

Influence of Natural Factors upon the Organization Activities

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Abstract

The main objective of this article is to demonstrate the importance of the natural factors on business environment, even for companies that do not have economic activities depending on them. The natural factors are ignored by most business analysis especially in companies whose main activity does not regard exploiting natural resources. But when natural factors are analysed, the so called ecological influences are mistakenly regarded by many specialists as regulations, policies and methods, imposed by government to protect the environment. Instead, we consider that the primary natural factors are: the geographic position, landscape, climate, ecosystem, natural resources and the natural hazard. This paper is addressed to specialists, researchers, managers and all interest readers.

Keywords: PESTEL analysis, business environment, natural factors

JEL classification: M10, M20, Q20, Q50

Introduction

In order to have a successful economic activity, which drives to performance, organizations must analyse both their internal and external environment. The internal environment (microenvironment) is represented by the components of the organization. The internal environment is mostly analysed using the Diagnostic Analysis and the SWOT Analysis (Moldoveanu & Dobrin, 2007). The specialists (Johnsson et al., 2014) consider that the external environment is divided into main two parts the microenvironment and the macroenvironment.

The microenvironment is represented by the branch industry or the market where the organization performs its activities. The microenvironment is analysed through Porter's Five Force Framework (1980) or using the Industry life cycle (Keppler, 1996).

The macro-environment represents the totality of factors that influence the organization's performance through direct and indirect influence. The most used methods, for the analysis of the macroenvironment, are represented by the PEST (STEP) and its expanded versions: the PESTLE or STEEPLED. The PEST analysis

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groups the external factors into four main categories like: Political, Economic, Social and Technological; the PESTLE adds the Environment (or Ecological or Natural) and Legal (Regulatory) groups; while the STEEPLED adds the Ethics and Demographic categories.

Many authors like Bach and Allen (2010), Johnson et al. (2014), Taylor and Francis (2002), Yüksel (2012) consider the ecological factors as regulations, policies, and methods that are imposed in order to protect the natural environment. The Ecological factors of the company's external environment represent the factors that are not a result of human activity, and which have a considerable influence over the performance of the organization. The natural factors represent the primary element that forces society to adapt in order to survive, representing the root of all macro-environment factors. These factors can be influenced by the activities of individual companies in a small way and in a limited area, mainly by the sum of human activities. However, most of the business analysis omit them, considering that an organization is adapted to their traits even from creation.

Primarily, companies that include natural factors in their analysis are those which have as main economic activity the exploitation of natural resources or those that are influenced by a certain natural phenomena. Nevertheless, most of the business studies omit them, mainly due to the fact that it is considered the organization is adapted to these traits even from its creation. In addition, the organization that has economic activities in different regions or must relocate to other areas must adapt to the features of the natural environment like the duration of daylight, climate, landscape and so on.

1. Natural factors

The main natural factors are represented by the geographical position, landscape, climate, ecosystems, natural resources and natural hazard. The natural factors represent the macro-environment factors of the business that change over a long period of time. For example, the geographical position and landscape are changing during millions years, in comparison with other groups like the technological factors that can change yearly. However, these factors can change very fast in case of catastrophic natural or human made events.

All natural factors are in strong relation to one another as represented in Figure 1. Although, geographical position is the least influenced one, due to the fact that there is a lower chance that these factors happen over a much longer period of time (million years) or in infrequent cases of catastrophic hazards like powerful earthquakes or astronomic events.

