

## Evaluating the effectiveness of green marketing of socio-economic organizations in reducing environmental pollution

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**Received:** 01 November 2020/ **Accepted:** 16 December 2020/ **Published:** 30 February, 2021

**Abstract:** The purpose of this study is to measure and evaluate the effectiveness of environmental advertising related to green marketing by organization. In other words, the researcher seeks to find the success rate of environmental advertising in reducing environmental pollution. The type of goal is an application that has been done by descriptive-survey method. A researcher-made questionnaire was used to collect data. The statistical populations of the study were consumers of environmentally-friendly goods in Tehran. Confirmatory factor analysis method and SPSS, Version 21 and AMOS (2016) software were used for data analysis. The results showed that the models for measuring the research variables are appropriate models. Because the value of  $\chi^2$  and the value of RMSEA are low and also the values of AGFI, GFI and NFI are greater than 0.9 and the significance level of factor loads is less than 5%, which indicates the significance of the relationship defined in the measurement models. Also, the effect of communication stimuli on the cognitive and emotional response of consumers and then the effect of content stimuli on the cognitive and emotional response of users in this study has the highest influence. However, neither content nor communication stimuli have influenced consumer attitudes.

**Keywords:** Effectiveness evaluation, green marketing, environmental advertising, reduction of environmental pollution



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### 1. Introduction

Organizations are made up of human groups and in order to achieve their goals, it is necessary to recognize environmental changes and developments and to best adapt to it. In other words, an organization is a system that receives financial resources, materials, human resources and other required inputs and by performing a series of operations, provides outputs as a product or service. Managers try to get different parts of the organization to work together as needed. In other words, managers are the control elements of this system. The mission of an organization; Expresses the nature, existential philosophy and goals of the organization. Today, many organizations are formed with different missions and goals. The emergence of organizations and their increasing expansion is one of the important features of human civilization. For the first time, Max Weber was able to differentiate the organization from other social institutions (Iyengar, 2011). In the first step, the formation of an organization requires the existence of social relations. That is, the individual has a reciprocal relationship with the organization. The European Commission has defined organizational social responsibility as follows: "Organizational social responsibility; "It is a concept

by which organizations voluntarily coordinate their business activities in terms of environment and society and interact with their stakeholders" (Porter & Golan, 2006). Here are some of the most important definitions of corporate social responsibility:

From the perspective of the Council for Sustainable Development for Global Trade, corporate social responsibility is: the commitment of the business to participate and contribute to sustainable economic development, cooperation with workers, their families, the community and society to the extent that their quality of life improves. According to the definition of this council, corporate social responsibility along with economic growth and ecological balance is the third pillar of sustainable development (WBCSD, 2020). United Nations Conference on Trade and Development; Corporate social responsibility is defined as methods that are based on ethical values and respect for their work, society and the environment (UNCTAD, 2018). The International Organization for Standardization (ISO, 2019) Advisory Group defines corporate social responsibility as a tool for balancing organizations to apply social and economic environmental issues in a way that benefits the people in the community (Hall et al., 2008). The International

Workers' Organization defines corporate social responsibility as: the use of voluntary initiatives and actions by companies to coordinate business activities with social and environmental issues. These principles and values have an impact on business performance and decision-making process through managerial measures (Mostafa, 2019). Barney and Griffin; In his book, he defines social responsibility as follows: Social responsibility is a set of duties and responsibilities that a company must fulfill to maintain, care for and help the community in which it operates (Barney & Griffin, 1992). Keith Davis believes that social responsibility is a sense of commitment by managers of private sector business organizations to make decisions that improve the welfare of society in addition to profits (Hollensen, 2007).

