HOW TO SELECT THE MOST SUSTAINABLE SUPPLIER CONFORMING TO YOUR PURCHASING NEEDS: A MULTI-CRITERIA-DECISION-MAKING MODEL FOR SUSTAINABLE PROCUREMENT

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Abstract
Recently increasing popularity and the substantial need for sustainability in supply chain requires new designs of procurement which is being regarded as the most important driver to push the suppliers to become more sustainable. Manufacturing firms, in the name of survivability on the market, accept sustainability principles and transform their corporate culture in this respect. The power of procurement is being regarded yet as a regulatory tool by the national governments and international organizations while establishing sustainability in supply chains. In this study, we intend to establish a multi-criteria-decision-making model to select the most sustainable supplier/manufacturer conforming to the current purchasing requirements of a sustainable manufacturing company. In doing so, the procuring company will foster the suppliers to becoming a sustainable company in the supply chain by both a product redesign and by the whole manufacturing process.

Keywords: Sustainability, manufacturing company, supply chain.

Satın Alma İhtiyaçlarınıza Uygun En Sürdürülebilir Tedarikçi Nasıl Seçilir: Sürdürülebilir Satın Alma İçin Çok Kriterli Karar Verme Modeli

Öz
Tedarik zincirinde son zamanlarda artan popülerlik ve sürdürülebilirliğe olan önemli ihtiyaç, tedarikçileri daha sürdürülebilir olmaya iten en önemli itici güç olarak kabul edilen yeni satın alma tasarımlarını gerektirmektedir. Üretim yapan firmalar piyasada kalıcı olmak adına sürdürülebilirlik ilkelerini benimsemekte ve kurum kültürlerini bu doğrultuda dönüştürmektedir. Satın alma birimi, tedarik zincirlerinde sürdürülebilirliği tesis ederken ulusal hükümetler ve uluslararası kuruluşlar tarafından bir düzenleyici araç olarak görülmektedir. Bu çalışmada, sürdürülebilir bir üretim şirketinin mevcut satın alma gereksinimlerine uyan en sürdürülebilir tedarikçi/üreticiyi seçmek için çok kriterli bir karar verme modeli kurmayı amaçlıyoruz. Bunu yaparken, satın alma bölümü, tedarikçilerin hem yeniden ürün tasarımı hem de tüm üretim süreci yoluyla tedarik zincirinde sürdürülebilir bir şirket olmalarını teşvik edecektir.

Anahtar Kelimeler: Sürdürülebilirlik, üretim şirketi, tedarik zinciri.

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Introduction

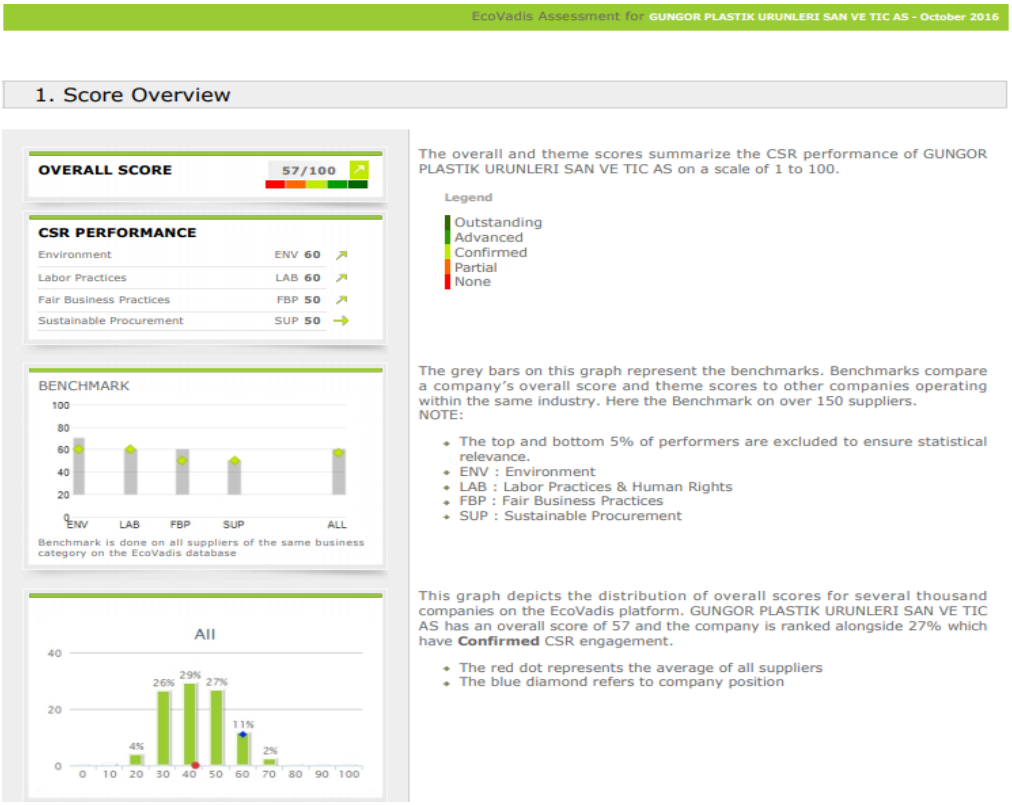
Sustainability, nowadays, gains more and more importance almost in all sectors especially in designing supply chain. Increasing consumption of energy and environmental destruction of natural resources by human beings as well as fossil combustion which causes green house gas emissions are upcoming threats in terms of sustainabilty to all ecosystems for the near future (Rohrmus et.al 2011). The manufacturing industries and resource consumption and total CO2-emissions of the world (OECD, 2008). However, there is a significant potential to reduce the resource consumption through sustainable initiatives and technologies (Karlsson 2011).