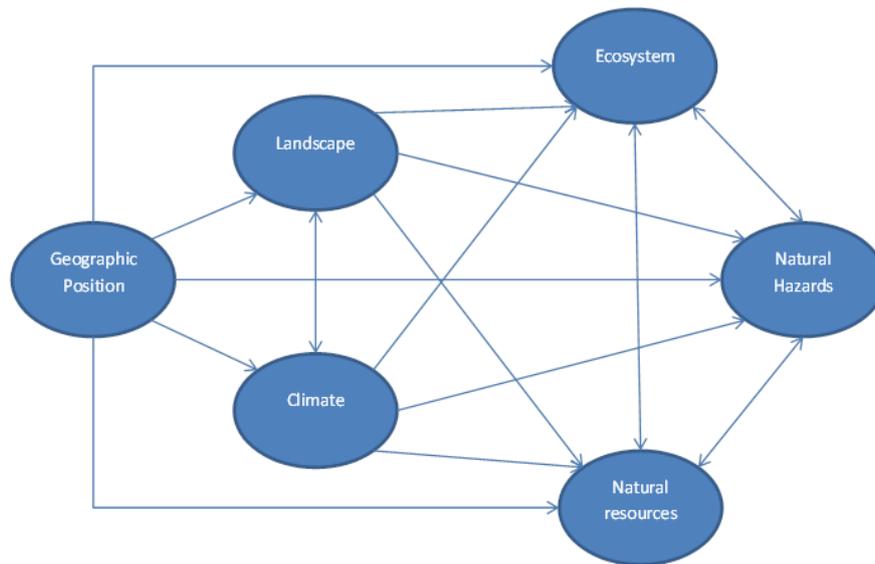


Figure 1 Relations between the natural factors

1.1 Geographical position

The geographical position constitutes one of the most important natural factors, because of its role in the determination of daylight duration, the daily sunrise and sunset in year (Glarner, 2006). The geographical position mainly describes the geographic coordinates like the latitude and longitude. The latitude influences the daylight variation in a year (Glarner, 2006), because the regions near Ecuador have the smallest variation of daylight during a year (the day is near equal with the night almost all year long) while the regions near the poles have the biggest variation of daylight in a year. The daylight duration can be longer than 24 hours in June and July, while nights can last longer than 24 hours in December and January. The longitude influences the moment when the sun will rise or set in a region. The main problem is that in many cases time zone does not reflect exactly the sun position in the sky. As a resultant, even though two regions are set in the same time zone, the sun will rise or set in a different period of time. For example, in Romania the difference between sunrise and sunset hours in Constanta and Timisoara is approximately 30 minutes (Table 1). But the difference can be even higher if the localities are situated at the oppose borders of the time zone. For example, Budapest and Madrid are situated both in the time zone GT+1, resulting a difference of sunrise at the equinox of approximately one hour and 40 minutes (<http://www.timeanddate.com>).

Table 1. Sunrise and Sunset periods of the major Romanian Cities

Cities	Sunrise			
	20 March	22 June	23 September	22 December
Bucharest	06:19:19	05:31:15	07:03:32	07:49:01
Brasov	06:21:40	05:28:15	07:05:06	07:55:25
Cluj-Napoca	06:29:12	05:31:40	07:13:23	08:07:58
Constanta	06:09:11	05:22:07	06:53:23	07:37:55
Galati	06:11:59	05:19:30	06:55:25	07:44:50
Craiova	06:28:31	05:40:56	07:12:46	07:57:49
Iasi	06:13:13	05:14:02	06:57:21	07:53:30
Timisoara	06:38:44	05:45:29	07:22:58	08:13:27
Cities	Sunset			
	20 March	22 June	23 September	22 December
Bucharest	18:27:42	21:03:53	19:11:43	16:39:14
Brasov	18:29:26	21:10:43	19:14:13	16:36:30
Cluj-Napoca	18:37:56	21:23:33	19:21:52	16:40:20
Constanta	18:17:31	20:52:44	19:01:34	16:29:59
Galati	18:19:43	21:00:04	19:04:31	16:28:12
Craiova	18:36:55	21:12:39	19:20:55	16:48:51
Iasi	18:21:59	21:09:13	19:05:56	16:23:23
Timisoara	18:47:20	21:28:42	19:31:17	16:54:23

(Source: SunEarthTools.com)

In order to save more daylight time, for efficient energy use, many Northern Hemisphere countries have implemented the Daylight Saving Time (DST) system, by turning the clock forward in the last week of March and turning the clock backward in the last week of October. However, many scientists believe that the DST system can provoke some health problems (Schneider & Randler, 2009) and behaviour (Sexton, 2014) issues. Some suggest it can provoke the decline of productivity (Kountouris & Remoundou, 2014) and perturb the stock markets (Berument, Dogan & Onar, 2009).

The main influence of daylight casts upon the organization management of working program or in some cases of the shifts. In addition, studies made by Mayhoub and Carter (2011), Begeman et al. (1997), Juslén, Wouters and Tenner (2007) consider that employees, who have access to daylight, have a higher productivity than those employees that have access only to artificial light. This theory can be observed in the tendency of companies to establish the work program in such way that employees will benefit from more daylight in the winter season.