As managers become more and more involved in preserving the natural environment, they have to deal with the issue of greening the environment. The list of global environmental issues and problems is long. Some of the more serious issues include natural resource scarcity, global warming, air and water and soil pollution, industrial accidents, and toxic waste. Numerous reports have shown that industrial societies consume 75% of the world's energy resources and that many of the consumer wastes, toxins and industrial waste are related to them (Zehner, 2012). The picture for the future is that as the world's population grows and countries become more market-oriented and industrialized, environmental issues are expected to get worse and worse. But many organizations around the world have demonstrated their social responsibility to protect the environment. Today, social responsibility is discussed as a way in economic management to empower the enterprise and create sustainable growth and development in three dimensions of economy, environment and society, and even in the economic dimension, social responsibility is a powerful tool for sustainable growth and development (Beskese et al., 2015) because it imposes many instructions on the company, which ultimately provides great opportunities to expand the company's activities. (Rouhani et al., 2017).

The social responsibility of the organization has a significant impact on the marketing activities of the organization, which plays its role in the organization through the marketing mix. The marketer can take action to implement the organization's social responsibility through tools such as packaging, advertising and personal sales that are used to produce and supply goods and services. As mentioned, social responsibility of the organization is a broad concept and includes the organization, so the marketer must determine the composition of the marketing mix in addition to public welfare, environmental issues and the long-term interests of society; Pay attention to the potential profit factor to ensure the survival of the organization (Kotler & Armstrong, 2008).

Optimal use of the environment in the country can guarantee the survival and sustainable development, and lack of attention to issues that set it would ensure economic development, social, cultural and political

risk faced by the country (Tavakoli et al., 2019). One of the organizational sectors that have paid attention to the issue of environmental sustainability in recent years is the marketing sector. One might not have imagined that one day marketing would be concerned with consumer health in addition to profitability and sales, but the dynamism and fierce competition and growing concern for the environment, as well as government decrees and consumer awareness, have led companies to consider the physical, mental health and cleanliness of the consumer environment (Cassel, 2008).

The study of green consumer behavior emerged as an important topic for marketing planners during the 1970s. After a hiatus, research progressed around 1991, and many journals researched environmental attitudes and their effects on consumer behavior, such as the effect of marketing variables on environmentally conscious purchasing decisions, storage consumption decisions. Energy and internal recycling practices (Hartman et al., 2006: 673). This change in consumer behavior helped launch the Green Revolution to prevent further damage to the environment (Rahbar & Abdul Wahid, 2011:73)

Demand for ecological products and sustainable business activities was determined by increasing consumer awareness of environmental issues as well as by announcing stricter laws by national governments, especially in industrialized countries, and environmental groups. Different, such as adaptation media, they carefully control companies with ecological principles and create more pressure and awareness in business environments and lead all businesses to green (Gurau & Ranchard, 2005: 547).

Marketers can create high values for consumers by using the right brands and proper labeling and environmental advertising and draw their attention to buying ecological products. In general, green marketing is a much broader concept that can be applied to consumer goods, industry or even services (Ottman, 2011).

Green consumers are defined as people who use products that are likely to endanger the health of the consumer and others, cause serious damage to the environment while producing or consuming the product, consume disproportionate amounts of energy, and create unnecessary waste and avoid raw materials created from threatened environments and parts (Lee, 2008, 755). Ecological products are defined as products produced using toxin-free raw materials and nature-friendly regulations and guaranteed by a formal organization (Gurau & Ranchard, 2005). As mentioned, green marketing is not just about producing and promoting green products, but about all the company's activities to become green. Organizations can be green in three different ways:

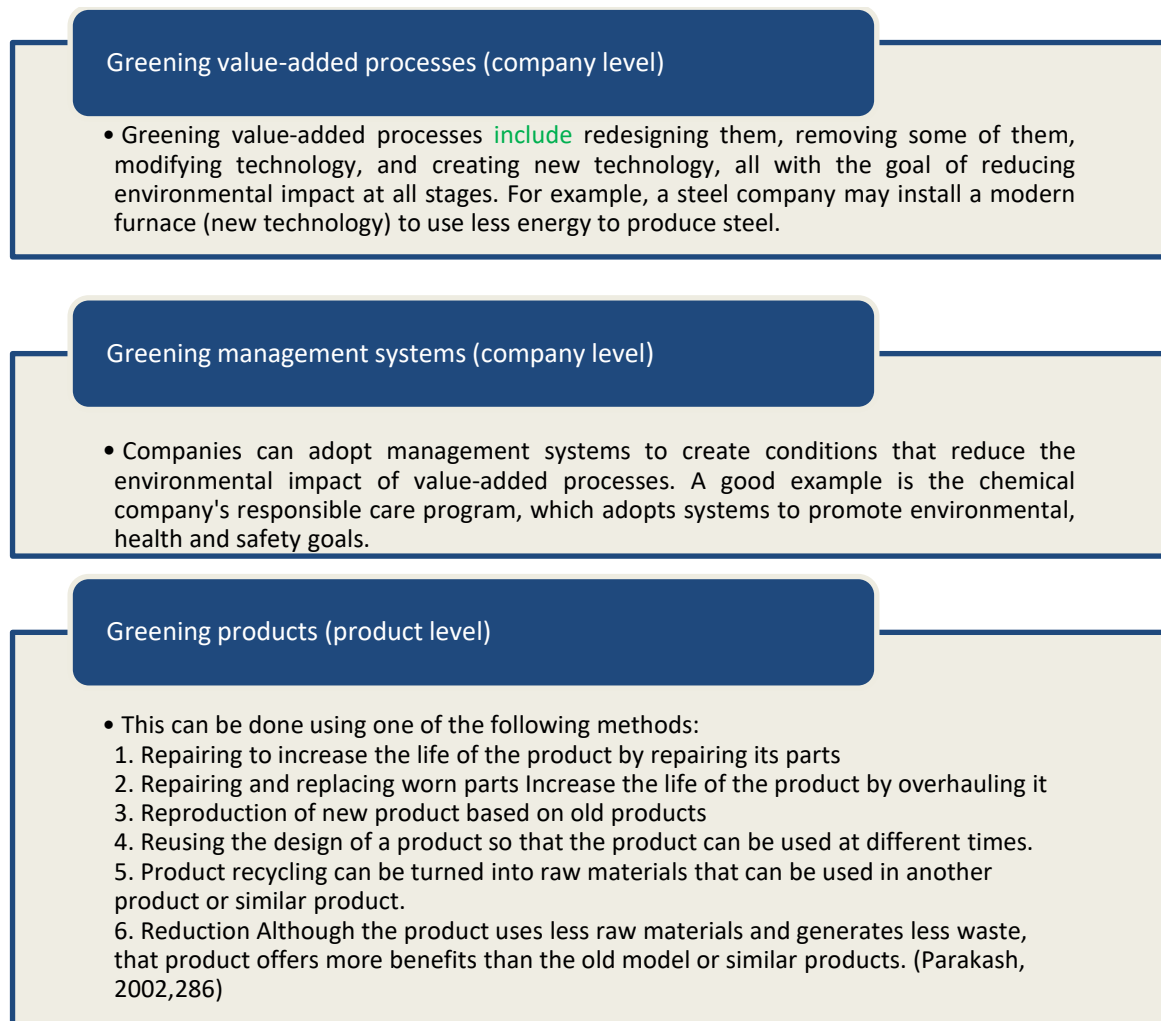


Fig. 1- Different methods of Greening in organizations (Prakash, 2002)

One of the most important green marketing tools is environmental advertising. As global green movement's improved and public attention to environmental issues increased, most organizations chose environmental advertising through the media or newspapers as a green technique to introduce their products to environmentally responsible consumers. The purpose of green advertising is to influence the buying behavior of consumers by encouraging them to buy products that do not harm the environment and to direct their attention to the positive consequences of their buying behavior, which is beneficial to them and the environment (Rahbar & Abdul Wahid, 2011).

