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A RESEARCH ON BARRIERS TO SUSTAINABLE SUPPLY CHAIN MANAGEMENT AND SUSTAINABLE SUPPLIER SELECTION CRITERIA

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Abstract

Firms have started to become aware of the fact that their suppliers' responsibility for sustainability has a great impact on their own development and reputation and that any organization's environmental sustainability is impossible without incorporating sustainable supply chain management applications into their activities. In this study, a survey was conducted on the firms that issue sustainability reports in Turkey. The purpose of the study is to examine issues that businesses see as obstacles to sustainable supply chain management and to search rankings of the criteria that can be used in sustainable supplier selection. According to the results of the study, supplier firm culture and financial costs are seen as obstacles to sustainable supply chain management, and amongst the criteria given for sustainable supplier selection, three criteria identified to have the highest importance value are, respectively, abolition of child labor and working conditions, quality, and reliability. According to the overall rankings of the criteria, economic criteria rank first, followed by environmental and social criteria.

Keywords: *Sustainability, Triple Bottom Line, Supply Chain Management, Sustainable Supply Chain Management.*

SÜRDÜRÜLEBİLİR TEDARİK ZİNCİRİ YÖNETİMİ İÇİN ENGELLER VE SÜRDÜRÜLEBİLİR TEDARİKÇİ SEÇİM KRİTERLERİ ÜZERİNE BİR ARAŞTIRMA

Öz

İşletmeler tedarikçilerinin sürdürülebilirlik konularındaki sorumluluklarının kendi gelişim ve itibarları üzerindeki etkisinin ve herhangi bir örgütün çevresel sürdürülebilirliğinin, sürdürülebilir tedarik zinciri yönetimi uygulamalarını içermeden imkânsız olduğunun farkına varmaya başlamışlardır. Yapılan çalışmada, Türkiye'de sürdürülebilirlik raporu yayınlayan işletmeler üzerine anket yoluyla bir araştırma yapılmıştır. Çalışmanın amacı, işletmelerin sürdürülebilir tedarik zinciri için engel olarak gördükleri konuları ve sürdürülebilir tedarikçi seçimi için kullanılacak kriterlerin önem

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derecelerini araştırmaktır. Araştırmanın sonuçlarına göre, tedarikçi firma kültürü ve finansal maliyetler sürdürülebilir tedarik zinciri yönetimi için engel olarak görülmektedir, sürdürülebilir tedarikçi seçimi için verilen kriterlerden en yüksek önem derecelerine sahip olan üç kriter ise sırasıyla, çocuk işgücü çalıştırmama ve çalışma koşulları, kalite ve güvenirlilik olarak tespit edilmiştir. Sürdürülebilir tedarikçi seçiminde kullanılabilecek kriterler genel ortalamalarına göre sıralandığında, ekonomik kriterlerin ilk sırayı aldığı ve bunu çevresel kriterler ve sosyal kriterlerin takip ettiği görülmüştür.

Anahtar Kelimeler: *Sürdürülebilirlik, Üç Boyutlu Sorumluluk, Tedarik Zinciri Yönetimi, Sürdürülebilir Tedarik Zinciri Yönetimi.*

INTRODUCTION

It is difficult to separate an organization, the environment and the society from one another as they are mutually dependant. For this reason, businesses should not endanger the environment or the society for the sake of their short-term profitability. Today, being profit-oriented is no longer enough for businesses; businesses must minimize their negative effects on the environment and have responsibility for their suppliers' attitudes towards child labor, health, safety, and pollution. In this context, sustainability which has three dimensions -economic, environmental and social- has become important to all business applications. Due to climate change, depletion of natural resources, wealth inequality, and corporate social responsibility, there is an ever-growing interest in improving organizations' social and environmental performance, and sustainability has begun to be integrated into a variety of missions and duties of organizations. Furthermore, it has become necessary to sustain processes along the value chain in order to contribute to sustainability (Gopalakrishnan et al., 2012: 193). Since more than 50% of a product's value is created by suppliers, businesses that want to operate in accordance with the principles of sustainability should take their supply chains into account entirely and ensure that there are sustainability practices in their supply chains (Hutchins and Sutherland, 2008: 1689; Paulraj, 2011: 21).

Recently, the concept of sustainability has begun to emerge in supply chain management (SCM) discipline in the literature as well. Sustainable supply chain management (SSCM) is the management of supply chain operations, resources, information, and funds, and aims to maximize the supply chain profitability while minimizing environmental impacts and maximizing social welfare (Hassini et al., 2012: 71). Sustainability of any organization is impossible without incorporating SSCM practices, and organization's environmental benefits diminish if the partners are not engaged in sustainability practices. Today, firms are well aware of the influence of their partners' irresponsible behavior on their own performance and reputation. Because of this, suppliers must be carefully evaluated and selected, and sustainability criteria must be taken into account during this process (Ageron et al., 2012: 169–170). In terms of the adoption of SSCM, it is necessary for businesses to reveal the barriers to SSCM and determine sustainable supplier selection criteria.

