (Singh & Pabla, 2013). Concerns of government and nonprofit organizations, people, especially environmental lovers, about global warming, natural resource depletion, the use of non-renewable resources and increased industrial activities in developed and emerging economies have led many stakeholders to Focus on develop sustainable business. In recent years, corporate, social and environmental accountability has become part of the goals of the manufacturing and service organizations, and has become a cornerstone of organizational activity in a positive way. There are also other factors that lead organizations to use sustainable supply chain management, especially in the supply chain sub-sectors. These factors can be internal or external. External factors include legal regulation, the nature of business activity, rivals and shareholders like (NGOs)<sup>1</sup>. Internal factors include senior management perspectives, sustained supplier incentives, and customer needs (Agerun et al, 2012). The purpose of this study is to investigate the factors affecting sustainable supply chain management in Iranian automotive industry.

<sup>1</sup>Non-Governmental Organization

## 2. Theoretical Fundamentals and Research Background

Sustainability in the supply chain is a new and highly influential discussion that has recently focused on supply chain management (2011, Ashrafi & Chaharsooghi). Qadikolaei and colleagues of year (1396) reviewed the factors affecting the selection of sustainable suppliers in Saipa Company. They found today that the guarantee of sustainable development in each country depends on maintaining and optimizing the use of limited and alternative resources in that country, and various measures have been taken by governments to deal with this issue. The main objective of this research is to identify and select the factors influencing the "choice of supplier" in the automotive industry. The present study is "applied" in terms of purpose and in terms of "descriptive" information collection method. In this research, for the purpose of selecting effective factors, after the review of theoretical literature, 58 indicators were identified for evaluating the sustainable supplier. After examining supply chain experts in the automotive industry, only 17 indicators were appropriately identified. The results of the research have provided a comprehensive model for selecting sustainable suppliers in the automotive industry, which can be used by industry and researchers (Qadikolaei et al., 1396).

Edalatian et al. (2014) examined the factors affecting the implementation of green supply chain in Iran's automotive industry. The purpose of this study was to identify factors affecting the implementation of green supply chain in the automotive industry of Iran. The statistical population of this study consists of 31 managers and experts of Iran Khodro, Pars Khodro, Saipa and Sapco. After reviewing the literature on the implementation of the green supply chain in various organizations, and in particular automobile companies, six factors were identified: Internal and external related trainings and conferences, technological equipment and technical knowledge, financial thoughts, policies and internal relations of the organization, foreign policy and laws, clients and other institutions. In order to investigate the effect of each of these factors on the implementation of the green supply chain, six hypotheses were developed and tested on the basis of experts' opinion of the automobile industry using a Likert scale and using single sample t-test of each of the hypotheses. The results of the research indicate the effect of each of the six factors on the implementation of the green supply chain (Edalatian et al., 2014).

In his article, Guelline Boyaucoskin et al. (2013) explores the components and elements of sustainable supply chain management and how it is evaluated, and states that using the QFD<sup>2</sup> method, an effective structure of the sustainable supply chain can be obtained. (2013, Gülc et al.). Zillani et al. (2012) have reviewed the management of sustainable supply chain management in 200 manufacturing companies in Malaysia. They have stated that environmental purchases have a positive effect on economic, social and operational factors, while sustainable packaging has an impact on the environment, economy and social outcomes, and sustainable supply chain management practices have a positive effect on sustainable performance in the supply chain. Especially from a socio-economic point of view, Therefore, companies need to collaborate in supporting the implementation of sustainable supply chain management in their company, which is not an ethical commitment but also a business's success (2012, Zaillani et al.).

Zhaohui et al. (2011) examined how organizations in the sustainable supply chain can make decisions in the short term and long term profitability in terms of uncertainty. They reviewed two organizations and raised perspectives in the sustainable supply chain, arguing that the need to protect the environment, increasing the demand for natural resources, forced companies to revise business models and supply chain operations. (2011, Zhaohui et al).

Carter and Rogers (2008) presented a comprehensive conceptual framework for managing sustainable supply chain management. In this study, in addition to the main dimensions of sustainability (economic, environmental and social dimensions), four other aspects that play the role of supporting the three main concepts of sustainability are added in this framework. These four aspects, based on a broad research in the organizational sustainability science literature and interviews with 95 senior executives and executives, comprise 12 successful international companies that include strategy, risk management and uncertainty, transparency, and organizational culture (2008, Carter & Rogers).

### 2.1. Sustainable Supply Chain

Sustainable supply chain Consider material flow management, information and capital, as well as collaboration among companies throughout the supply chain along with the integration of goals from all dimensions of the three dimensions of sustainable development (economic, environmental and social) that are tailored to the needs of customers and stakeholders. In sustainable supply chains, these members use social and environmental criteria to remain in the supply chain; at the same time, competition is expected to be maintained through customer satisfaction and related economic criteria (2008, Seuring & Moler).