In Romania, the main working program of the majority of organizations for one shift starts around 8:00 or 9:00 and ends at 17:00 or 18:00 (Figure 2). It results that the working program ends after sunset in the winter season, thus raising the cost with electric and thermic energy and lowering the productivity of the employees if the lighting is not done properly.

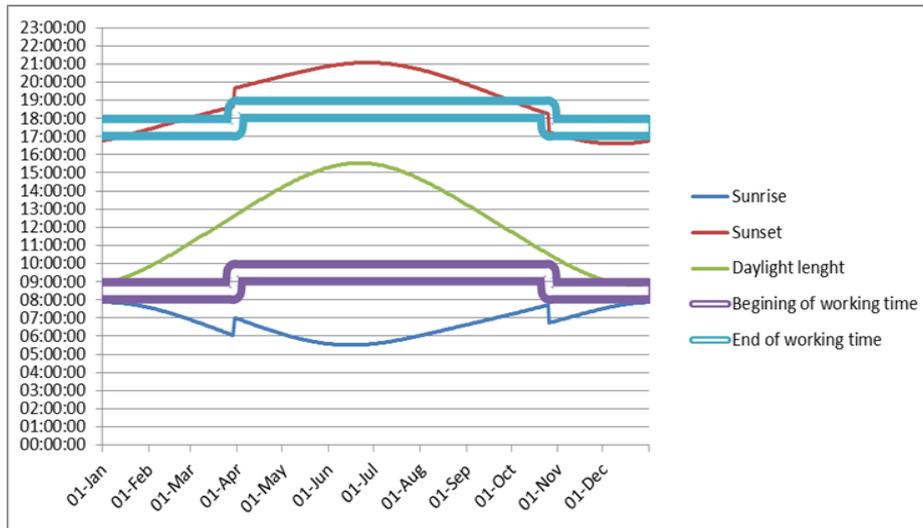


Figure 2. Yearly Sunrise, Sunset and the Daylight duration in Bucharest
 (Source: made by authors with data from SunEarthTools.com)

1.2 Landscape

The landscape (landform or relief) is the second most important element that has a significant influence upon the performance of the organization as well as on other natural factors. The influence of landscape is represented by the additional investments incurred in placing the economic activity in a specific region. The main activities influenced by the landscape are transport, constructions and the resource exploitation like agriculture (Geiger, 2010), mining or sylviculture. The transport activities are mainly influenced by the consumption of energy per distance, for example, the consumption of fuel per km is cheaper in the plain region than mountain region. The construction activity is mainly influenced by the cost of stabilization of the terrain, protection against landslide and so on. In the case of agriculture, the landscape limits the types of plants and animals that can be grown. The landscape is mainly influenced by the human activity through the process of urbanization, construction transport ways and quarries. The exploitation of natural resources is mainly influenced by the difficulty and costs implied by the hampered accessibility on the terrain.

Also, in times of increased competitiveness and globalization, companies tend to organize themselves in clusters on the base of similarity and regional proximity. This proves to be a real advantage for innovative small and medium enterprises (SMEs), due to the easy and fast access to suppliers, markets and knowledge (Girneata, 2013).

The accessibility of landforms contributes to the cluster organization and provides companies the opportunity to be more efficient as they find more specialized assets and suppliers and they minimize the reaction times contrary to the situation of isolation (Girneata, Mascu, 2014).

1.3 Climate

The climate has a **direct influence** upon the economic activities affected by a seasonal factor (agriculture, tourism, consumption of certain goods) and an **indirect influence** on activities that do not have a seasonal factor (construction, transport, textile industry). The direct influence has a major impact on the revenues of the companies, mainly in the production process (agriculture) or in sales of services like tourism (Valls and Sarda, 2009). The indirect influence is mainly represented by the costs that companies must invest in order to adapt to the features of each season (winter product stocks) and the increase of the consumption of energy and fuels (Nordin and Arvidsson, 2014).