Despite the long history of sustainability, its implementation to the supply chain has begun recently. The relationship between SCM and sustainable development is emphasized in the researches on environmental management under different terminologies such as green purchasing, reverse logistic and reverse supply chain, product management and green supply chain, and social responsible purchasing (Krause et al., 2009: 18; Vachon and Mao, 2008: 1553). Most researches on SCM basically deal with the issues such as the environment, safety, and human rights separately, without considering the potential interrelationships amongst these or the other aspects of social responsibility. Since sustainability reporting is not mandatory and there are few firms issuing sustainability reports, there are not enough researches on SSCM in Turkey. The studies on SSCM available in Turkey are as follows. Erol et al. (2006) discussed the notions of reverse supply chain management, reviewing the relevant literature and the environmental directives, pointing to research opportunities for Turkey based on these discussions, and listed several research hypotheses and questions to be tested in field studies in Turkey. Zamantılı Nayır and Demiralay (2007) searched the meaning of corporate social responsibility and its importance to supply chains in food industry. Büyüközkan and Vardaloğlu (2008) explained the green supply chain concept and emphasized the points required for the success of green supply chain practices. Büyüközkan and Çiftçi (2011) focused on the problem of identifying an effective model based on sustainability principles for supplier selection in supply chains. Altuntaş and Türker (2012) analyzed how sustainable supply chains are strategically conceptualized and practiced in Turkey and examined sustainability reports of 10 production firms in terms of supply chain applications. The main purpose of this research is to look into SSCM barriers and sustainable supplier selection criteria for Turkey with a survey conducted on the firms that operate in Turkey and issue sustainability reports for Turkey. This study tries to contribute to the field of integration of sustainability into SSCM by determining the barriers to SSCM and the rankings of the criteria that can be used in sustainable supplier selection. The organization of the paper is as follows: First, in the literature review part, sustainability and SSCM concepts are introduced. Next, barriers to SSCM and sustainable supplier selection criteria are explained. Finally, the results of the survey conducted on the firms that issue sustainability reports for Turkey are presented.

LITERATURE REVIEW

In this section, the literature available on sustainability, SSCM, barriers to SSCM and sustainable supplier selection criteria are reviewed.

Sustainability

The awareness of the increasing impact of human beings on the earth has brought about the concepts of sustainability and sustainable development. The concept of sustainability has come into prominence in global sense by Brundtland

Report. In this report, prepared by the World Commission on Environment and Development (WCED), sustainable development is defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). In order to ensure sustainable development both in industrialized and in developing countries, the interaction and connection between three pillars of sustainability should be characterized. The balance between those three pillars cannot be achieved without understanding how societal and industrial activities affect the environment or how the decisions taken today affect the future generations. For this reason, increasing the knowledge and awareness has become necessary in sustainability issues (Hutchins and Sutherland, 2008: 1688).

On the other hand, we need to acknowledge that it is difficult for businesses to adopt WCED's commonly accepted macroeconomic definition of sustainability as it provides little guidance for organizations. It can be operationalised through "Triple Bottom Line" (TBL) concept which was developed by Elkington (1998). TBL considers and balances economic, environmental and social issues simultaneously from a microeconomic point of view (Gimenez and Tachizawa, 2012: 531; Govindan et al., 2013: 346; Hutchins and Sutherland, 2008: 1688). The main idea behind the TBL is that the ultimate success of a company should be measured not only by traditional financial bottom line but also with the company's social and environmental performance as well (Markley and Davis, 2007: 766).

While there are various interpretations of sustainability, TBL approach helps to make sustainability applicable as a fundamental concept (Büyüközkan and Çiftçi, 2011: 165). Through sustainability reports, organizations can provide information about their economic, environmental and social performance and demonstrate their commitment to sustainable development to internal and external stakeholders (Hu et al., 2011: 843). Sustainability reporting helps organizations to set goals, measure performance and manage change towards the goal of sustainable development. Sustainability reporting is used synonymously with TBL reporting, corporate social responsibility reporting, and non-financial reporting, etc. in the academic literature and practice (GRI, 2013). Global Reporting Initiative (GRI) and the United Nations Global Compact (UNGC) provide companies with guidance on the main principles of sustainability reporting when preparing sustainability reports (İMKB, 2013).