Evaluating the effectiveness of advertising determines the extent to which advertising has been successful in achieving the set goals. Evaluating the effectiveness of advertising acts as a feedback, reminds us of the strengths and weaknesses of our advertising, and with the help of which we realize the shortcomings of our advertising (Huang et al., 2013).

The purpose of this study is to measure and evaluate the effectiveness of environmental

advertising related to green marketing by companies. In other words, the researcher seeks to find the success rate of environmental advertising in reducing environmental pollution. The conceptual model of the research is presented in Figure 2. This model is based on theoretical foundations and review of research background.




Input	Process	Output
Advertising stimuli	Effectiveness	Consumer behavior
 1- Content stimuli 2- Communication stimuli	 1- Cognitive reaction (presentation and display, perception and observation, intellectual reaction) 2- Emotional reaction (perception, emotional reaction) 3- Attitude (power of thinking and analysis, perception and way of thinking)	 Behavioral reaction (image and mentality, intention and desire to try, buy, consume)
<b>Indicators for measuring communication stimuli:</b>  Being interactive Availability Being global Facilitate shopping	<b>Indicators for measuring content stimuli:</b>  Entertainment Awareness Persuasive Accreditation Being social Search Update	

Fig.2 - Conceptual model of research; how advertising stimuli affect consumer behavior and related details

**2. Materials and Methods**

This research is an applied research that has been done by descriptive-survey method. The research hypotheses are:

- Hypothesis 1: Content stimuli affect the cognitive response of the consumer.
- Hypothesis 2: Content stimuli affect the consumer's emotional response.
- Hypothesis 3: Content stimuli affect consumer attitudes.
- Hypothesis 4: Communication stimuli affect the consumer's cognitive response.
- Hypothesis 5: Communication stimuli affect the consumer's emotional response.
- Hypothesis 6: Communication stimuli affect consumer attitudes.

In order to obtain research questions and test the hypotheses, a researcher-made questionnaire with 28 questions based on 5-point Likert scale was used (Table 1). The validity of the questionnaire was confirmed by 5 experts; also; the reliability of the questionnaire was determined by Cronbach's alpha at 96%. In the present study, the factor validity of the questionnaire with the help of confirmatory factor analysis and using software AMOS was done. The statistical population of the study was the consumers of environmentally friendly goods in the country. The statistical populations of the study were consumers of environmentally-friendly goods

in Tehran. Due to the uncertainty of the exact number of the statistical population, Cochran's formula was inevitably used to determine the statistical sample and 96 people were determined. SPSS, Version21 and AMOS (2016) software were used for data analysis.

The research variables were as follows:

- Independent variable: stimuli (content and communication) of environmental advertising
- Dependent variable: Consumer behavioral response to environmental advertising
- Moderating Variable: cognitive reaction, emotional reaction, consumer attitude to environmental advertising.

Table 1: Questionnaire used in research

Variables	Number of questions
Content stimulus	8
Communication stimulus	8
Cognitive reaction	4
Emotional reaction	4
Attitude	4
Total	28

**3. Results:**

Content and communication stimuli are two independent variables of this article. Content stimulus variables with the dimensions of awareness, persuasion, validation and updating and communication stimulus variables include availability, purchase facilitation and cost-effectiveness, personalization, measurement and feedback. The mediating variables (including cognitive reaction) are thought (emotional response, emotional attitude (and attitude), mindset. "Cognitive variables refer to individual variables and include variables such as attention or

awareness. Reminder and recognition are the most commonly used indicators in attention and awareness. The emotional variable is related to emotions. A wide range of emotional variables, "They are from positive to negative and from personal to semi-personal; sometimes this variable is considered as a cognitive and behavioral variable."

The personal characteristics of the respondents are shown in Table 2. As can be seen, most of the respondents were women.

