

Managers' Perceptions on Environmental Sustainability

Michalis Skordoulis¹, Garyfallos Arabatzis², Miltiadis Chalikias⁴, Stamatias Ntanos⁵, Spyros Galatsidas³, Dimitris Drosos⁶

¹Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Orestiada, Greece; e-mail: mskordoulis@gmail.com

²Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Orestiada, Greece; e-mail: gamp@fmenr.duth.gr

³Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Orestiada, Greece; e-mail: sgalatsi@fmenr.duth.gr

⁴Department of Accounting and Finance, University of West Attica, Egaleo, Greece; email: mchalikias@hotmail.com

⁵Department of Business Administration, University of West Attica, Egaleo, Greece; e-mail: sdanos@uniwa.gr

⁶Department of Business Administration, University of West Attica, Egaleo, Greece; e-mail: drososd@uniwa.gr

Abstract. The aim of the present research is to investigate the perceptions of Greek firms' managers on the environment and environmental sustainability strategies. Data were collected using a structured questionnaire distributed to a wide range of firms operating in Greece. Managers' perceptions on the environment were measured using the New Ecological Paradigm (NEP) Scale and were statistically analyzed. The research findings highlight the environmental attitudes of the managers and how they are connected with the firms' environmental sustainability strategies. More specifically, the results of this study provide evidence on how environmental attitudes of top management can affect a firm's both environmental sustainability performance.

Keywords: Environmental Sustainability; Environmental Strategy; Environmental Performance; New Ecological Paradigm; NEP Scale.

1 Introduction

Natural environment is one of the most important elements that interacts with a firm. Due to the emergence and the ever-increasing intensity of climate change and its consequences, states, firms and citizens need to be sensitive to the environment, protect it and use it productively (Ntanos et al., 2014; Ntanos et al., 2018a). At the same time, the increasing public awareness of environmental protection issues has made it imperative for firms to address the need for a green direction in their activities (Skordoulis et al., 2019). Thus, environmental protection actions are one of the most rational business behaviors, in terms of increasing efficiency and nature protection, ensuring a sustainable future (Fousteris et al., 2018).

Copyright © 2020 for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

Proceedings of the 9th International Conference on Information and Communication Technologies in Agriculture, Food & Environment (HAICTA 2020), Thessaloniki, Greece, September 24-27, 2020.

Many firms have identified several major environmental problems that will not disappear since they deny their existence; this leads them to take on the responsibility of protecting the environment (Fousteris et al., 2018). However, it is important that firms show concern on the environment, not only by taking reactive measures, but also by placing their emphasis on the proactive measures they apply. In this context, there are firms that continuously calculate the impact they cause on the environment, throughout the life cycle of their products, from the export of raw materials to the sale of the final products and their devaluation.

In any case, the environmental strategy of a firm, either it is reactive, or it is proactive, can be defined as its response to the relationship of its products, services, and any other activity connected with the natural environment (Lawrence et al., 1998). Environmental strategy is the effort of a firm to integrate environmental protection in the framework of its strategic plans and business processes and includes the way in which managers perceive the need for environmental protection and weight the costs and benefits of adopting environmentally friendly processes and technologies (Yang et al., 2019). Environmental strategy can be applied in a variety of areas, such as product development, supply chain management, and waste recycling (Hart, 1995).