The issue of sustainability has gained more importance in supply chain operations in recent years (Büyüközkan and Çiftçi, 2011: 165). Supply chain managers are in an important position to impact -positively or negatively- the environmental and social performance through supplier selection, model and carrier selection, location decisions, and packaging choices, etc. (Carter and Easton, 2011: 47). Reduced packaging, more efficient design for reuse and recycling, safe storage and transportation, improved working conditions, ISO 14000 standards are some of the activities that make a business more attractive to

customers and suppliers and that fall into the area of TBL approach. These activities lead to lower health and safety costs, reduced turnover and recruitment costs, less absenteeism, lower labor costs, shorter lead times, improved product quality, lower disposal costs, high level of motivation resulting from improved working conditions, productivity, and increased organizational reputation (Carter and Easton, 2011: 49).

Sustainable Supply Chain Management (SSCM)

Supply chain management (SCM) is a term that has emerged and gained popularity in the last few decades. A supply chain consists of all parties involved in fulfilling customer requests. Bowersox and Closs (1996) defined SCM as follows: The supply chain includes all activities associated with the flow and transformation of goods and services as well as the flow of information from material sources to the end user. Management refers to the integration of all internal and external activities of a firm (Büyüközkan and Çiftçi, 2011: 164). In other words, SCM is the management of an organization's network that is connected with and involved in the process all the way from the acquisition of products and services to the end customer (Walker and Jones, 2012: 15).

As an organization's social impact is the sum of input and output throughout the supply chain, the best supply chain applications require more transparency along the supply chain (Vachon and Mao, 2008: 1554). Any irresponsible behavior of suppliers is likely to cause negative publicity, reputational damage, and costly legal obligations and reach to the focal company, and because of this, companies must ensure sustainability applications in their suppliers' facilities (Reuter et al., 2010: 46). A supply chain covers the whole production process, from the initial processing of raw materials to the delivery of the end product to the customer. Thanks to this, focusing on supply chain means a step towards the comprehensive development and implementation of sustainability (Linton et al., 2007: 1078). A supply chain consists of a number of businesses, and the sustainability of chain depends on the sustainability of each business (Ageron et al., 2012: 168; Hutchins and Sutherland, 2008: 1689; Krause et al., 2009: 18).

Organizations want to enhance sustainability profiles to meet the demands of various stakeholders, to comply with environmental legislations, and to tackle with the increase in the market pressure. Therefore, organizations have begun to pay attention to their supply chains. Now, academics and practitioners have begun to take account of sustainability issues in SCM and draw attention to the transformation to SSCM (Büyüközkan and Çiftçi, 2011: 165; Govindan et al., 2013: 346). SSCM is the management of material, information and capital flows as well as the cooperation among the companies along the supply chain while taking into account the goals of sustainability dimensions which are derived from the customer and stakeholder requirements. This way, the focus on environmental management and operations is moved from local optimization of environmental factors to the entire supply chain—stages from production to disposition of

products (Amindoust et al., 2012: 1668; Beske, 2012: 374; Büyüközkan and Çiftçi, 2011: 164; Erol et al., 2011: 1088; Gopalakrishnan et al., 2012: 194; Hutchins and Sutherland, 2008: 1688; Seuring, 2011: 478; Seuring and Müller, 2008a: 1702).

SSCM includes a firm's plans and activities for the integration of environmental and social issues into SCM in order to enhance the firm's and also its suppliers' and customers' environmental and social performance (Gimenez et al., 2012: 150). SSCM means that organizations are held responsible for their suppliers' environmental and social performance in addition to traditional financial performance (Pagell and Wu, 2009: 37; Pullman et al., 2009: 40; Walker and Jones, 2012: 15). According to the SSCM, environmental and social criteria need to be fulfilled by the members who want to stay within the supply chain (Büyüközkan and Çiftçi, 2011: 164; Erol et al., 2011: 1088; Gopalakrishnan et al., 2012: 194; Seuring and Müller, 2008a: 1702; Seuring, 2011: 478). SSCM covers concepts such as green or environmental SCM where businesses endeavour to minimize negative impacts on the environment. It also incorporates the social issues such as ensuring decent working conditions in their suppliers or sourcing goods ethically and fairly along the supply chain (Walker and Jones, 2012: 15).