Transparency in sustainable supply chain management requires companies to report to stakeholders and communicate actively with them in order to improve the supply chain performance, which can be facilitated by vertical integration throughout the supply chain and horizontal integration across networks (2008 Carter & Rogers).

The supply chain is a set of approaches that are implemented to integrate efficiently suppliers, manufacturers, warehouses and stores. Formation in order to produce and distribute the product, with the correct amount, in the right place at the required time. The goal of this trend is to reduce systematic expense costs so that the needs of customer service levels are met (Handfield & Nichols, 1999).

<sup>2</sup>Quality Function Deployment

## 2.2. Sustainability

Today, incorporating the concept of sustainability in the design of the supply chain network has become an important issue for organizations, governments and people, especially environmental lovers, in view of the effects that the growing global population has on the environment and, as a result, increased human activities. (Ghasemi et al., 1392). Srivastava (2007) defines sustainability as a potential to reduce long-term risks associated with reduced resources, changes in energy costs, product management, pollution and waste management. In this paper, sustainability is considered more than an environmental point of view, and social aspects are not considered. In another definition of sustainability, one or more independent or parallel systems that can survive in a long period of time and at the same time allow this development and life in the eyes of other systems and allow the life and development of other systems No endangered, stable systems are defined (2008, Srivastava).

## 2.3. Supplier Management

Managing Suppliers is for Risks and Performance and Supply Chain Management is for Sustainable Products. These strategies are exactly the opposite of each other and of course cannot complement each other (2008, Seuring & Moler). Selecting a sustainable supplier needs indicators that are not considered in operational decisions. After more emphasis on environmental and social issues in organizations and the concept of corporate social responsibility, there has been a greater need for sustainability and strategic vision for suppliers (2008, Ciliberti et al).

A lot of studies have been done on the choice of suppliers in the supply chain. Grouping and categorizing suppliers based on their past performance or on the basis of familiarity and experience with them, including supplier assessment methods. In this method, grouping is based on performance and work experience, and based on specific criteria, suppliers are grouped into different groups and given them a positive or negative score, and eventually one or more assigners are selected (2000, Liu et al.).

Suppliers of the first layer produce semi-finished parts, while providing the materials they need to make these components from the second-tier suppliers. Accordingly, if organizations and industrial companies have suppliers that are approved in terms of both the quality of the raw materials and the quality of the semi-finished product, they can be certain of the quality of their final product. The type of raw material used can have a significant impact on the quality and price of semi-manufactured products and components, and the quality of the primary material used to select the suppliers of the first layer is undoubtedly important. Different approaches and models for solving the selection problem have always been used to choose the first-level suppliers who directly deal with the buyer and do not pay attention to second-level suppliers, while most factories attach importance to the topic of the second-tier suppliers. And although in the presented models and scientific studies there is not much attention to this issue, the type of materials and parts used can have a significant impact on the quality and price of the final parts. (2010, Najafi et al).

## 2.4. Production Management

Contractor manufacturers and virtual manufacturers (suppliers) are an important part of the supply chain system. Since reliable suppliers enable manufacturers to reduce the cost of inventory and improve the quality of the goods, it is understood that manufacturers are increasingly concerned about the supplier's choice, and it is clear that choosing the right suppliers and Effective management of relationships with the supplier is a key factor in increasing the competitiveness of the companies. Choosing the right supplier to buy raw materials and delegating some internal production operations to the supplier is an important part of the chain. To achieve this goal, researchers have achieved some results; to stay in the competitive cycle and improve the performance of the supply chain, a company has to collaborate with its supply chain partners. One of the important tasks that purchasing managers are in this area is the choice of suppliers (Aissaoui Et al, 2007).

## 2.5. Hypotheses and Research Model

- H1: The commitment to sustainability has a positive impact on the management of the supply chain of the sustainable supply chain.
- H2: A commitment to sustainability has a positive impact on the management of sustainable supply chain production.
- H3: A commitment to sustainability has a positive impact on monitoring sustainable supply chain products.
- H4: A commitment to sustainability has a positive impact on sustainable supply chain management.
- H5: The management's willingness to manage the supply chain provider has a positive effect.
- H6: The management's readiness to manage the production of the sustainable supply chain has a positive effect.
- H7: Preparation sustainable supply chain management has a positive impact on monitoring products.
- H8: The management's readiness for sustainable supply chain logistics management has a positive impact.