Several researchers have analyzed managers' perceptions on the environment and how they can affect a firm's environmental strategy. Jaggi and Zhao (1996) carried out a research concerning managers' environmental perceptions in Hong Kong. Their results show that there is a gap between managers' perceptions on the environment and firms' actions to protect it. Moreover, according to the same researchers, accountants show a low interest in protecting the environment a result which is show in other studies as well (Ntanos et al., 2020). Banerjee (2001) found that managers evaluate environmental protection actions based on their financial impact on the firm, showing low ecocentrism. Based on these results, managers include environmental protection within the framework of productivity improvement, cost savings, and eliminating defects. Taylor et al. (2003) reported that most of the managers took part in their research, perceive environmental protection as a cost that cannot lead in benefits while a few ones believe that it can lead to a competitive advantage. However, the adoption of environmental protection strategies is found to be correlated with firms' financial performance (Albertini, 2013) as well as the adoption of environmental standards (Soerger Zaro et al., 2015; Drosos et al., 2017; Drosos & Skordoulis, 2018). Tyler et al. (2020) found that when managers perceive strong pressure in terms of competition, they avoid environmental protection measures. Furthermore, it is shown that stakeholders such as regulators, communities or customers, motivate firms to adopt environmental protection more that their managers' perceptions of the environment. The results of another research show that stakeholders like the above-mentioned ones may influence managers' perceptions on the environment (Dolorez López-Gamero et al., 2011). According to the same research, managers' commitment to environmental protection can be the source of a competitive advantage.

As far as the case of Greece is concerned, the awareness of Greek firms on issues related to the environment, coincides with the adoption of European Union's legislation which marked the beginning of more intensive efforts to harmonize with the policies of the other states that already had taken more intensive measures on environmental issues (Kassolis, 2007). This progress has supported the adoption by Greek firms of a greener mentality, since it became necessary to comply with the

provisions and regulations of the European legislation regarding the environment and its protection. In many different industries, Greek firms tend to follow the lessons learned from the cases of firms from other countries on how to implement and benefit from the environmental protection methods (Nikolaou & Evangelinos, 2010). Based on the relevant literature, constructs like the development of a competitive advantage and the social requirements seem to motivate the managers of Greek firms to adopt environmentally friendly strategies and implement environmental management standards (Psomas et al., 2011).

The aim of this research is to measure and analyze the perceptions on the environment and environmental sustainability strategies of the managers of firms operating in Greece.

2 Research methodology

To measure the examined managers' perceptions on the environment and environmental protection strategies an empirical study was employed. A 7-point Likert questionnaire was responded by the managers that are involved in the environmental strategy of randomly selected Greek firms. In some cases, firms' CEOs were interviewed as they were the most involved persons in their firms' environmental strategy. Based on the research of Chen (2008), firms belonging to industries that do not create pollution to the environment at all, were excluded from the sample.

Respondents' perceptions on the environment were measured using the New Ecological Paradigm (NEP) Scale based on a 7-point Likert scale. The scale items are coded from 1 = "strongly disagree" to 7 = "strongly agree", while 4 is "neutral". A high score of the scale means a high ecocentric orientation (Dunlap et al., 2000). Furthermore, the component concerning environmental corporate strategy of the corporate environmentalism framework as proposed by Banerjee et al. (2003) is used in the analysis of the examined firms' environmental sustainability strategies.

A total of 225 personal interviews were carried out between 1 December 2019 and 1 May 2020. The data of the 225 questionnaires collected were statistically analyzed using descriptive and inductive statistics. All the statistical analyses were carried out at a 0.05 level of significance.

3 Results and discussion

3.1 Sample demographics

Initially, the demographics of the sample are analyzed. The results are provided in the Table 1.

Based on the following table we may see that the vast majority of the respondents are males, while the age of the most of them is between 35 and 55 years old (71.1%). Furthermore, more than half of them holds a Master's degree.

Last, the mean of years of experience in their current position is equal to 9.2 years, while the standard deviation of it is equal to 8.4 years, which means that there is a wide range between the values of the examined variable.

Table 1. Sample demographics.

		% Percent
Gender	Male	84.4
	Female	15.6
Age	18-35	11.1
	35-45	28.9
	45-55	42.2
	55-65	17.8
Level of education	Associate's degree	2.2
	Bachelor's degree	31.1
	Master's degree	57.8
	Doctoral degree	8.9

3.2 Environmental perceptions

The respondents' perceptions on the environment were measured using the NEP Scale. The revised NEP Scale as proposed by Dunlap (2008) is a unidimensional measure of environmental attitudes which consists of 15 Likert scale questions.