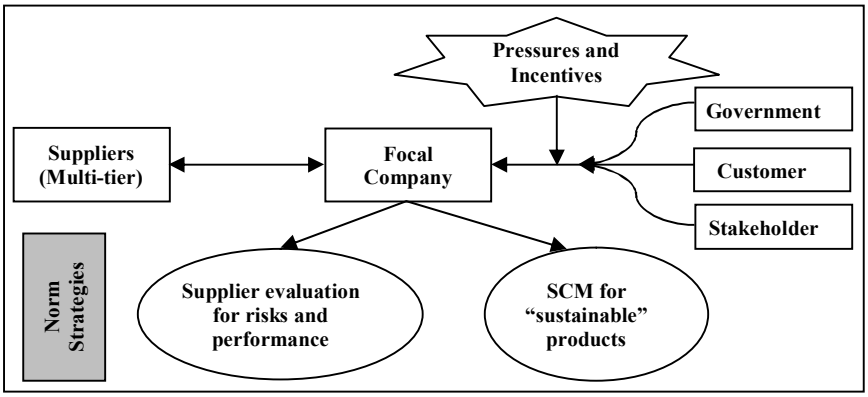
The researches about SSCM in the literature are as follows: Svensson (2007) described and illustrated the aspects of SSCM. Markley and Davis (2007) outlined the potential competitive advantage firms could create through the formation of a sustainable supply chain and described potential measures for managers to use. Seuring and Müller (2008b) presented the findings from a Delphi study where they identified four major topics: (1) pressures and incentives for SSCM, (2) identifying and measuring impacts on SSCM, (3) supplier management and (4) SCM. Seuring and Müller (2008a) offered a literature review on SSCM taking 191 papers published from 1994 to 2007 into account and offered a conceptual framework that summarized the research in this field. Seuring and Müller concluded that research on SSCM was dominated by green/environmental issues and social aspects, and also the integration of the three dimensions of sustainability was still rare. Keating et al. (2008) aimed to provide clues to industry and academia on how best to approach the challenge of developing a sustainable supply chain. Vachon and Mao (2008) explored the potential link between supply chain characteristics and sustainable development at the country level and indicated that supply chain strength is positively linked to all three dimensions of sustainable development. Pagell and Wu (2009) used 10 firms' case studies to build a coherent and testable model of the elements necessary to create a sustainable supply chain. Gold et al. (2010) explored the role of SSCM as a catalyst of generating valuable inter-organizational resources and possible sustained inter-firm competitive advantage through collaboration on environmental and social issues on the basis of a content analysis. Carter and Easton (2011) conducted a systematic review of the SSCM literature in the principal logistics and supply chain management journals, across a 20-year time frame. They stated that SSCM research has become richer theoretically and more rigorous methodologically, and there are numerous

opportunities for further advancing theory, methodology, and the managerial relevance of future inquiries. Paulraj (2011) sought to evaluate the effect of firm-specific resources and/or capabilities on SSCM and sustainability performance. They found that in addition to external stakeholder pressures, firm-specific capabilities can also have a significant influence on the environmental, social and economic performance of firms. Hassini et al. (2012) reviewed the literature on sustainable supply chains between the years 2000–2010 and provided frameworks for SSCM and performance measures. Ashby et al. (2012) examined the discipline of SCM within the context of sustainability. They stated that the environmental dimension is significantly better represented in the literature through specific processes at all stages of the supply chain but social dimension receives less emphasis than expected. Beske (2012) discussed the complementarities of dynamic capabilities and SSCM research and developed a framework which integrated dynamic capabilities into SSCM practices. Walker and Jones (2012) aimed to explore SSCM issues in companies that were recognized as leaders in their sectors and investigated what factors influence SSCM and how practice might change in the future. They drew useful lessons from leading companies for practitioners seeking to implement SSCM.

Barriers to Sustainable Supply Chain Management

Organizations adopt sustainability and deal with SSCM practices in order to respond to pressures and incentives from their environment --especially from government, NGOs and other stakeholders (Beske, 2012: 374). Triggers for SSCM are shown in Figure 2.

Figure 1: Triggers for Sustainable Supply Chain Management



Source: Seuring, S. and Müller, M. (2008a). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, 16 (15), p. 1703.

The issues that encourage SSCM are the pressures of and incentives from different groups, authoritative demands and regulations, responsibility towards stakeholders, obtaining competitive advantage, customer demand, and loss of

reputation. Stakeholders constitute the largest part, but customers and the governments are also important. Customers are of great importance because as long as the products and services are accepted by customers, it may be seen right to work with that supplier. Moreover, government control of any type is of great importance (Ageron et al., 2012: 170; Seuring and Müller, 2008a: 1703).

When businesses face pressure, they generally transmit this pressure to their suppliers. It has been identified by previous researches that organizations face internal and external barriers and enablers to SSCM. Internal enablers include top management commitment, supportive culture, and involvement of employees. Adopting environmental management systems is also beneficial for sustainable supply chains. For SSCM, cooperation with suppliers is important. In order to successfully implement SSCM, top management support, cross-functional teams, enhanced communication, and a win-win situation for all included parties are necessary (Beske, 2012: 375). Otherwise, enabling factors may turn into barriers.