The United Nations Conference on Environment and Development in 1992 invited world leaders and citizens to have their attention to environmental destruction. In addition to economic and environmental issues of sustainability, social issues have been recognized also as a third consideration about sustainability at this conference. This challenge raised procurement practices as a sanctionary tool for policy and planning factors (Fisher 2013). It may be inevitable that a manufacturing company, not only as a supplier but also as a buyer, has to be in a sustainable supply chain. The external customers of the manufacturing companies might have already accepted an entire sustainable understanding and might have been implementing it during all their processes. In addition to that, the decisions taken by international organizations such as UN, World Bank, and EU might have already started to foster the manufacturing companies to implement sustainability factors in their procurement – production – sales flow. In this case, the change will make an influence not only on that process but also on the whole company culture. EU public authorities try to make a substantial contribution to achieve local, regional, national and international sustainability goals by using their purchasing power. As an impact of procurement on sustainable supply chains, estimated total expenditures by EU public authorities account for approximately 19% of the EU GDP (Tosoni 2013).

Many definitions of sustainable (public) procurement (Fisher 2013), (The State of Queensland 2009), (DEFRA 2006), (American society of civil engineers, 2020), and (Agbesi, 2018) primarily use terminology like "strategic concern and political project, a technical exercise, a case for procurement professionals, linking minimization of social and environmental risk with enhanced organizational image, cost savings (based on life-cycle costing methodologies), a case for procurement professionals, and a technical exercise. We frequently encounter formulations that refer to a strategy that generates value for money over the long term in terms of advantages for society, the economy, and the environment in addition to the company. In response to the question "why sustainable procurement?" it lowers a company's carbon footprint and environmental waste, which has long-term business benefits like an improved public image, competitive advantage through innovation, and potential economic benefits through improved efficiencies, longer lasting materials, and less expense on waste disposal and cleanup (Ramkumar and

Jenamani 2015). On the other side, client expectations for environmentally friendly goods and services and growing legislation are some of the forces behind sustainable procurement initiatives. According to Ramkumar and Jenamani (2015), more businesses are using these programs as a part of their social responsibility initiatives recently. Through increased internal quality and operational efficiency, innovation, efficiency, openness, and social and environmental responsiveness, sustainable procurement methods assist firms in achieving greater financial benefits (Islam et al., 2017). Proactive purchasing, value generation, cost reduction, risk management, and compliance seem to be the benefits of sustainable procurement as a part of the procurement process. (Oracle, 2015). Sustainable supplier selection (SSS) is a complex multi-criteria decision-making process that is crucial because supplier selection is one of the most crucial steps in the entire procurement process. The outcome of this decision will determine whether the sustainable procuring department's efforts with suppliers are successful or unsuccessful. A prerequisite for supplier selection is the incorporation of sustainability factors into conventional supplier selection procedures (Phochanikorn and Tan, 2019).A important and difficult job for buying departments is how to set up an efficient assessment system and approach when selecting sustainable suppliers (Phochanikorn and Tan, 2019).Most studies in the field of supplier selection methods employ MCDM techniques based on standard fuzzy set theory to address unclear information and compute weights without considering how each aspect would affect the decision-making process's outcomes (Phochanikorn and Tan, 2019).

Figure 1: Güngör Plastik 2016 Sustainability Score



Source: (EcoVadis, 2016)

As mentioned above sustainability has three main categories that are called economic, social and environmental sustainability (Garbie 2013), (The State of Queensland 2009). While economic sustainability relates with the finacial stability and the costs, environmental sustainability refers to the impacts of firms' activities such as manufacturing, purchasing and selling etc.- the least known side, social sutainability deals with life standards of people such as health, safety and well-being aspects (Raunak, 2015).