Apart from the landscape, climate is also influenced by the global human activities mainly through the emission of pollutants, but also the exploitation of natural resources like the wood. In recent decades, the phenomena are known as climate change became of serious issues throughout the social, political, academic and economic levels. In order to stop the climate change, the governments started to negotiate agreements that limit the emission of CO₂, although they proved to be unsuccessful. One of these types of agreements was the Kyoto Protocol (1997) but without the support of the major polluters, the protocol failed to enforce its clauses and expired in 2012.

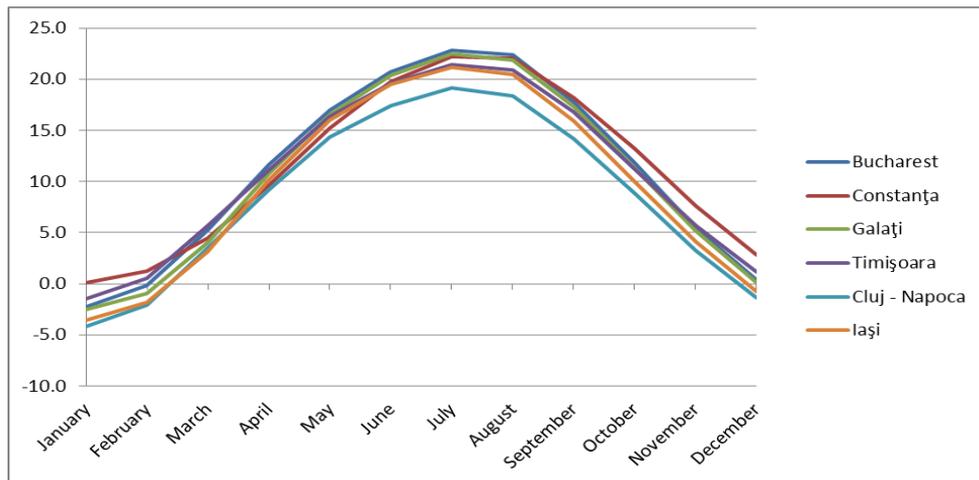


Figure 3. Average Temperature for main Romanian Cities
(Source: National Institute of Statistics)

1.4 Natural resources

Natural resources are represented by water, minerals, material, organisms or other substance that can be used by human activity (Newbert, 2008). The importance of natural resources resides in the ratio between the revenue from exploitation and the cost of exploitation. Even if the demand and the price are significant elements for

a company to start the exploitation of a certain resource, the influence of quantity, quality, density and difficulty of exploitation can result in turning some areas into non-profitable ones. Natural resources can be divided into renewable (wind, solar energy, organic material and so on) and non-renewable resources (minerals, oil, gas etc.). Even the renewable resources can be depleted if they are exploited unsustainably, such is the case of soil (D. Blandford,2014). Natural resources must be used in a responsible way in order to reduce the material losses (Aikins, 2014) and to develop efficient recycling technologies.

1.5 Ecosystem

Ecosystem represents the life form found in a certain area. This category of factors includes plants and animal which are not considered resources, but influence the economic activity of the organization. The main two are represented by the endangered species and the pest species. The endangered species represent the plants and animals that are in low numbers, and that are protected by national or international laws. The companies must invest additional resources in order to protect the habitat of this type of species according to the legislation. The dangerous species are represented by animals and plants that can harm humans or domestic animals. In order to protect their employees and their assets, companies must invest in ways to adapt their activities in dangerous habitats. Pest represents the life forms that disrupt the productivity of economic activities by damaging the company's assets, like the destruction of cereals and vegetables in agriculture branch, damaging the products and insects can even damage electric equipment. One category is represented by the parasite microorganisms that provoke disease which can harm the employees. Even if the pandemic cases can be solved only by the government, companies must instruct their workers in case of relocation by acquisition of vaccines for the diseases of each region (flu vaccines for employees from southern regions or yellow fever vaccines for employees from northern regions).

The ecosystem, the most influenced factor by human activity, after the natural resources. In order to protect it, regulations were created in order to impose norms regarding which economic activities can be done in wildlife areas. Another policy is to create protected areas like reservations or to protect the endangered species of plants or animals.