Being proactive in sustainable supply chains gives organizations competitive advantage and helps them to manage their reputational and environmental risks. Adopting sustainable concepts in traditional SCM is very difficult, and there are many barriers firms face during the integration of sustainability consciousness into traditional SCM (Luthra et al., 2011: 231-257; Walker and Jones, 2012: 16; Zaabi et al., 2013: 895-905). Barriers to SSCM include lack of supportive corporate structures and processes, lack of management commitment, and depending on traditional accounting methods that don't facilitate reporting on TBL, consumers' lower price demands, and competitive pressures. Government regulations, lack of commitment among suppliers, industry type, product price, production capacity, supply chain configuration and location also constitute barriers to SSCM (Luthra et al., 2011: 231-257; Walker and Jones, 2012: 16; Ageron et al., 2012: 172; Zaabi et al., 2013: 895-905).

Barriers to SSCM can be grouped under the following headings;

Suppliers' facilities: An efficient information and technology system is necessary for supporting sustainable activities during various stages of product life cycle. For example a product development program which encompasses the design for the environment, recovery and reuse is very useful for sustainable goals (Luthra et al., 2011: 236; Zaabi et al., 2013: 898; Mittal and Sangwan, 2013: 299; Zhu and Geng, 2013: 8). Innovation and technology integrate innovation into the corporate culture, inducing new ideas and processes by all the employees of the firm. Lack of IT implementation and resistance to technology advancement adoption are important barriers to achieve efficient SSCM. (Luthra et al., 2011: 237; Zhu and Geng, 2013: 8). Because of this, IT implementation and adoption of technology advancements must be placed in suppliers' facilities.

Suppliers' human skills: Firms which have higher quality of human resources such as the ones having training programs of high quality will be in a

good position for the adoption and implementation of SSCM practices. The skills and the training of human resources provide new ideas for companies and enable them to adopt new technologies more easily. Poor quality of human resources is an important barrier to the implementation of SSCM practices in an organization (Luthra et al., 2011: 237; Zaabi et al., 2013: 896; Mittal and Sangwan, 2013: 299; Zhu and Geng, 2013: 8).

Financial costs: The investment required by sustainable methodologies such as green design, green manufacturing, environmentally friendly packing and disposal of hazardous wastes is high. IT enablement, advanced technology adoption, hiring qualified employees all requires a large investment. Lack of clear benefits like not being able to predict return on investment and consumers' desire for lower prices constitute barriers to SSCM. Therefore, financial costs constitute a major barrier to the implementation of SSCM practices (Luthra et al., 2011: 239; Zaabi et al., 2013: 897; Mittal and Sangwan, 2013: 299; Zhu and Geng, 2013: 7, 8).

Suppliers' top management commitment: Top management support is necessary for the success of any strategic program success. Top management encourages formation and implementation of sustainable initiatives across the organization. For this reason lack of top management commitment is one of the barriers to the implementation of SSCM (Luthra et al., 2011: 239; Zaabi et al., 2013: 898; Mittal and Sangwan, 2013: 299; Zhu and Geng, 2013: 8).

Suppliers' firm size: Small and medium-sized enterprises (SMEs) face a variety of barriers to the implementation of environmental practices that may not exist in the larger corporate arena (Herren and Hadley, 2010: 3; Zaabi et al., 2013: 896).

Sustainable Supplier Selection

Because of suppliers' essential role in supply chain functioning and their contribution to the firm's sustainability performance, suppliers must be carefully evaluated and selected (Ageron et al., 2012: 170). In building a sustainable supply base, supplier selection is an important activity for purchasing and supply management. Purchasing acts as a gatekeeper using predefined criteria in selection of suppliers. (Goebel et al., 2012: 8).

Since the 1960s, many researchers and purchasing practitioners have been focusing on the criteria that are needed for the selection and evaluation of potential suppliers. Dickson (1966) identified 23 different criteria -including quality, delivery, performance, warranty and claim policy, production facilities and capacity and technical capabilities- and concluded that quality, delivery and performance history criteria are the most important three criteria for supplier selection. Weber et al. (1991), Weber and Current (1993) and Ghodsypour and O'Brien (1998) reviewed past research on supplier evaluation methods and concluded that price was the highest ranked criteria followed by delivery and quality. Ho et al. (2010) reviewed past articles in order to investigate the most