Table 1: Sustainability dimensions

ECONOMIC SUSTAINABILITY	SOCIAL SUSTAINABILITY	ENVIRONMENTAL SUSTAINABILITY
- Globalization Issues - Emerging Issues Innovation - Reconfiguration - Competitive trategies Appraisal Performance - Flexible Organization Management	- Work Management - Human Rights - Societal Commitment - Customers Issues - Business Practices	- Environment Management - Use of Resources - Pollution and Dangerousness - Natural Environmental

(Source: Raunak, 2015)

About five years ago researchers (Touboulic and Walker 2015) were thinking that quantitative measurement of sustainability performance indicators should have been included in economic, environmental and social dimensions. Today, as a provider of business sustainability ratings, EcoVadis' sustainability scorecards provide quantitative environmental, social and ethical rates of the organizations across 198 purchasing categories and 155 countries (PR Newswire, 2019). Since the rates are in quantitative measurements, we can use them in TOPSIS which is one of the most usefull MCDM model for selecting the most sustainable supplier as per our purchasing needs. In this paper, we will be seeking to finding out the weighs in quantitative percentage of the criteria that will be used in TOPSIS model trough AHP.

Literature Review

Fisher (2013), in his research, questioned the goals that are targeted to achieve by sustainable public procurement. In addition to economic, environmental and social aspects of sustainability the author who claimed that there is a political side of becoming able to get sustainability by way of using government procurement identified the negative and positive sides of European Union Public Procurement Directives.

Tosoni (2013) highlighted the emphasis of the European Union on public procurement as a tool to be used in obtaining social and environmental objectives but he criticized the Union on remaining not clear how to integrate sustainability principles into procurement. The author who studied the European Union Public Procurement Directives regarding to WTO (World Trade Organization) Government Procurement Agreement (GPA) claimed that this agreement gave openness to sustainable procurement principles and is going to help UN lawpeople draw the legal framework of the subject.

Rankumar and Jenamani (2015) defined 26 factors required by supply chain sustainability through online auctions and procurement and they gathered them in six main dimensions. The writers who gathered the selection of the dimensions and the criteria in three phases used analytic network process (DANP) based on the Decision Making Trial and Evaluation Laboratory (DAMATEL) as a multi-criteria decision-making (MCDM) for solution and they tried to find out dependency weights using the criteria themselves.

Gold and Awasthi (2015), argued that from now on, the products manufactured by the companies must have sustainabiliity standards which can be established in the criteria of supplier selection and evaluation processes. The authors supported their arguments with a two-step fuzzy decision making model which they used for selecting the supplier and their second tier supplier.

Setiadi and Abduh (2020) investigated how to organize sustainable concrete work through the planning of sustainable procurement, the integration of sustainable concepts into specifications, supplier selection, contract management, assessment of bids, and supplier performance.

It is commonly acknowledged that one of the key facilitators of SSCM is the depth and quality of the connection between a company and its suppliers. A collaborative approach to SC relationship management is likely to be more successful in attaining sustainable development goals, according to several experts in the area. Little study, however, has examined collaborative SSCM from a more nuanced standpoint or particularly evaluated its viability outside of the setting of major firms working together on environmental initiatives.

According to Grandia and Voncken (2019), the lack of social kinds of GPP prevents direct generalization of GPP to other types of sustainable public procurement (SPP).
In their study, Kumar et al. (2016) claimed that their method helped managers take into account the language judgment of the decision-makers and translate it into a quantitative scale. Poor performance will be outranked after this strategy is applied, which will aid in choosing the best green supplier for the organization's needs.

By concentrating on PCS (Private Certification Systems), which have arisen as governance instruments for sustainable development and regulate social and environmental norms across global supply chains, D'Hollander and Marx (2014) attempt to state engagement with private governance.

To identify uncertainties and dependencies among criteria as well as to examine the weights of the criteria, Phochanikorn and Tan (2019) proposed a method combining intuitionistic fuzzy set theory (IFS) with a decision making trial and evaluation laboratory (DEMATEL) combined with an analytic network process (ANP). Results indicate that the proposed model is capable of not only identifying the most environmentally friendly supplier, but also of improving the socio-environmental performance of the enterprises, which is essential for achieving sustainable development.

By taking into account both quantitative preferences like cost, supplier capacity, and carrier capacity along with qualitative criteria like quality, reliability, social, and environmental factors for the selection of suppliers and carriers, Kaur and Singh (2019) proposed a flexible dynamic sustainable procurement (FDSP) framework for global supply chains.