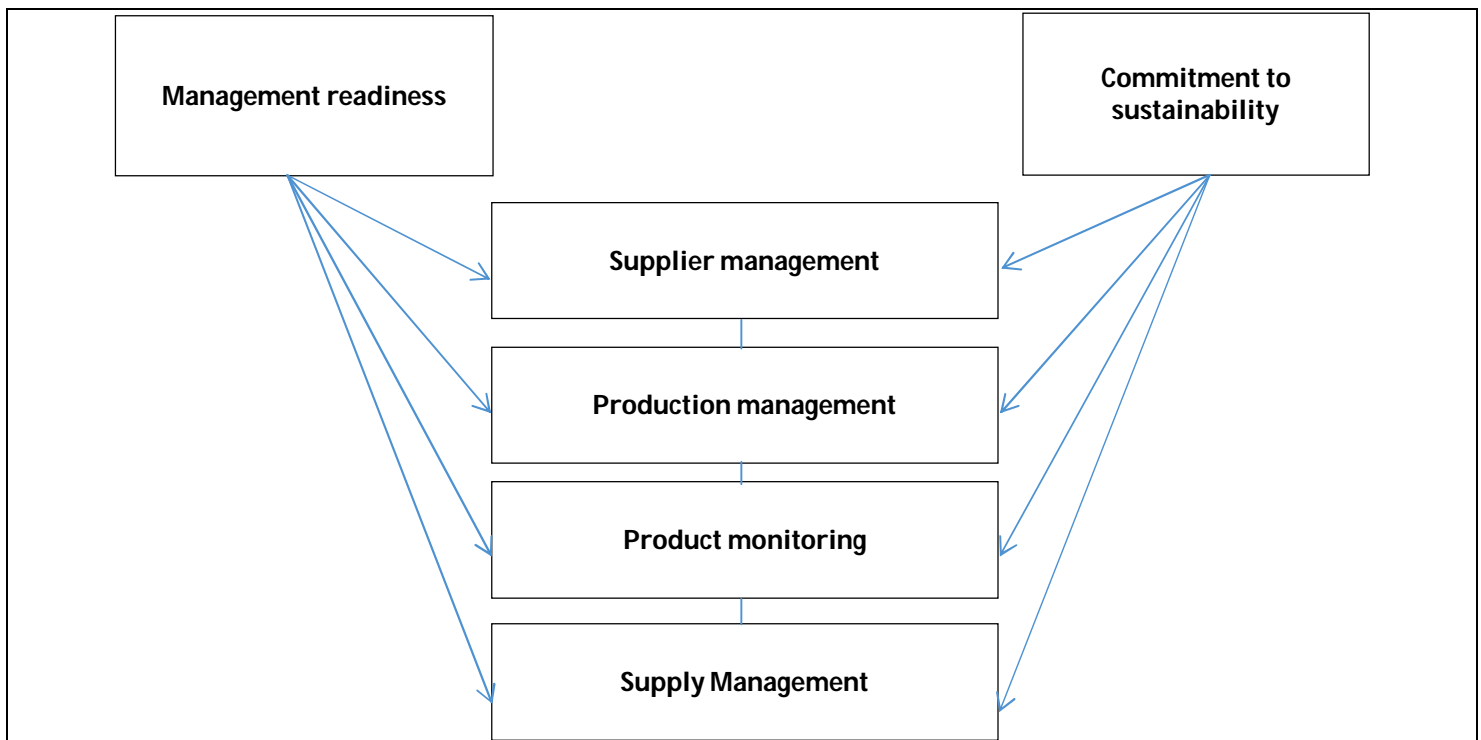


Figure 1: Conceptual model, (Wan et al, 2015)

2.6. Research Method

The purpose is applied research. The research community is Iran Khodro Operations Managers. The number of operational executives of this car company is 2800 people, using the Cochran sampling formula, sample size is 338 people. For data collection, library method and questionnaire tool were used among operational managers. After collecting questionnaires, descriptive statistics were used for demographic information and inferential statistics of linear regression tests and SPSS software was used in order to data analyzes.

2.7. The Descriptive Findings

2.7.1. Features of Respondents

Age status					Education				Sexuality		Features of Respondents
Older than 45 years	41 to 45 years old	36 to 40 years old	31 to 35 years old	Less than 30 years	Ph.D.	Masters	Bachelor	Assistant and lower	Female	Man	
31	70	62	125	50	27	170	131	10	118	220	Abundance
9.2	20.7	18.3	37	14.8	8	50.3	38.8	3	34.9	65.1	Percent

Table 1: Characteristics of respondents

2.8. Descriptive Statistics of the Research Variables

In this section, descriptive statistics, central indicators and dispersion including mean, standard deviations and variance related to each variable have been investigated by respondents. The results are reported in Table 2.