popular criteria for supplier selection and evaluation and concluded that quality was the most popular criteria followed by delivery, price/cost, manufacturing capability and service. Liao and Kao (2011) found quality, price, and delivery performance are the most important supplier selection economic criteria (Govindan et al, 2013: 348). Economic aspects have been considered solely for supplier selection for many years. Purchasing managers make a selection from a range of suppliers using traditional evaluation and selection criteria such as price, quality, and delivery time for ensuring economic sustainability of a company and pay little attention to environmental and social criteria. After SSCM started to receive increasing interest in the sustainability and SCM area, academicians pointed out the importance of including environmental and social aspects to the traditional supplier selection criteria, and eventually, organizations started to include these criteria as well. Amindoust et al. (2012) determined the sustainable supplier selection criteria and sub-criteria and proposed a methodology for evaluation and ranking of a given set of suppliers based on those criteria and sub-criteria. Govindan et al. (2013) explored sustainable supply chain initiatives and examined the problem of identifying an effective model based on TBL approach for supplier selection operations in supply chains by presenting a fuzzy multi-criteria approach.

METHODOLOGY

Research Objectives

This study focuses on firms' demand for sustainability reporting of their suppliers, the barriers that the firms face in SSCM and their views about sustainable supplier selection criteria. By drawing on barriers to SSCM, supply chain, and sustainable supply chain selection criteria literature, we seek to identify the barriers and most important selection criteria.

Sample Selection and Data Collection

The research questions are addressed by means of an exploratory survey conducted among companies that issue sustainability report. The questionnaire was sent to the firms that issue sustainability reports according to GRI and UNGC guidelines. We found out that 36 firms that issued sustainability reports for Turkey prepared sustainability reports according to GRI guidelines. The firms that issue sustainability reports are taken from kurumsalsurdurulebilirlik.com website. Kurumsalsurdurulebilirlik com is responsible for data gathering and local communication on sustainability reports and practices in Turkey for GRI Sustainability Disclosure Database. 89 firms' extensive UNGC-COP (Communication on Process) reports were attained from unglobal compact website. The questionnaires were sent to 125 (89+36) firms in total. The questions about SSCM were prepared in the light of the researches of McKinsey (2010 and 2011), Ageron et al. (2012), Lee et al. (2009) and Govindan, et al. (2013). The data were collected through e-mail, and 55 questionnaires were taken into consideration. In

the analysis of the data obtained from the survey, descriptive statistics were calculated. Data were analyzed through SPSS 13.0 (Statistical Package for Social Sciences).

Descriptive Analysis

The distribution of respondents according to industry sectors and firms' number of employees are presented in Table 1. 16% of the 55 responding companies are in energy sector, 13% are in health care products sector, and 9% are conglomerates. The companies that have been marked as other (13%) are operating in communication consulting, household appliances, and promotional services sectors. 33% of the respondents have more than 1500 employees, 7% have between 901-1500, 15% have between 601-900, 9% have between 401-600, 5% have between 251-400, and 31% have fewer than 250 employees. The questionnaire was answered by the general manager, general manager assistant, auditor, managers responsible for corporate communications, and investment specialists. According to the results of this research, 95% of respondents want their suppliers to prepare sustainability reports.

Table 1: Industry Sectors and Number of Employees

Industry Sectors	**N**	**%**
Automotive	2	4
Textiles and Apparels	4	7
Metals products	2	4
Construction	3	5
Financial Services	3	5
Energy	9	16
Transportation and Logistic	2	4
Conglomerates	5	9
Telecommunication	2	4
Health care products	7	13
Food and Beverage Products	3	5
Chemicals	3	5
Information Technology	1	2
Public Agencies	2	4
Other:	7	13
TOTAL	**55**	**100**

Number of Employees	**N**	**%**
More than 1500	18	33
Between 901-1500	4	7
Between 601-900	8	15
Between 401-600	5	9
Between 251-400	3	5
Fewer than 250	17	31
TOTAL	**55**	**100**

Respondents were asked to assess barriers to SSCM. Barriers to SSCM, frequencies and percentages are listed in Table 2. Two dominating barriers were identified: the top score was reached by "suppliers' firm culture" (78.2%), and it was subsequently followed by "financial costs" (58.2%).

Table 2: Barriers to SSCM

	N	%
Suppliers' firm culture	43	78.2
Financial costs	32	58.2
Supply chain configuration	19	34.5
Return on investment (ROI)	18	32.7
Product price	18	32.7
Suppliers' firm size	16	29.1
Suppliers' human skills	16	29.1
Product characteristics	13	23.6
Suppliers' location	13	23.6
Suppliers' top management commitment	12	21.8
Suppliers' facilities	10	18.2

Firms' culture is a key driver for the application of new strategies and applications, but for Turkey, firms' culture often constitutes a barrier to the adoption of new applications. The investment required by sustainable methodologies and the consumers' desire for lower prices may constrain and generate barriers to SSCM practices. Firms are generally profit oriented and economic sustainability which is an important issue must be ensured by sustainable investments.