In order to integrate social and environmental sustainability factors into the procurement process holistically, Laosirihongthong et al. (2019) employed FAHP to evaluate suppliers and allocate orders in a sustainable manner.

According to Waris et al. (2019), the Analytic Hierarchy Process (AHP) is a recommended method for generating a sustainable procurement index with reliable sensitivity analysis findings for purchasing construction equipment. The suggested procurement index, according to the proponents, will aid decision-makers in the process of buying environmentally friendly construction equipment.

Supçiller and Çapraz (2011) combined AHP and TOPSIS to choose the best supplier for a recurring demand for purchases. Through AHP, they calculated the criteria's weights, which they then entered into TOPSIS.

Integrating Sustainability Criteria Into Procurement Process

The ISO (International Organization for Standardization) 20400 standards for sustainable procurement are not certification requirements but rather a set of guidelines for organizations looking to incorporate sustainability into their procurement practices (Setiadi and Abduh, 2020). Sustainable manufacturing can be defined as producing outputs not only in a nonpolluting but also economic way, while preserving energy and natural resources. Besides the maufacturing operations and products have to be safe both for employees and consumers in social terms (Norsiah Hami et al 2015). A manufacturer must integrate social and environmental factors into the enterprise to become a sustainable company (Greenberg and Quillian 2012). On the other hand, environmental regulations can lead to creativity and vital improvements such as, new materials, new technologies and new functionalities (Dalmarco et al 2015).

Two directives were approved in 2004 by the Council and European Parliament in order to provide a clear framework and modernize public procurement at the EU level. The directives make it permissible for contracting authorities to take environmental and social factors into account when making purchasing choices (D'Hollander and Marx, 2014).

When it comes to the relationship between these three pillars and procurement, social procurement serves as a sign of social and ethical accountability for issues like labor laws and worker rights as well as for favorable social outcomes from the acquisition of goods, services, and works, thereby enhancing the procurement's value (The State of Queensland 2009). Environmental considerations include the lifespan of the good or service (The State of Queensland 2009): Impact on the environment, Resource usage, including the use of non-renewable resources, Waste volume and kind, End-of-life decisions (such as recyclability, resource recovery), and Energy use and type of energy used. • The quantity of hazardous and poisonous waste; the level of pollution, noise, and emissions. Some of the economic issues that need to be addressed include acquiring capital that results in lower through-life costs, such as through lower annual operating and maintenance costs, reexamining requirements and demand at the source to avoid unnecessary procurement, lowering end-of-life disposal costs and impacts, enhancing supply chain efficiency, and cost savings.

How To Get And Evaluate Sustainability Measurements Of The Suppliers

Manufacturing operations and products have to be safe both for employees and consumers in social terms (Hami et al 2015). Sustainable manufacturers must report their performance to accepted authorities, such as Global Reporting Initiative and Carbon Disclosure Project, depending on particular geography and industry (Greenberg and Quillian 2012), and they also reveal voluntarily their environmental and social performance. This mechanism makes a corporate image of socially responsible enterprises

(Rover et al 2015). But, unless a catastrophe in the industry or just leaks of negative news occure general reports are not made (Lee and Hutchison 2005). So disclousers of manufacturers must be considered as credible by stakeholders, consumer, supplier et al. (Bartley et al 2015). Another tool for sustainabilty measurement is third party certification programs and management system standarts. An authorized third party certifies and so decides on whether a manufacturer meets the required environmental and social performance in terms of sustainabilty (Greenberg and Quillian 2012). Management system standards is another option. One of the most common used mechanism for sustainabilty standardization is ISO 14000 series. Thanks to the environmental management standards, manufacturers can be aware of their production activities' impact on environment and they can benchmark their sustainability performance in particular industry.

A procurement process can be as follows:

1. Preparation and planning,
2. Publication,
3. Submission of tenders and selection of tenderers,
4. Evaluation of tenders
5. Awarding the contract,
6. Contract implementation (European Commission 2015).

Finding suitable suppliers is a prerequisit to start with selecting the most suitable one. From a traditional perspective, only price analysis could be enough, but nowadays only having the lowest cost isn't a wise solution. Sustainability ıssues are getting more and more important. It's a big challenge to relate the balance of cost benefit and sustainabilty (Department of Housing and Public Works Procurement Transformation Division 2009). Under the open competittion circumstances, how the firm will balance the sustainability and its other objectives is a challenging question waiting for answer. The main rationale of the firms' foundation is assuring their sustainable competitive advantages. It can be achieved by maintaining profit ration at the highest level. For high profit, low raw material costs, also low labor costs must be ensured. While those issues are indispensable for the managers and also for the purchasers, sustainability is a big challenge for competitive firms (Fisher 2013). Despite the fact that numerous studies have concentrated on evaluating suppliers from a variety of angles, there has been little research on how best to distribute purchases among favored suppliers who comprehensively meet the financial advantages, environmental goals, and social requirements. Due to current pressure on global sustainable supply chain norms, the necessity for a holistic strategy is increased. (Laosirihongthong et. al., 2019).