Based on the work of Dunlap (2008) and the results of other researchers (Ogunbode, 2013; Ntanos et al., 2019), the NEP Scale questions were categorized into 5 components. The means and standard deviations for each of the NEP Scale components are provided in the following table.

Table 2. NEP Scale components' means and standard deviations.

	Mean	Standard deviation
Reality to limits of growth	4.61	1.53
Anti-anthropocentrism	4.92	1.64
Fragility of nature's balance	5.35	1.35
Anti-exceptionalism	5.19	1.58
Mean total NEP score	5.02	1.52

We may conclude that the managers took part in the research seem to be ecocentric. However, since the mean value of NEP is 5.02, this perception is not very strong, taking into account the Likert scale used. Furthermore, standard deviations' values are relatively low, meaning that most of the recorded views are somewhat similar.

According to other studies (Uysal et al., 1994; Ogunbode, 2013), there are possible statistically significant differences between respondents' demographic characteristics values and the NEP Scale. To test the statistical significance of the differences between the NEP Scale score and the respondents' age and level of education a one-way

analysis of variance (ANOVA) is applied, since the NEP Scale mean score is found to be normally distributed based on the result of Kolmogorov-Smirnov test (sig.=0.605).

The results of the one-way ANOVA revealed that there is no statistically significant difference between the means of respondents' age and level of education and the NEP Scale mean score (Table 3).

Table 3. One-way ANOVA results.

			Mean Square	Sig.
NEP Scale mean score	Age	Between groups	0.338	0.506
		Within groups	0.428	
	Level of education	Between groups	0.172	0.761
		Within groups	0.440	

Furthermore, the same result is obtained for NEP Scale mean score difference between males and females (independent samples t-test sig.=0.801) while no correlation is recorded between NEP Scale mean score and respondents' years of experience in their current position (Pearson's correlation coefficient sig.=0.071).

3.3 Environmental sustainability strategies

The existence of a correlation between managers' perceptions on the environment and the firms' environmental sustainability strategies will be examined. To do so, the correlation between the examined firms' managers NEP Scale mean score and the firms' environmental corporate strategy constructs (Banerjee et al., 2003) will be examined using Spearman's correlation coefficient.

Based on the data provided in Table 4, we see that in most of the cases, managers' environmental attitudes are not correlated with the firms' environmental sustainability strategies. The only exception concerns the statistically significant positive correlation between managers' environmental perceptions and the fact that environmental protection is the driving force behind the firm's strategies. However, even this correlation is weak.

Table 4. Environmental perceptions and environmental sustainability strategies correlations.

	Environmental corporate strategy constructs	Spearman's rho	Sig.
NEP Scale mean score	Environmental issues are integrated into strategic planning process	0.059	0.698
	Quality includes environmental impact of products and processes reduction	0.151	0.321
	Every effort is made to link environmental objectives with the firm's other goals	0.237	0.117
	The firm is engaged in developing products and processes that minimize environmental impact	0.131	0.390
	Environmental protection is the driving force behind the firm's strategies	0.249	0.009
	Environmental issues are considered when developing new products	0.228	0.132
	The products and processes developed minimize environmental impact	0.181	0.233

4 Conclusions

The aim of this paper was to analyze managers' perceptions on the environment and examine a possible correlation between them and the firms' environmental sustainability strategies.

The NEP Scale mean score has revealed that the examined managers' perception on the environment is ecocentric but not in at a high degree. In contrast to the results of other studies (Uysal et al., 1994; Ogunbode, 2013; Ntanos et al., 2018b; Ntanos et al., 2019; Skordoulis et al., 2020) this perception is not related with any of the managers' demographic characteristics.