Several studies have addressed the financial costs as the most important barrier to sustainability and SSCM (Ageron et al., 2012: 175; Herren and Hadley, 2012: 2). In the study of Ageron et al. (2012), financial costs, green investments, ROI, product price, top management commitment, organizational culture of supplier firms, production capacity, human resources, supply chain configuration, location and size of suppliers were given as major barriers from the supply side. And they confirmed that financial preoccupations remain the principal barrier to SSCM. They identified financial costs, green investments, and ROI as top three barriers to sustainable supply management. As mentioned before, supportive culture is given as an enabler of SSCM in our survey; respondents see suppliers' firm culture as a barrier (not an enabler) to SSCM in Turkey. Financial costs and ROI constitute the top barriers for Turkish firms, and this is in line with the results of the Ageron et al. (2012).

Analysis of Supplier Selection Criteria

In the survey, respondents were asked to rate the importance of economic, environmental and social criteria that could be used in SSCM on a five-point Likert scale from not at all important (= 1) to extremely important (= 5). These criteria and their means are shown in Table 3.

When we ranked the criteria that could be used in SSCM according to the importance given, three criteria with the highest means are, respectively, working conditions and abolition of child labor (4.74), quality (4.73), and reliability (4.72). Traditional approach to supplier selection takes into account merely the economic

aspects, however in the present research; "abolition of child labor and working conditions" has the highest mean. This might be a result of the problems experienced by the businesses in the past. Sometimes a high level of environmental and social performance and reputation achieved by businesses can be damaged by its suppliers' poor environmental and social management systems and working conditions. For example, in 1996, Nike was vilified because some of its subcontractors were using child labor. For this reason, nowadays, businesses should control and monitor suppliers' operations in order to ensure that their suppliers are environmentally friendly and have social responsibility (Gimenez and Tachizawa, 2012: 531). The means of all of the economic criteria are over 4. Traditional economic criteria still pursue its importance for firms in the supplier selection and evaluation process. Social criteria on supporting community projects (3.74), supporting educational institutions (3.60), grants and donations (3.38) rank last according to the importance given. The means of all of the environmental criteria are below the means of the economic criteria (except flexibility).

Table 3: Supplier Selection Criteria for Sustainable Supply Chain Management

	Mean		**Mean**
Economic Criteria		**Environmental Criteria**	
Quality	4.73	Use of environmentally friendly materials	4.35
On time delivery	4.62	Recycling	4.35
Costs (product cost, ordering cost, logistic cost)	4.51	Checking and controlling of environmental activities	4.33
Lead time	4.51	Use of environmentally friendly technology	4.33
Technology Capability	4.37	Air and carbon emissions	4.31
Flexibility	4.07	Solid wastes	4.31
Overall Mean	**4.47**	Energy consumption	4.31
Social Criteria		Waste water	4.29
Working conditions and abolition of child labor	4.74	Raw material consumption	4.26
Reliability	4.72	Water consumption	4.26
Health and Safety Practices	4.64	Having environment-related certificates and environmental management systems like ISO 14001	4.20
Equity of labor sources, diversity and discrimination	4.30	Eco-design and green packing	4.14
Long-term relations	4.23	Green Image	3.87
Education and service infrastructures	4.12	**Overall Mean**	**4.26**
Social responsibility	4.01		
Flexible working arrangements	3.76		
Supporting community projects	3.74		
Supporting educational institutions	3.60		
Grants and donations	3.38		
Overall Mean	**4.11**		

Traditionally, organizations take into consideration price/cost, quality, and delivery criteria when assessing suppliers' performance. Nowadays, sustainability plays an important role in the long term success of the supply chain, and the

purchasing process has become more complicated as a result of environmental and social pressures. Most of the organizations take economic, environmental, and social concerns into account and begin to pay attention to the sustainability operations of the suppliers. Sustainable performance criteria have to be taken into account to incorporate SSCM practices and to achieve sustainability, which is known by firms.

Overall means for economic, environmental and social criteria are calculated as follows: 4.47 for the economic criteria, 4.26 for the environmental criteria, and 4.11 for the social criteria. Therefore, when the criteria that can be used in SSCM according to the level of importance given are ranked, economic criteria are followed by environmental and social criteria. After all, the traditional supplier selection criteria have the highest overall means.

In the study of Ageron et al. (2012), they confirmed that quality and price were two most important criteria and other traditional criteria were highly valued. They observed that the importance given to environmental issues exceeded social responsibility issues. The results of this study are in line with the results of Ageron et al.'s (2012) study.