Figure 2: Firm's sustainability process

Source: Kannegresser 2014

The Environmental Factors of Sustainable Procurement

The purchasing process is the window of a firm opening to external environment. The purchasing and supply management are at the centre of sustainability affairs. But howewer it doesn' t only depends on itself or it's willingness toward sustainability. A firm is as sustainable as its suppliers are. A firm's sustainability doesnt just refer to the direct relationship between the firm and its first suppliers. It also implies the other dealings which take place between its suppliers and suppliers' suppliers (Miemczyk and Johnsen). So it is a sustainability chain which starts from the secondary or tertiary suppliers and continues during the process.

In last decades, the old adversarial relationship between supplier and the purchaser has changed a lot. The new form indicates that from the beginning of the contract, both of the parties become candidates of being strategic partners (Aluntaş ve Türker 2011) What are the barriers or incentives for sustainability in pocurement? A survey explains this question. It was conducted as sending e-mail to over 1000 public procurement professionals in 25 countries.

Table 3: Perceived barriers to implementing SP

	UK (%)	**Western Europe (%)**	**Eastern Europe (%)**	**Scandinavia (%)**	**USA/Canada (%)**	**Rest of the world (%)**	**All Countries (%)**
Financial	48.1	16.3	11.1	10.3	34.6	18.2	30.4
Informational	12.3	12.2	5.6	6.9	7.7	9.1	9.9
Legal	1.9	8.2	2.8	6.9	7.7	0.0	4.6
Managerial/Structural	21.7	8.2	2.8	3.4	5.8	9.1	11.7
Political/Cultural	5.7	8.2	2.8	0.0	5.8	18.2	5.7
Product/Quality	5.7	4.1	2.8	0.0	9.6	27.3	6.0
Priority	8.5	2.0	0.0	0.0	3.8	0.0	4.2

Source: Brammer and Walker 2011

Being sensitive in environmental and social ıssues is an attractive feature for a supplier. The knowing of that "Sustainable supplier must be working with sustainable supplier" may attract the firms' attention. By this way, suppliers may create new markets for themselves. In manufacturing industry, firms know that sensitive suppliers provide them reduced likelihood of supply disruption. So, for the purpose of sustainable procurement, the companies should make their suppliers as sustainable as the highest degree at which they want to be.

Conclusion

This paper intend to establish a multi-criteria-decision-making model to select the most sustainable supplier/manufacturer conforming to the current purchasing requirements of a sustainable manufacturing company. In conclusion, selecting the most sustainable supplier that aligns with your purchasing needs is a crucial step towards achieving sustainable procurement practices. The multi-criteria decision-making model presented in this article provides a comprehensive framework to guide organizations in making informed and responsible choices when it comes to supplier selection. Implementing the multi-criteria decision-making model discussed in this article requires commitment and collaboration from all stakeholders involved in the procurement process. It demands a shift towards a more sustainable mindset and a willingness to prioritize long-term benefits over short-term gains. However, the rewards are substantial, as sustainable procurement not only mitigates environmental and social risks but also enhances reputation, reduces costs, and fosters innovation and resilience within the organization. Through this research, we have highlighted the importance of sustainable procurement in promoting

environmentally responsible practices, social equity, and long-term economic viability. By adopting this model, researchers and procurement professionals can make informed decisions that align with their organization's sustainability goals and contribute to a more sustainable supply chain. One key aspect of the model is its ability to consider multiple criteria simultaneously, enabling a holistic assessment of supplier performance. This approach goes beyond traditional procurement practices that primarily focus on cost and quality, allowing organizations to prioritize sustainability factors when selecting suppliers. By integrating environmental impact, social responsibility, and economic considerations, the model empowers researchers to make sustainable choices that lead to positive impacts across various dimensions.

