AN ANALYSIS OF ENVIRONMENTALLY CONSCIOUS PRACTICES IN TURKISH COMPANIES

İpek Özer[1], Erkan Bayraktar[1], Ekrem Tatoglu[2]
[1]Bahçeşehir University, Faculty of Engineering
[2]Bahçeşehir University, Faculty of Business Administration
34100, Beşiktaş, Istanbul
Turkey

ABSTRACT
Awareness on environmental pollution is increasing, and reducing carbon dioxide emissions is one of the leading concerns regarding the ecological environment. This empirical study explains using statistical data, how the level of environmentally conscious practices by Turkish companies varies according to different factors.
Keywords: Environmentally Conscious Practices, Green Supply Chain Management, Turkey.

1. INTRODUCTION

The concerns that the public has regarding to environmental pollution call everyone to be more environmentally conscious. Previous research studies prove that the greatest damage to the environment comes from the energy, transportation and industrial sectors [1]. Industrial societies are increasingly recognizing the need for modifying existing processes to more environmentally conscious practices (ECP) minimize environmental impact.

This empirical study explains using statistical data, how the level of environmentally conscious practices by Turkish companies varies according to different factors. A total of 34 questions in a six separate sections were asked to 519 participants to determine the environmental awareness of companies. Using multiple regression analysis, it is expected that the level of awareness in supply chain management potential polluters, environmental management drivers, competitive environment, and differentiation based competitive priorities and customer relationship are positively associated with the level of ECP.

2. ENVIRONMENTALLY CONSCIOUS PRACTICES

Environmental practices represent actions and programs within the firm that improve environmental performance, remediate problems, and minimize any environmental burden. Environmentally conscious business practices (ECBP) require a powerful supply chain, well-coordination and cooperation [2]. Therefore, the capability of supply chain should be sufficient [3]. Because of this, before implementing ECBP, organizations should identify supply chain strategies. The components of ECBP are grouped as; design for the environment (DfE), life cycle analysis (LCA), total quality environmental management (TQEM), environmental regulations and green supply chain management.

The goal of DfE is to consider the complete product life cycle when designing environmental aspects into a product or process. LCA focuses on the analysis of the design and identifies opportunities to reduce the environmental impacts, associated with a specific product, process, or activity [2]. TQEM is the application of total quality management with environmental regards. ISO 14000 is the most

popular kind of environment management system (EMS) which is defined as a management model established on the basis of risk analysis and developed for decreasing systematically and rationally the damages or risks that enterprises caused in the environment [4]. The Weee directive is a regulation restricting the waste and the RoHS restricts the use of some hazardous substances on electrical and electronically equipment [5]. Environmental management and supply chain management generates the term green supply chain management (GSCM) [3]. Motivated by an environmentally conscious mindset, it can also stem from a competitiveness motive within organizations [6]. GSCM is defined as: "Green Purchasing + Green Manufacturing + Green Distribution + Reverse Logistics" [6]. Previous literature support that the waste and emissions caused by the supply chain system members have become the main sources of serious environmental problems [7]. Therefore; logistics, reverse logistics, energy production, manufacturing process and packaging are analyzed as the biggest contributors to CO_2 emission in a supply chain.

The literature on drivers for environmentally conscious practices is grouped into internal (organizational factors) and external drivers that include regulation, customers, competition, and society [8]. The motives suggest that firms may be ecologically responsive to comply with legislation, to build better stakeholder relationships, to acquire economic wealth and competitive advantage [9].

3. CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT
Using literature support, the expected relationships among environmentally conscious practices; SCM potential polluters, environmental management drivers, competitive environment, competitive priorities and customer relations are discussed, and hypotheses relating these variables are developed.
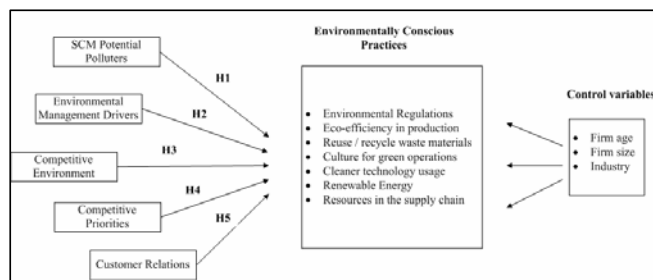

It is expected that all the five dependent variables has a positive effect on the implementation level of the environmentally conscious practices. The conceptual framework of the hypothesized relationships is delineated in Figure 1.