Table 2: Individual characteristics of respondents

	Gender		Age			Education				
	Female	Male	20-30	30-40	40-50	More than 50	Diploma	Bachelor	M.A.	Ph.D.
Abundance	54	42	32	28	24	12	11	48	30	7
%	56.25	43.75	33.3	29.16	25	12.5	11.45	50	31.25	7.29

First, in order to evaluate the status of each of the research variables, a one-sample t-test was used, the results of which are presented in Table 3. Due to the use of a 5-point Likert scale, in this test, a

score of 3 (average limit) was selected as the theoretical average.

According to Table 3, the mean of all variables is significantly different from the theoretical mean, and their status is below average.

Table 3: Determining the status of research variables using one-sample t-test

Variable name	The value of t	Significance level	Average	Test result	
Content stimulus	Awareness	- 5.55	0.001	2.32	Less than average
	Persuasive	- 2.31	0.001	2.88	//
	Accreditation	-8.76	0.001	1.91	//
	Update	- 4.52	0.001	2.23	///
Communication stimuli	Availability	- 3.97	0.001	2.76	//
	Facilitate shopping	- 4.77	0.001	2.87	//
	Personalization	- 9.11	0.001	1.21	//
	Assessment and feedback	- 10.40	0.001	1.22	//
Cognitive reaction	- 5.23	0.001	2.55	//	
Emotional reaction	- 2.64	0.001	2.63	//	
Attitude	- 7.86	0.001	2.65	//	
Average studied = 3					

In the present study, structural equation modeling, which is a multivariate correlation method, has been used to analyze the data based on the research framework.

To examine the model, first, confirmatory factor analysis has been used to measure the relationships of hidden variables with their measurements. The measurement model (confirmatory factor analysis) examines the relationship of the items or the questions of the questionnaire with the structures. Then, using the structural model, the relationship of

the factors with each other will be examined to test the hypotheses. If the markers do not measure the latent variables well, the relationships cannot be tested, so confirmatory factor analysis is used first.

It should be noted that in order for the measurement model to be validated, firstly, its indices must show a suitable fit and secondly, the values of standard coefficients of factor loads must be significant.

If the ratio of chi-square to degree of freedom (df) is less than 3, RMSEA less than 0.05 and

AGFI, GFI and NFI greater than 0.9, it can be concluded that the model has a very good fit. The results of confirmatory factor analysis showed that the models for measuring research variables are appropriate models. Because the value of  $\chi^2$  and

the value of RMSEA are low and also the values of AGFI, GFI and NFI are greater than 0.9 and the significance level of factor loads is less than 5%, which indicates the significance of the relationship defined in the measurement models.

Table 4: Fit indicators for each of the research measurement models

Measurement models	$\chi^2$	df	RMSEA	GFI	AGFI	NFI	R <sup>2</sup>
Content stimulus	28.342	135	0.05	0.90	0.92	0.96	-
Communication stimulus	67.890	167	0.04	0.92	0.95	0.99	-
Cognitive reaction	54.675	124	0.03	0.94	0.96	0.97	-
Emotional reaction	27.32	118	0.04	0.95	0.96	0.98	-
Attitude	33.45	101	0.03	0.91	0.92	0.97	0.977

**4. Discussion**

As shown in the model, content and communication stimuli have a positive and significant effect on consumer reactions, while they do not show a significant effect on consumer attitudes. In addition, the value of regression coefficients indicates that the effect of communication stimuli on consumer reactions (cognitive and emotional) is greater than content stimuli and indicates that the use of communication

stimuli in the environmental advertising process is greater than stimuli. To a greater extent, content can lead to consumers' cognitive and emotional reactions to the product in question (green and environmentally friendly goods). The results of this study are consistent with some previous research on other goods and products. Including research (Yazdani, 2015) with which the final results are largely consistent.