1.6 Natural Hazards

Natural hazards represent the all natural phenomena that provoke damages and loss of human life, through their intensity. In many cases, natural hazards are considered to be a turbulence of the other factors. For example, earthquakes are produced especially in mountain areas, while hurricanes are specific to regions with tropical climate. Even if the natural hazards are unpredictable and cannot be foreseen in the most times, the regions where these phenomena have a high probability to happen are well known (Hurley & Corotis, 2014) and can be avoided by companies

that do not desire to take any chances. The type of organization mostly influenced by natural hazard is represented by insurance companies whose profits are influenced by the damaged provoked. The main actions that companies can take are trying to diminish or to cover the damage of a natural disaster. Even if companies can cover their loss of assets through insurances, their economic activities will be heavily perturbed if they do not take actions to reduce the impact of such phenomena. To diminish the damage companies must invest in: warning alarms, systems that stop the electricity or natural gas supply to prevent fires, dugs against floods, shelters and provisions, constructions that resist earthquakes, exercises and regulations. Although, companies invest important resources in protections against hazards, they will never be efficient without governmental investments like: digging of rivers and seashores, warning systems, assistance plans and so on.

According to the National Oceanic and Atmospheric Administration (NOAA), between 1990 and 2014 there were 58 earthquakes, 48 of which have caused damages exceeding 25 million in each case. The most costly has been the earthquake that struck Japan in 2011, rethinking the entire concept of safety measures imposed to the nuclear plants management.

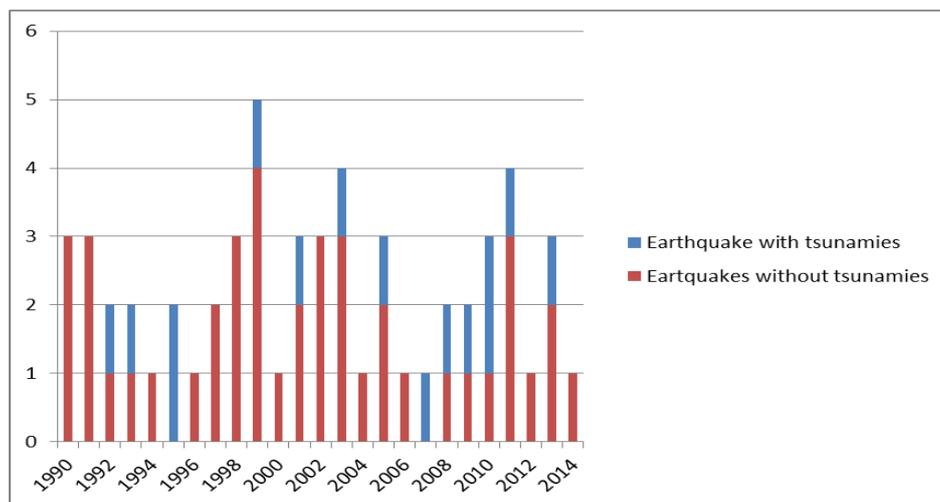


Figure 3. Major earthquakes in the world, between 1990 and 2014

(Source: The National Geophysical Data Center)

Conclusion

In conclusion, it can be considered that the ecological factors have a relatively similar importance as the rest of macro environmental factors on the economical performance of companies. Also, these factors should not be mistaken for the environmental protection policies, regulations and methodologies, because these elements are included in the Legal or Political factors.

Even though factors like geographic position (daylight) or landscape seem not to have the same degree of importance like the rest of the natural factors, their influence must not be neglected. Companies should clearly remark the impact of natural factors especially in the time of globalisation, when they decide to place their activities in different parts of the Globe or in their process of relocation. The climate, ecosystem and natural hazards are considered important by the companies, mainly due to the cost of adaptation to these factors' features and also because of the legal regulations and social views about them. The natural resources will always be considered the most important factor, since the exploitation of resources is one of the basic economic activities in every economic branch.