Figure 1. Conceptual Framework

4. OPERATIONALIZATION OF VARIABLES
All data used in the empirical analyses were from the administered questionnaire used earlier [2, 10, 11, 12]. The primary data is collected by asking the respondents to respond to statements that are organized on a Likert scale with five options such as "1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree".
The ECP were treated as the dependent variable. Questions asked to evaluate the implementation level of environmental practices. Respondents were asked to which of the supply chain components from logistics, reverse logistics, energy production, manufacturing process and packaging is the biggest factor to increase the level of CO_2 emission. An index composed of four items was also used to rate the environmental management drivers that forces the companies to go green; customers, competition, government policy and company. Six indicators of competitive environment include; management's perceptions of the aggressiveness of competitors, the time and effort taken by company to analyze and respond to the strategies and actions of competitors, and perceptions of overall industry competitiveness [10]. The first two items for differentiation based priorities ask the respondents to what extent the firm's strategy is related with the lowest price or high quality performance. The third and fourth items quantify to what extent the firm places greater emphasis on innovation or customer service than price. The last items are the indication the level of delivering products with high performance and launching new products quickly. Customer relationship practices with seven questions were identified. These include the evaluation of customer complaints and satisfaction. A company's performance on these dimensions is an indicator of whether it is aware of the importance of

customer satisfaction and of the company's dual roles as buyer and supplier in the value chain [10]. In addition, a set of three variables were included in the model to control possible extraneous variation: firm age, firm size and industry dummies were created for nine industry categories.

5. CONCLUSION

In order to test the study's hypotheses, a series of regression models were estimated with the dependent variable of the environmentally conscious practices (ECP). The effects of independent variables on the dependent variable of ECP are shown in Table 1 respectively. A set of seven models were tested for the dependent variable. As the first step, the control variables were entered in Model 1. The firm size and the firm age does not have a significant effect on environmentally conscious practices all seven models in Table 1 ($p<0.01$). The industrial dummies had only modest effects. The individual effects of the hypothesized variables were then tested in Models 2 to 6, and all independent variables along with control variables were tested in Model 7. The F statistics indicate that all models in Table 1 are significant ($p<0.01$) and hence are useful for explanation purposes.

Table 1. Regression results on the extent of the level of environmentally conscious practices

Variable name	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Predictor variables							
SCM Potential Polluters		0.32***					0.23***
Environmental Management Drivers			0.42***				0.26***
Competitive Environment				0.17**			0.14*
Competitive priorities					0.41***		0.20***
Customer relations						0.40***	0.16***
Control variables							
Logarithm of firm size	0.01	0.02	-0.01	0.02	0.02	0.01	0.01
Firm age	0.01	0.01	0.01	0.00	0.01	0.00	0.01
Industrial, automotive and electrical equipment	-0.28*	-0.22	-0.14	-0.32*	-0.28*	-0.25*	-0.15
Food, textile and paper	-0.14	-0.15	-0.13	-0.21	-0.17	-0.14	-0.16
Metal, wood, leather and glass	-0.17	-0.22	-0.14	-0.22	-0.17	-0.16	-0.17
Chemical and pharmaceuticals	-0.04	-0.13	-0.10	-0.11	-0.12	-0.08	-0.20
Other manufacturing	-0.24	-0.20	-0.31*	-0.27*	-0.29*	-0.21	-0.27*
Wholesale and retail trade	-0.26	-0.29*	-0.19	-0.33*	-0.26	-0.23	-0.24*
Computer and engineering services	-0.10	-0.08	-0.05	-0.19	-0.15	-0.10	-0.08
Financial services and consultancy	-0.26	-0.23	-0.16	-0.43*	-0.34	-0.35	-0.35
Hospitality and leisure services	0.01	-0.09	0.02	-0.07	-0.05	0.06	-0.08
Intercept	3.77***	2.76***	2.30***	2.33***	2.02***	2.01***	0.46*
F statistic	0.97	11.14***	23.14***	6.95***	8.93***	8.32***	31.52***
R-square	0.02	0.22	0.36	0.15	0.18	0.17	0.52
Adjusted R-square	0.01	0.20	0.35	0.13	0.16	0.15	0.50