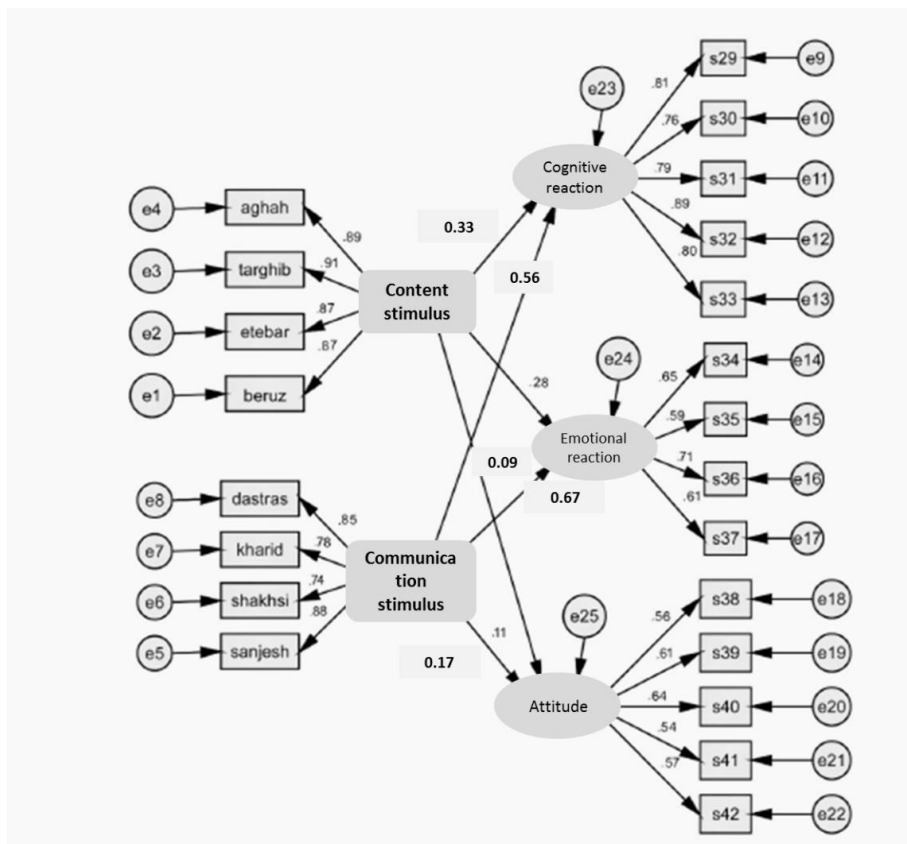


Fig. 3- Structural model of research with standardized coefficients

Meanwhile, the effectiveness of environmental advertising in green marketing for ecological products has been questioned. Examination of research hypotheses showed that:

- The proposed structural model shows that content stimuli have a positive (0.45) and significant effect on consumer cognitive response.
- Content stimuli have a positive (0.33) and significant effect on the consumer's emotional response.
- Content stimuli have a positive (0.09) and significant effect on consumer attitude.
- Communication stimuli have a positive (0.56) and significant effect on consumer cognitive response.
- Communication stimuli have a positive (0.67) and significant effect on the consumer's emotional response.
- Communication stimuli have a positive (0.17) and significant effect on consumer attitude.

Advertising incentives are known as input to an organizational green system. These stimuli can be divided into two main groups: communication stimuli and content stimuli. Indicators affecting communication stimuli are: Interactivity, availability, universality and ease of shopping. On the other hand, the indicators affecting content stimuli are: Entertaining, informative, persuasive, credible, social, searching and updating. Advertising incentives have the potential to be effective. This effectiveness is achieved through cognitive reactions, emotional reactions and attitudes. Eventually, consumer behavior will be affected and changed.

Although in the field of engineering sciences, considerable studies have been done on environmental sciences, for example impact of pollutants on the environment (Fataei, 2017; Ajami & Fataei, 2015) or introducing novel and eco-friendly materials (Esmaeili-Falak, 2017; Nassr et al. 2018), nevertheless environmental law topics has less been studied. In the current world, various types of pollution are the result of the adverse effects of human activities (Dabiri et al., 2018). Therefore, it seems necessary to study in the field of environmental law (Soleimani, 2019) and other fields, such as; green marketing. Obviously, in order to better plan for green marketing, it is necessary to act through a network of environmental policies, because in this case, environmental policy-making is done at the national level through the network. And all

programs and procedures follow a hierarchy and national order. This is consistent with Hosseini et al. (2019) research.