Furthermore, the research results show that managers' environmental perceptions are positively correlated only when environmental protection drives a firm's strategies. This result does not mean that the examined firms do not integrate environmental protection into their strategies. However, it is shown that many constructs of firms' environmental corporate strategy are independent of their managers' environmental perceptions. The level of managers' ecocentrism which is not very high, in relation to other factors such as customers', regulators' or other stakeholders' requirements would explain this evidence as there are many other reasons for a firm to develop an environmental sustainability strategy as Tyler et al. (2020) found.

Due to the existing evidence in the relevant literature that environmental sustainability strategies are positively correlated with firms' performance and the establishment of a competitive advantage (Banerjee, 2001; Dolorez López-Gamero et

al., 2011; Albertini, 2013; Skordoulis et al., 2019) it is important to further analyze the main motivations for a firm to develop and implement them.

References

1. Albertini, E. (2013). Does environmental management improve financial performance? A meta-analytical review. *Organization & Environment*, 26(4), p.431-457.
2. Banerjee, S.B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *Journal of Management Studies*, 38(4), p.489-513.
3. Banerjee, S.B., Iyer, E.S. and Kashyap, R.K. (2003). Corporate environmentalism: Antecedents and influence of industry type. *Journal of Marketing*, 67(2), p.106-122.
4. Chen, Y.S. (2008). The driver of green innovation and green image-green core competence. *Journal of Business Ethics*, 81(3), p.531-543.
5. Dolores Lopez-Gamero, M., Claver-Cortés, E., and Francisco Molina-Azorin, J. (2011). Environmental perception, management, and competitive opportunity in Spanish hotels. *Cornell Hospitality Quarterly*, 52(4), p.480-500.
6. Drosos, D., and Skordoulis, M. (2018). The role of environmental responsibility in tourism. *Journal for International Business and Entrepreneurship Development*, 11(1), p.30-39.
7. Drosos D., Skordoulis M., Chalikias M., Kalantonis P. and Papagrorgiou A. (2017). The Impact of ISO 9001 Quality Management System Implementation in Tourism SMEs. In: Katsoni V., Upadhya A., Stratigea A. (Eds.), *Tourism, Culture and Heritage in a Smart Economy*. Springer Proceedings in Business and Economics, Springer, Cham, p.145-157.
8. Dunlap, R.E., Van Liere, K.D., Mertig, A.G. and Jones, R.E. (2000). New trends in measuring environmental attitudes: measuring endorsement of the new ecological paradigm: a revised NEP scale. *Journal of Social Issues*, 56(3), p.425-442.
9. Dunlap, R.E. (2008). The new environmental paradigm scale: From marginality to worldwide use. *The Journal of Environmental Education*, 40(1), p.3-18.
10. Fousteris, A.E., Didaskalou, E.A., Tsogas, M.M.H., and Georgakellos, D.A. (2018). The environmental strategy of businesses as an option under recession in Greece. *Sustainability*, 10(12), p.4399.
11. Hart, S.L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), p.986-1014.
12. Jaggi, B., and Zhao, R. (1996). Environmental performance and reporting: perceptions of managers and accounting professionals in Hong Kong. *The International Journal of Accounting*, 31(3), p.333-346.