Furthermore, the model provides a structured framework that enhances transparency and accountability in supplier selection processes. Researchers can use it to objectively evaluate potential suppliers, ensuring that sustainability considerations are systematically integrated into the decision-making process. This not only helps organizations identify suppliers with strong sustainability practices but also fosters continuous improvement by encouraging suppliers to align with sustainability standards. It is worth noting that the model presented in this article is a guide and can be adapted to suit the specific needs and context of different organizations. Researchers and procurement professionals are encouraged to tailor the criteria and weightings according to their unique requirements and industry-specific challenges. Additionally, ongoing research and collaboration across academia, industry, and government are vital for refining and advancing sustainable procurement practices. In conclusion, the multi-criteria decision-making model presented in this article offers a valuable tool for researchers and procurement professionals seeking to select the most sustainable supplier in accordance with their purchasing needs. By embracing sustainability as a fundamental criterion in supplier selection, organizations can drive positive change, contribute to a more sustainable future, and create a competitive advantage in the marketplace.

Bibliography

Agbesi, K., Fugar, F. D., & Adjei-Kumi, T. (2018). "Modelling the adoption of sustainable procurement in construction organisations. Built environment project and asset management", 8(5), 461-476.

Altuntaş, C., & Türker, D. (2012). Sürdürülebilir tedarik zincirleri: sürdürülebilirlik raporlarının içerik analizi. Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 14(3), 39-64.

Ashford, N. A., Clarke, R., Aloisi de Larderel, J., Oldenburg, K., de Hoo, S., & Kryger, J. (1994). "Government strategies and policies for cleaner production". UNEP.

Ashby, A., Leat, M., & Hudson-Smith, M. (2012). "Making connections: a review of supply chain management and sustainability literatüre". Supply chain management: an international journal, 17(5), 497-516.

Bartley, J., Buckless, F., Al Chen, Y. S., Harvey, S., Showalter, D. S., & Zuckerman, G. (2015). "How Widely Used Sustainability Metrics Distort Actual Performance—And a Solution to This All-Too-Common Problem". Environmental Quality Management, 24(4), 1-9.

Barbu, C., Negulescu, M., & Barbu, I. C. (2012). "A Theoretıcal Study Between The Two Envıronmental Management Systems: Eco Management Audıt Scheme-Emas-And Iso 14000". Journal of Environmental Management & Tourism, 3(2), 59.

Brammer, S., & Walker, H. (2011). "Sustainable procurement in the public sector: an international comparative study. International Journal of Operations & Production Management", 31(4), 452-476

Branco, M. C., & Rodrigues, L. L. (2006). "Corporate social responsibility and resource-based perspectives". Journal of business Ethics, 69, 111-132.

Bhinge, R., Moser, R., Moser, E., Lanza, G., & Dornfeld, D. (2015). "Sustainability optimization for global supply chain decision-making". Procedia Cirp, 26, 323-328.

Carlsston C. (2011). "Value System For Sustainable Manufacturing, Department Of Environmental Technology And Management", Dissertation Thesis, Linköping University.

Choongo, P., Paas, L. J., Masurel, E., van Burg, E., & Lungu, J. (2019).

"Entrepreneurs' personal values and CSR orientations: evidence from SMEs in Zambia". Journal of Small Business and Enterprise Development, 26(4), 545-570.

D'Hollander, D., & Marx, A. (2014). "Strengthening private certification systems through public regulation: The case of sustainable public procurement". Sustainability Accounting, Management and Policy Journal, 5(1), 2-21.

De Abreu Sofiatti Dalmarco, D., Hamza, K. M., & Aoqui, C. (2015). "The implementation of product development strategies focused on sustainability: From Brazil—The case of Natura Sou Cosmetics brand". Environmental Quality Management, 24(3), 1-15.

de Almeida, D. M., da Gama Madruga, L. R., Lopes, L. F. D., Avila, L. V., & Ibdaiwi, T. K. R. (2015). "Sustainability: a study of the level of ecological behavior of postgraduate students in Brazil". Environmental Quality Management, 25(2), 71-89.

DEFRA(2006) , "Procuring the Future – The Sustainable Procurement Task Force National Action Plan", London.

Department of Housing and Public Works Procurement Transformation Division (2009), "Procurement Guidance: Integrating sustainability into the procurement process".

DiSegni, D. M., Huly, M., & Akron, S. (2015). "Corporate social responsibility, environmental leadership and financial performance". Social Responsibility Journal, 11(1), 131-148.

European Commission (2015), "Public Procurement Guidance for Practitioners",Luxemburg

European Commission (2011) , "Buying Green: A Handbook on Green Public Procurement".

Fassin, Y., Van Rossem, A., & Buelens, M. (2011). Small-business owner-managers' perceptions of business ethics and CSR-related concepts. Journal of Business ethics, 98, 425-453.

Fisher, E. (2013). "The Power of Purchase". European Procurement & Public Private Partnership Law Review, 8(1), 2-7.

Garbie, I. H. (2013). "DFSME: design for sustainable manufacturing enterprises (an economic viewpoint)". International Journal of Production Research, 51(2), 479-503.