## 5. Conclusion

Today, the importance of using green and environmentally-friendly goods is not hidden from anyone. However, due to the unknown positive effects of consuming such goods and sometimes the higher prices that these products have, it causes green marketing to be used as a useful tool. The software output indicates the appropriateness of the fitted structural model for testing the hypotheses. The effect of communication stimuli on the cognitive and emotional response of consumers and then the effect of content stimuli on the cognitive and emotional response of users in this study has the highest influence. However, neither content nor communication stimuli have influenced consumer attitudes. As mentioned earlier, the statistical population of this study was consumers of environmentally friendly goods in Tehran. It is possible that the research results are different in other cities in Iran because one of the important and influential factors on consumer behavior is the culture and economy of the studied society. Therefore, it is suggested that similar research be conducted in other parts of the country in the future and that the results be compared. In this case, we can comment on the generalizability of the research model.

## 6. Conflict of interest

The authors declare that they have no conflict of interest.

## 7. Additional Information and Declarations

### Funding

*I thank* Science and Research Branch, Islamic Azad University, Tehran, Iran

### Grant Disclosures

There was no grant funder for this study.

### Competing Interests

The author declare there is no competing interests, regarding the publication of this manuscript

### Author Contributions

**Hojjat Nazari:** Proposed the plan

**Sadegh Zibakalam:** Conceived the experiments, analyzed the data, corresponding author

**Mohammad Reza Parvin:** Authored or revised drafts of the paper

### Ethics Statement

**Vice Chancellor for** Science and Research Branch, Islamic Azad University, Tehran, Iran



## References

- Ajami, F., & Fataei, E. (2015). Determination of Heavy Metals level (lead, cadmium, chrome) in waters of Meshkinshahr River for agricultural use. *Advances in Bioresearch*, 6(3).
- Barney J., Griffin R.W. (1992). The management of organizations: strategy, structure, behavior. Boston: Houghton Mifflin Co, 1992.
- Beskese, A., Demir, H.H., Ozcan, H.K., Okten, H.E. (2015). Landfill site selection using fuzzy AHP and fuzzy TOPSIS: a case study for Istanbul. *Environmental Earth Sciences*, 73(7), 3513–3521. <https://link.springer.com/article/10.1007%2F12665-014-3635-5>
- Cassel, J. (2008), Enforcing Environmental Human Rights: Selected Strategies of US Rights Volume 6, Issue 1.
- Dabiri F, Ganjalinejhad M, Zarei S, Salehpour SA, (2018) A Review on National and International Legal Documents on Combating Sand and Dust Storms, *Anthropogenic Pollution Journal*, 2 (1): 24-37
- Esmaeili-Falak, M. (2017) Effect of System's Geometry on the Stability of Frozen Wall in Excavation of Saturated Granular Soils. Doctoral dissertation, University of Tabriz.
- Fataei, E. (2017). Soil carbon, nitrogen and phosphorus pools under exotic tree plantations in the degraded grasslands of Iran. *Agricultural & Biological Research*, 33(2), 113-127.
- Gurau C., Ranchhod A. (2005), "International green marketing ,A comparative study of British and Romanian firms", *International Marketing Review*, Vol. 22 No. 5, pp. 547-561.
- Hall D., Jones R., Raffo C., Anderton, A. (2008). *Business Studies* (Fourth ed.). Essex: Pearson Education. ISBN 9781405892315.
- Hartmann P., Apolazalbanez. (2006). "Green value added", *Marketing Intelligence & Planning*, Vol. 24 No. 7, pp. 673-680.