13. Kassolis, M.G. (2007). The diffusion of environmental management in Greece through rationalist approaches: driver or product of globalisation? *Journal of Cleaner Production*, 15(18), p.1886-1893.
14. Lawrence, L., Andrews, D., and France, C. (1998). Alignment and deployment of environmental strategy through total quality management. *The TQM Magazine*, 10(4), p.238-245.
15. Nikolaou, I.E., and Evangelinos, K.I. (2010). A SWOT analysis of environmental management practices in Greek Mining and Mineral Industry. *Resources Policy*, 35(3), p.226-234.
16. Ntanos, A., Skordoulis, M., and Ntanos, S. (2014). Millennial consumers' perceptions on the organic products. In *Proceedings of the International Scientific Conference eRA-9, September 2014, Technological Education Institute of Piraeus, Piraeus, Greece*, p.26-35.
17. Ntanos S., Asonitou S., Kyriakopoulos G., Skordoulis M., Chalikias M., and Arabatzis G. (2020). Environmental Sensitivity of Business School Students and Their Attitudes towards Social and Environmental Accounting. In: Kavoura A., Kefallonitis E., Theodoridis P. (Eds.), *Strategic Innovative Marketing and Tourism. Springer Proceedings in Business and Economics*, Springer, Cham, p.195-203.
18. Ntanos, S., Kyriakopoulos, G., Chalikias, M., Arabatzis, G., and Skordoulis, M. (2018b). Public perceptions and willingness to pay for renewable energy: A case study from Greece. *Sustainability*, 10(3), p.687.
19. Ntanos, S., Skordoulis, M., Kyriakopoulos, G., Arabatzis, G., Chalikias, M., Galatsidas, S., Batzios, A., and Katsarou, A. (2018a). Renewable energy and economic growth: Evidence from European countries. *Sustainability*, 10(8), p.2626.
20. Ntanos, S., Kyriakopoulos, G., Skordoulis, M., Chalikias, M. and Arabatzis, G. (2019). An application of the new environmental paradigm (NEP) scale in a Greek context. *Energies*, 12(2), p.239.
21. Ogunbode, C.A. (2013). The NEP scale: measuring ecological attitudes/worldviews in an African context. *Environment, Development and Sustainability*, 15(6), p.1477-1494.
22. Psomas, E.L., Fotopoulos, C.V., and Kafetzopoulos, D.P. (2011). Motives, difficulties and benefits in implementing the ISO 14001 Environmental Management System. *Management of Environmental Quality: An International Journal*, 22(4), p.502-521.
23. Skordoulis M., Chalikias M., Galatsidas S. and Arabatzis G. (2019). Competitive Advantage Establishment through Sustainable Environmental Management and Green Entrepreneurship: A Proposed Differential Equations Framework. In: Theodoridis A., Ragkos A., Salampasis M. (Eds.), *Innovative Approaches and Applications for Sustainable Rural Development. Springer Earth System Sciences*, Springer, Cham, p.205-219.
24. Skordoulis, M., Ntanos, S., and Arabatzis, G. (2020). Socioeconomic evaluation of green energy investments: Analyzing citizens' willingness to invest in

- photovoltaics in Greece. *International Journal of Energy Sector Management*, 14(5), p. 871-890.
25. Soerger Zaro, E., Soerger Zaro, C., Richartz, F., Borgert, A., and Van Bellen, H.M. (2015). The impact of ISO 14001 certification on cost behavior of petrochemical companies listed in the BM&FBOVESPA Stock Exchange. *Environmental Quality Management*, 24(3), p.57-70.
 26. Taylor, N., Barker, K. and Simpson, M. (2003). Achieving 'sustainable business': a study of perceptions of environmental best practice by SMEs in South Yorkshire. *Environment and Planning C: Government and Policy*, 21(1), p.89-105.
 27. Tyler, B., Lahneman, B., Beukel, K., Cerrato, D., Minciullo, M., Spielmann, N., and Discua Cruz, A. (2020). SME managers' perceptions of competitive pressure and the adoption of environmental practices in fragmented industries: a multi-country study in the wine industry. *Organization & Environment*, 33(3), p.437-463.
 28. Uysal, M., Jurowski, C., Noe, F.P., and McDonald, C.D. (1994). Environmental attitude by trip and visitor characteristics: US Virgin Islands National Park. *Tourism Management*, 15(4), p.284-294.
 29. Yang, D., Wang, A.X., Zhou, K.Z., and Jiang, W. (2019). Environmental strategy, institutional force, and innovation capability: A managerial cognition perspective. *Journal of Business Ethics*, 159(4), p.1147-1161.