Variance	Standard deviation	Average	Maximum	At least	Number	Variable
0.826	0.909	3.15	5	1	338	Commitment to sustainability
0.532	0.729	2.87	4.33	1	338	Management readiness
0.528	0.727	3.21	5	1.5	338	Supplier management
0.957	0.978	3.38	5	1	338	Production management
0.741	0.861	3.12	4.5	1	338	Product monitoring
0.737	0.858	2.98	5	1	338	supply Management

Table 2: Descriptive statistics of the research variables

### 3. Analysis and Discussion

H1: Based on table-breaking data, it can be concluded that with 95 percent confidence, the independent variable is the sustainability commitment for the dependent variable of supply chain management. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 19% of the dependent variable. The commitment to sustainability has a positive effect on the supply chain management of the sustainable supply chain.

H2: Based on table-breaking data, it can be concluded that with 95 percent confidence, the independent variable is the commitment to sustainability for the dependent variable of management for the production of a stable supply chain. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 5 percent of the dependent variable. Sustainability commitment to the management of the production of the supply chain has a positive effect.

H3: Based on table-breaking data, it can be concluded that with 95 percent confidence, the independent variable is the commitment to sustainability for the dependent variable monitoring the sustainable supply chain products. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 43% of the dependent variable. The commitment to sustainability has a positive effect on monitoring the products of the sustainable supply chain.

H4: Based on table-breaking data, it can be concluded that with 95 percent confidence, the independent variable is the commitment to sustainability for the dependent variable monitoring the sustainable supply chain products. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 37% of the dependent variable. The commitment to sustainability has a positive effect on the supply chain management of the sustainable supply chain.

H5: Based on Table data, it can be concluded that with 95% confidence, the independent variable is management readiness for the dependent variable of supply chain management. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 29% of the dependent variable. The management's readiness for the management of the supply chain of the supply chain has a positive effect.

H6: Based on table-breaking data, it can be concluded that with 95 percent confidence, the independent variable is management readiness for the dependent variable of the management of the production of the sustainable supply chain. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 16 percent of the dependent variable. The management's readiness to manage the production of the supply chain has a positive effect.

H7: Based on table-breaking data, it can be concluded that with 95% confidence, the independent variable is the management readiness for the dependent variable of management to monitor the sustainable supply chain products. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 47% of the dependent variable. The readiness of management to monitor the sustainability of the supply chain products has a positive effect.

H8: Based on table-breaking data, it can be concluded that with 95 percent confidence, the independent variable is the management readiness for the dependent variable of management on sustainable supply chain procurement management. Also, the value of the calculated coefficient of determination indicates that the independent variable of this research has the ability to predict about 40% of the dependent variable. The readiness of the management to manage the supply chain management of the sustainable supply chain has a positive effect.

Hypothesis	The significance level	Watson Camera	Adjusted coefficient of determination	The coefficient of determination	The correlation coefficient	Result
H1	0.000	2.008	0.190	0.192	0.438	Confirmation
H2	0.000	1.546	0.052	0.055	0.234	Confirmation
H3	0.000	2.065	0.426	0.427	0.654	Confirmation
H4	0.000	1.871	0.369	0.371	0.609	Confirmation
H5	0.000	1.724	0.290	0.292	0.540	Confirmation
H6	0.000	1.520	0.155	0.157	0.396	Confirmation
H7	0.000	1.693	0.468	0.469	0.685	Confirmation
H8	0.000	1.681	0.396	0.397	0.630	Confirmation

Table 3

### 4. Conclusion

All car companies have a supply chain that needs to be well managed so that the organization can succeed in achieving its goals. In this research, Iran Khodro, one of the largest car companies in Iran, has been studying the sustainable supply chain management. After analyzing the factors affecting sustainable supply chain management, data analysis showed that all the research hypotheses were confirmed. Hence, it is suggested that managers pay more attention to four factors that have a

positive commitment to sustainability and logistics management, including supplier management, manufacturer management, product monitoring, and logistics management in the organization to improve sustainable supply chain management. One of the ways to improve it is to better manage suppliers, including the selection of appropriate suppliers that have the importance of the environment and the sustainability of the supply chain as the main criterion for supply-side processes. From the director, as well as production management, managers for effective management of producers must have sufficient information on supply and demand, available capacity, production schedules and sales status, and sufficient supervision of the products by managers, including the quality, integrity and assembly of parts or The product is produced and other related material. Also, for managing logistics, executives need to plan appropriately, including knowledge of required resources, cost estimates, logistics scheduling, and control and monitoring of these cases. By following all the suggestions given in this research, managers are well they can implement sustainable supply chain management in their organization.

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