- Hollensen S. (2007). *Global Marketing: A Decision-Oriented Approach*. 4<sup>th</sup> edition, England: Pearson Education Unlimited, Essex.
- Hosseini, S.H., Daneshfard, K., Memarzadeh Tehran, G.R., Bahmanpour, H. 2019. Validation of Networking Approach in Environmental Policy in IRAN to Decrease Environmental Pollution by Factor Analysis Method, *Anthropogenic Pollution Journal*, Vol 3 (2), 2019: 1-9, DOI: 10.22034/ap.2019.668486
- Huang J., Su S., Zhou L., Liu X. (2013). Attitude toward the Viral Ad: Expanding Traditional Advertising Models to Interactive Advertising. *Journal of Interactive Marketing*, 27(1): 36-46.
- Iyengar, R., Van den Bulte, C. and Valente, W.T. (2011). Opinion Leadership and Social Contagion in New Product Diffusion. *Marketing Science*, 30 (2): 195-212.
- ISO. (2019). For a detailed analysis of the ISO 26000 development process see Hahn, R. (2012): "Transnational Governance, Deliberative Democracy, and the Legitimacy of ISO 26000". In: *Business and Society* doi:10.1177/0007650312462666
- Kotler P., Armstrong G. (2008). *Principles of marketing*, New Jersey: Prentice Hall.
- Lee K. (2008), "Opportunities for green marketing: young consumers", *Marketing Intelligence & Planning*, Vol. 26 No. 6, pp. 573-586.
- Mostafa M.M. (2009), Shades of green: A psychographic segmentation of the green consumer in Kuwait using self-organizing maps, *Expert Systems with Applications* (36), PP: 11030–11038.
- Nassr, A., Esmaeili-Falak, M., Katebi, H., & Javadi, A. (2018). A new approach to modeling the behavior of frozen soils. *Engineering Geology*, 246, 82-90.
- Ottman, J. (2011). *The New Rules of Green Marketing: Strategies, Tools, and Inspiration for Sustainable Branding*. ebook.
- Porter L. Golan G. (2006). From Subservient Chickens to Brawny Men: A Comparison of Viral Advertising to Television Advertising. *Journal of Interactive Advertising*, 6 (2): 26-33.
- Prakash A. (2002), "Green marketing, public policy and managerial strategies", *Business Strategy and the Environment*, vol. 11, pp. 285–297.
- Rahbar, E., Abdul Wahid, N. (2011), "Investigation of green marketing tools'effect on consumers' purchase behavior", *BUSINESS STRATEGY SERIES*, Vol. 12 No. 2, pp. 73-83.
- Rouhani, A., Taybi Sani, S.M., Bahmanpour, H. (2017). Spatial assessment and environmental sustainability assessment of Shemiranat sports complexes in Tehran in relation to air pollution zoning: In order to sustainable development and environmental protection, *Journal of Geography (Regional Planning)*, Year 8, No. 1, 236-215.
- Soleimani I. (2019). Right to Environment in the Islamic Sources, *Anthropogenic Pollution Journal*, Vol 3 (1), 2019: 33-38. Available online at [www.ap.iauardabil.ac.ir](http://www.ap.iauardabil.ac.ir)
- Tavakoli F., Zaimdar M., Lahijanian A. (2019). The Impact of Environmental Education on The Environmental Behavior of Elementary



- School Students, Anthropogenic Pollution Journal, Vol 3 (2), 2019: 37-42
- UNCTAD. (2018). Emprise Women in Business Awards 2018 – World Investment Forum – UNCTAD", worldinvestmentforum.unctad.org. Retrieved 29 November 2018.
- WBCSD. (2020). World Business Council for Sustainable Development – WBCSD". Genève Internationale. Retrieved 28 November 2018.
- Yazdani N. (2015). Evaluating the effectiveness of online advertising in the Iranian carpet market, Journal of Modern Marketing Research, Vol. 5, No. 1 (16). 43-58 pp.
- Zehner O. (2012). Green Illusions, University of Nebraska Press, 2012. An environmental sociology text forming a critique of energy production and green consumerism.