CONCLUSION

In this day and age, customers buy products considering not only the brand of the product but also the supply chain that produce the product. Because of this, businesses are affected by and held responsible for their suppliers' operations, and sustainability issues have gained more importance in supply chain operations. Suppliers that are sensitive to environmental and social issues increase the efficiency of purchasing firms/companies and decrease the probability of problems in procurement and provide protection for organization's reputation. Firms are well aware of the importance of their partners' responsibility for sustainability on their own development, and any organization's environmental sustainability is impossible without incorporating SSCM applications. Suppliers are important drivers of the sustainable supplier chain. Therefore, when selecting suppliers, firms do not only take into account the traditional economic criteria but also must give importance to the other dimensions of sustainability as well. In order to investigate the barriers to SSCM and determine importance given to sustainable supplier selection criteria, a survey was conducted on the firms that operate in Turkey and issue sustainability reports for Turkey. According to the results of the research, most of the firms want their suppliers to prepare sustainability reports. Suppliers' firm culture and financial costs are seen as obstacles to sustainable supplier management. When the criteria that can be used in SSCM are ranked according to the importance given, three criteria with the highest means are, respectively, abolition of child labor and working conditions, quality, and reliability. As a result of problems experienced by the businesses, the "abolition of child labor and working conditions" criterion amongst the social criteria has the highest mean.

Instead of traditional economic criteria, a criterion amongst the social aspects having the highest importance indicates a considerable progress towards SSCM.

Businesses, as part of the prevention and risk minimization strategy, must ensure that their suppliers operate environmentally friendly and socially responsible. Tomorrow's businesses will be held responsible not only for creating economic value, but also on the basis of their provision of sustainability. Integration of sustainability into supply chains is a significant and evolving field. In order to achieve a sustainable supply chain, all of the members of the chain, from suppliers to top managers, must be aware of, knowledgeable about and ready for sustainability issues. Partnerships with suppliers that are strong in economic, environmental and social fields will enhance the performance of the supply chain and extend the sustainability beyond the businesses' boundaries to their supply chain partners.

The purpose of this study is to contribute to the SSCM field by identifying barriers to the implementation of SSCM for the firms that issue sustainability reports. The findings of the study can be useful as it outlines the major barriers and sustainable supplier selection criteria. In Turkey, firms are very slow in adopting sustainable practices. Because of this, firms that issue sustainability reports are so few, and this is one of the limitations of this study. Another limitation of the study is that the list of barriers may be incomplete. This research can be extended by including other developing countries and/or by including more barriers.

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APPENDIX: Survey

What is your company's activity field?
Automotive
Textiles and Apparels
Metals products
Construction
Financial Services
Energy
Electronics
Transportation and Logistic
Conglomerates
Telecommunication
Health care products
Food and Beverage Products
Chemicals
Information Technology
Public Agencies
Other:

What is your position in your organization?
…..

How many people work in your company?
Fewer than 250
Between 251-400
Between 401-600
Between 601-900
Between 901-1500
More than 1500

Do you want your suppliers to prepare sustainability report?
Yes
No

What are the main barriers to sustainable supply chain management?
(You can select more than one option.)
Financial costs
Return on investment (ROI)
Product price
Product characteristics
Supply chain configuration
Suppliers' location
Suppliers' firm size
Suppliers' firm culture
Suppliers' facilities
Suppliers' top management commitment
Suppliers' human skills

Evaluate importance degrees of economic criteria which can be used for supplier selection in sustainable supply chain management?

	Not at all important 1	Slightly important 2	Neither important nor unimportant 3	Very important 4	Extremely important 5
Quality					
Costs (product cost, ordering cost, logistic cost)					
Lead time					
On time delivery					
Flexibility					
Technology Capability					

Evaluate importance degrees of environmental criteria which can be used for supplier selection in sustainable supply chain management?

	Not at all important 1	Slightly important 2	Neither important nor unimportant 3	Very İmportant 4	Extremely İmportant 5
Air and carbon emissions					
Waste water					
Solid wastes					
Raw material consumption					
Energy consumption					
Water consumption					
Having environment-related certificates and environmental management systems like ISO 14001.					
Checking and controling of environmental activities					
Use of environmentally friendly materials					
Use of environmentally friendly technology					
Eco-design and green packing					
Recycling					
Green image					

Evaluate importance degrees of social criteria which can be used for supplier selection in sustainable supply chain management?

	Not at all important 1	Slightly important 2	Neither important nor unimportant 3	Very important 4	Extremely important 5
Long-term relations					
Reliability					
Equity of labor sources, diversity and discrimination					
Flexible working arrangements					
Working conditions and abolition of child labor					
Health and safety practices					
Education and service infrastructures					
Supporting educational institutions					
Grants and donations					
Supporting community projects					
Social responsibility					