Gelderman, C. J., Ghijsen, P. W. T., & Brugman, M. J. (2006). "Public

procurement and EU tendering directives–explaining non-compliance". International Journal of Public Sector Management, 19(7), 702-714.

Grandia, J., & Voncken, D. (2019). "Sustainable public procurement: The impact of ability, motivation, and opportunity on the implementation of different types of sustainable public procurement". Sustainability, 11(19), 5215.

Greenberg, A., & Quillian, L. (2012). "Managing sustainable production: a framework for integrating sustainability in the manufacturing sector". Environmental Quality Management, 21(4), 25-40.

GreenBiz Group & Trucost., "State of Green Business", 2014, https://www.greenbiz.com/blog/2014/01/21/state-green-business-2014(Erişim tarihi: 03.06.2016).

Gold, S., & Awasthi, A. (2015). "Sustainable global supplier selection extended towards sustainability risks from (1+ n) th tier suppliers using fuzzy AHP based approach". Ifac-Papersonline, 48(3), 966-971.

Gupta, S., Dangayach, G. S., & Singh, A. K. (2015). "Key determinants of sustainable product design and manufacturing". Procedia CIRP, 26, 99-102.

Hami, N., Muhamad, M. R., & Ebrahim, Z. (2015). "The impact of sustainable manufacturing practices and innovation performance on economic sustainability". Procedia Cirp, 26, 190-195.

Hsueh, C. F. (2014). "Improving corporate social responsibility in a supply chain through a new revenue sharing contract". International Journal of Production Economics, 151, 214-222.

Jacobsen J. J. (2011), "Designing and Operating for Social and Environmental Responsibility", Sustainable Business and Industry, ASQ Quality Press Milwaukee, Wisconsin,

Islam, M. M., Turki, A., Murad, M. W., & Karim, A. (2017). "Do sustainable procurement practices improve organizational performance?". Sustainability, 9(12), 2281.

Kamande, M. W., & Lokina, R. B. (2013). "Clean production and profitability: An eco-efficiency analysis of kenyan manufacturing firms". The Journal of Environment & Development, 22(2), 169-185.

Kannegiesser, M., & Günther, H. O. (2014). "Sustainable development of

global supply chains—part 1: sustainability optimization framework". Flexible Services and Manufacturing Journal, 26, 24-47.

Karlsson, Christian (2011), "Value System for Sustainable Manufacturing - A study of how sustainability can create value for manufacturing companies", Master's thesis, LIU-IEI-TEK-A--11/01226--SE Linköping University

Kashmanian, R., Keenan, C., & Wells, R. (2010). "Corporate environmental leadership: Drivers, characteristics, and examples". Environmental Quality Management, 19(4), 1-20.

Kashmanian, R. M. (2015). "Building a sustainable supply chain: Key elements". Environmental Quality Management, 24(3), 17-41.

Kaur, H., & Singh, S. P. (2019). "Flexible dynamic sustainable procurement model". Annals of Operations Research, 273, 651-691

Knorringa, P. (2009). "Global companies, fair trade and responsible production". Teaching Business & Economics, 13(1), 18.

Kulatunga, A. K., Karunatilake, N., Weerasinghe, N., & Ihalawatta, R. K. (2015). "Sustainable manufacturing based decision support model for product design and development process". Procedia CIRP, 26, 87-92.

Kumar, P., Singh, R. K., & Vaish, A. (2017). "Suppliers' green performance evaluation using fuzzy extended ELECTRE approach". Clean Technologies and Environmental Policy, 19, 809-821.

Laosirihongthong, T., Samaranayake, P., & Nagalingam, S. (2019). A holistic approach to supplier evaluation and order allocation towards sustainable procurement. Benchmarking: An International Journal, 26(8), 2543-2573.

Low, J. S. C., Tjandra, T. B., Lu, W. F., & Lee, H. M. (2016). "Adaptation of the Product Structure-based Integrated Life cycle Analysis (PSILA) technique for carbon footprint modelling and analysis of closed-loop production systems". Journal of Cleaner Production, 120, 105-123.

Lee, T. M., & Hutchison, P. D. (2005). "The decision to disclose environmental information: A research review and agenda". Advances in accounting, 21, 83-111..

McWilliams, A., & Siegel, D. S. (2011). "Creating and capturing value: Strategic corporate social responsibility, resource-based theory, and sustainable competitive advantage". Journal of management, 37(5), 1480-1495.

Miemczyk, J., Johnsen, T. E., & Macquet, M. (2012). "Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels". Supply Chain Management: An International Journal, 17(5), 478-496.