Acknowledgement

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/159/1.5/S/142115 „Performance and excellence in doctoral and postdoctoral research in Romanian economics science domain”

References

1. Aikins, E. K. (2014), “The relationship between sustainable development and resource use from a geographic perspective”. *In Natural Resources Forum*, 389(4), pp. 261-269
2. Bach, D. Allen (2010), “What every CEO needs to know about nonmarket strategies”, *Sloan Management Review*, 51(3), p. 41
3. Begemann, S. H. A., Van den Beld, G. J., & Tenner, A. D. (1997). “Daylight, artificial light and people in an office environment, overview of visual and biological responses”. *International Journal of Industrial Ergonomics*, 20(3), 231-239.
4. Berument, M. H., Dogan, N., & Onar, B. (2010). “Effects of daylight savings time changes on stock market volatility”. *Journal Information*, 106(2).
5. Geiger, F., de Snoo, G. R., Berendse, F., Guerrero, I., Morales, M. B., Onate, J. J. & Tschardtke, T., (2010), “Landscape composition influences farm management effects on farmland birds in winter: a pan-European approach”. *Agriculture, ecosystems & environment*, 139(4), p. 571-577.
6. Gîrneață, A., (2013), “The Importance of Clusters in the Development of the Textile and Clothing Industry”, *Network Intelligence Studies*, Volume I, Issue 2, pp. 83-89.
7. Gîrneață, A. & Mascu, M., (2014), Development Discrepancies between Western and Eastern EU Countries: A Statistical Analysis of Textile and Apparel Clusters, *Proceedings of the 8th International Management Conference “Management Challenges for the Sustainable Development”*, November, Bucharest, Romania

8. Glarner, H., (2006), Length of day and twilight. Online http://herbert.gandraxa.com/length_of_day.xml [accessed 15 January 2015]
9. Hurley, M. A., & Corotis, R. B., (2014). "Perception of risk of natural hazards: a hazard mitigation plan framework". *International Journal of Risk Assessment and Management*, 17(3), pp. 188-211.
10. Johnson, G., Whittington, R., Scholes, K., & Angwin, D., (2014), *Exploring strategy: Text & cases. Tenth Edition*, Harlow: Financial Times Prentice Hall. pp. 34-37
11. Juslén, H., Wouters, M., & Tenner, A. (2007), "The influence of controllable task-lighting on productivity: a field study in a factory". *Applied Ergonomics*, 38(1), pp. 39-44.
12. Keppler, S. (1996), "Industry life cycles". *Industrial and corporate change*, 6(1), pp. 145-182.
13. Mayhoub, M. S., & Carter, D. J., (2011). "The costs and benefits of using daylight guidance to light office buildings". *Building and Environment*, 46(3), pp. 698-710.
14. Moldoveanu G., Dobrin C. (2007). *Turbulenta si flexibilitate organizationala*. Editura Economica, pp. 23-30
15. Newbert, S. L., (2008). "Value, rareness, competitive advantage, and performance: a conceptual-level empirical investigation of the resource-based view of the firm". *Strategic management journal*, 29(7), pp. 745-768.
16. Nordin, L., & Arvidsson, A. K., (2014). "Are winter road maintenance practices energy efficient? A geographical analysis in terms of traffic energy use". *Journal of Transport Geography*, 41, pp.163-174.
17. Porter, M.E. 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Free Press, p. 5
18. Schneider, A. M., & Randler, C., (2009), "Daytime sleepiness during transition into daylight saving time in adolescents: Are owls higher at risk?", *Sleep medicine*, 10(9), pp. 1047-1050.
19. Sexton, A., (2014), "Behavioral responses to Daylight Savings Time", *Journal Of Economic Behavior & Organization*, 107(1), pp. 290-307
20. Eva, M., Hindle, K., Paul, D., Rollaston, C., & Tudor, D. (2010). *Business analysis*. Edited by D. Paul, & D. Yeates, British Informatics Society.
21. Valls, J. F., & Sarda, R., (2009). "Tourism expert perceptions for evaluating climate change impacts on the Euro-Mediterranean tourism industry". *Tourism Review*, 64(2), pp. 41-51.
22. Yüksel, I. 2012. "Developing a multi-criteria decision making model for PESTEL analysis". *International Journal of Business and Management*, 7(24), p. 52.
23. Romanian Statistical Yearlybook, 2013, *National Institute of Statistics*
24. Kyoto protocol, http://unfccc.int/kyoto_protocol/items/2830.php
25. The National Geophysical Data Center, <http://www.ngdc.noaa.gov/hazard/>
26. Sun Earth Tools, <http://www.SunEarthTools.com>
27. Time and date <http://www.ngdc.noaa.gov/hazard/>