As a result of survey analysis of Turkish companies, it is proven that the survey items except competitive environment are strongly associated with the implementation level of the environmentally conscious practices. The summary of findings proves that Turkish companies do not give high importance to competitive environment. On the contrary, the literature review supports that most of the firms adopt environmentally responsive activities to remain competitive [4]. Environmental drivers have the highest impact on the implementation level of environmentally conscious practices in Turkish companies. Internal environmental management is one of the most important GSCM practices organizations must adopt to improve environmental performance [12]. Governmental regulation is the significant driver for most Turkish companies; this result has parallel results with the research in Chinese Enterprises. The research supports that governmental environmental regulations as a driver have the highest mean value in comparison with other drivers; suppliers', cost and marketing' pressure [12]. For Turkish companies in this survey analysis, competitive priorities have great impact on the environmentally conscious practices. Focus on the differentiation business strategy gives rise to be conscious on the environmentally practices [11]. The evaluation of customer complaints and the measurement of customer satisfaction are also positively associated with environmental consciousness. A company's performance on these dimensions is an indicator of whether it is aware of the importance of customer satisfaction and of the company's dual roles as buyer and supplier in the value chain [10].

Finally, the survey results showed that as the level of awareness in the five items; supply chain management potential polluters, environmental management drivers, competitive environment, differentiation based competitive priorities and customer relationship increases, the level of environmentally conscious practices increases positively.

6. REFERENCES

[1] EEA, 2008 EEA (European Environment Agency), (2008). Greenhouse gas emission trends and projections in Europe 2008. EEA Report No. 5, 2008. Available online at (www.eea.europa.eu/publications/eea_report_2008_5).

[2] Sarkis, J., 1998. Evaluating environmentally conscious business practices - Theory and Methodology. *European Journal of Operational Research,* **107**: pp.159-174.

[3] New, S. & Westbrook, R., 2004. *Understanding Supply Chain*. Oxford, England: Oxford University Press.

[4] Clark, D., 1999. What drives companies to seek ISO14000 certification?. *Pollution Engineering Summer:* pp.14-18.

[5] Coombs, C., 2007. *Printed Circuits Handbook*. New York: McGraw-Hill.

[6] Hervani, A.A., Helms, M.M. & Sarkis, J., 2005. Performance measurement for green supply chain management. *Benchmarking: An International Journal*, **12(4)**: pp. 330-353.

[7] Bloemhuf-Ruwaard, J.M., Van Beck, P., Hordijk, L. & Van Wassenhove, L.N., 1995. Interactions between operational and environmental management. *European Journal of Operational Research*, **85(2)**: pp.229-243.

[8] Walker, H., Sisto, L.D. & McBain, D., 2008. Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors. *Journal of Purchasing & Supply Management*, **14**: pp.69-85.

[9] Bansal, P., & Roth, K., 2000. Why Companies Go Green: A Model of Ecological Responsiveness. *Academy of Management Journal,* **43(4):** pp.717-736.

[10] Tan, K.C., Kannan, V.R., Handfield, R.B. & Ghosh, S., 1999, Supply chain management: an empirical study of its impact on performance. *International Journal of Operations & Production Management*, **17(10)**: pp.1034-1052.

[11] Chen, I.J. & Paulraj, A., 2004. Towards a theory of supply chain management: the constructs and measurements, *Journal of Operations Management,* **22(2):** pp.119-150.

[12] Zhu, Q., Sarkis, J., & Geng, Y., 2005. Green supply chain management in China: pressures, practices and performance. *International Journal of Operations & Production Management*, **25(5)**: pp.449-468.