"New Paths to Business Value: Strategic Sourcing—Environment, Health and Safety", Global Environmental Management Initiative (GEMI), 2010, http://www.gemi.org/resources/newpath.pdf, (Access Date: 03.06.2016)

Phochanikorn, P., & Tan, C. (2019). "A new extension to a multi-criteria decision-making model for sustainable supplier selection under an intuitionistic fuzzy environment". Sustainability, 11(19), 5413.

PR Newswire (2019), "2019 Sustainable Procurement Barometer: Sustainable Supply Chain Awareness Grows, 'Compliance Trap' Hinders Progress and Business Impact".

Oracle (2015), "Embedding Sustainability in the sourcing and Procurement Process", Oracle White Paper.

Ramkumar, M., & Jenamani, M. (2014). "Sustainability in supply chain through e-procurement—An assessment framework based on DANP and liberatore score". IEEE Systems Journal, 9(4), 1554-1564.

Rebelo, M. F., Santos, G., & Silva, R. (2016). "Integration of management systems: towards a sustained success and development of organizations". Journal of cleaner production, 127, 96-111.

Reverte, C., Gomez-Melero, E., & Cegarra-Navarro, J. G. (2016). "The influence of corporate social responsibility practices on organizational performance: evidence from Eco-Responsible Spanish firms". Journal of cleaner production, 112, 2870-2884.

Rodrigues, P., & Borges, A. P. (2015). "Corporate social responsibility and its impact in consumer decision-making". Social Responsibility Journal, 11(4), 690-701.

Rohrmus, D., Mose, C., Holst, J. C., Müller, K., Schedlbauer, M., Raschke, U., & Weinert, N. (2011). Sustainable manufacturing at siemens AG. "In Advances in Sustainable Manufacturing: Proceedings of the 8th

Global Conference on Sustainable Manufacturing" (pp. 79-84). Springer Berlin Heidelberg.

Rover, S., Murcia, F. D. R., & de Souza Murcia, F. C. (2015). "The determinants of social and environmental disclosure practices: The Brazilian case". Environmental Quality Management, 25(1), 5-24.

Schlosser, R., Klocke, F., & Lung, D. (2011). Sustainabilty in manufacturing–Energy consumption of cutting processes. In "Advances in Sustainable Manufacturing: Proceedings of the 8th Global Conference on Sustainable Manufacturing" (pp. 85-89). Springer Berlin Heidelberg.

Setiadi, T., & Abduh, M. (2020, June). "The study of sustainable procurement in the procurement of ready mixed concrete supplier". In IOP Conference Series: Earth and Environmental Science (Vol. 520, No. 1, p. 012004). IOP Publishing.

Seuring, S., & Müller, M. (2008). "From a literature review to a conceptual framework for sustainable supply chain management". Journal of cleaner production, 16(15), 1699-1710.

Sezen, B., & Cankaya, S. Y. (2013). "Effects of green manufacturing and eco-innovation on sustainability performance". Procedia-Social and Behavioral Sciences, 99, 154-163.

Supçiller, A., & Çapraz, O. (2011). "AHP-TOPSIS yöntemine dayali tedarikçi seçimi uygulamasi". Istanbul University Econometrics and Statistics e-Journal, (13), 1-22.

Tosoni, L. (2013). "The impact of the revised WTO government procurement agreement on the EU procurement rules from a sustainability perspective". European Procurement & Public Private Partnership Law Review, 8(1), 41-48.

Touboulic, A., & Walker, H. (2015). "Love me, love me not: A nuanced view on collaboration in sustainable supply chains". Journal of Purchasing and Supply Management, 21(3), 178-191.

The State of Queensland, Department of Housing and Public Works (2009), Procurement guidance: Integrating sustainability into the procurement process

UNEP(2009),"Sustainable Public Procurement Implementation Guidelines".

Walke, R. C., Topkar, V., & Kabiraj, S. (2010). Managing Risk for Green Supply Chain Management: Competitive Strategies for

Manufacturing Companies. Skyline Business Journal, 6(1), 1-60.

Voegtlin, C., & Greenwood, M. (2016). "Corporate social responsibility and human resource management: A systematic review and conceptual analysis". Human Resource Management Review, 26(3), 181-197.

Waris, M., Panigrahi, S., Mengal, A., Soomro, M. I., Mirjat, N. H., Ullah, M., ... & Khan, A. (2019). "An application of analytic hierarchy process (AHP) for sustainable procurement of construction equipment: Multicriteria-based decision framework for Malaysia". Mathematical Problems in Engineering, 2019, 1-20.

Winkler, H. (2011). "Closed-loop production systems—A sustainable supply chain approach". CIRP Journal of Manufacturing Science and Technology, 4(3), 243-246.