HARBOUR INFRASTRUCTURE PROTECTION – PESTLE ANALYSIS

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Abstract: The aim of the following article is to present the PESTLE analysis with its general concept and role which is to provide valuable information about the external factors that affect a given organization, industry or whole infrastructure. It also outlines the components of the analysis (the six factors – political, economic, social, technological, legal and environmental), the main five steps of conduction, as well as, some positive and negative aspects of its implementation. The publication concentrates on the harbour infrastructure as a part of the critical infrastructure and the importance of preserving its security and safety in order to manage its everyday activities successfully. The harbour takes a significant role in the execution of the transportation industry's responsibilities and provides different types of services from distribution of cargo items and packages to passengers traveling and shelter for vessels. In order to detect threats for the normal functioning of the harbour industry, a PESTLE analysis is presented with main indicators for each external factor that could influence positively or negatively the particular infrastructure:

- **Political** – government policy, political stability, corruption, foreign trade policy;
- **Economic –** economic growth, change in interest level and foreign exchange rates, inflation and unemployment, expected economic changes;
- **Social –** demographic aspects, consumer preferences, security and defence, social-cultural differences;
- **Technological –** technological improvement, research and development, new technologies, international influence;
- **Legal –** laws and regulations, customer's protection, copyright, patents and intellectual property;
- **Environmental –** climate change, environmental pollution, corporate social responsibility.

Last but not least, this article introduces the behavioral analysis programs as an instrument for detection of suspicious or hostile behavior which could be useful proactive measure for overcoming potential threats for the critical infrastructure outlined by the conduction of PESTLE analysis. The harbour as a crowded place with numerous vital assets and constructions on its territory and as a part of the critical infrastructure needs specific and effective measures for protection, and the behavioral analysis might be a suitable solution in achieving that. Besides positive aspects, some issues are presented concerning the implementation of the behavioral programs that should be taken into a consideration in advance.

Keywords: PESTLE analysis, Critical infrastructure, Harbour security, Behavioral analysis programs

1. INTRODUCTION

The critical infrastructure is a crucial component of the political, economic, social and even environmental life of the contemporary society. Its existence and preserved safety and security are of significant importance for the functioning of any given country. Numerous internal and external factors might influence it both a positive and a negative manner. That is why the conduction of PESTLE analysis could facilitate the process of identifying and analysing the indicators outside the particular infrastructure. The harbour as a component of the critical infrastructure is subjected to different negative aspects that affect its everyday activities and provision of services. Based on that, a PESTLE analysis of harbour infrastructure could be a useful instrument for identifying potential threats and overcoming currently existing issues. The behavioral analysis programs could present a solution to some of the social factors concerning the harbours as an example of crowded places with high risk of safety intrusions.

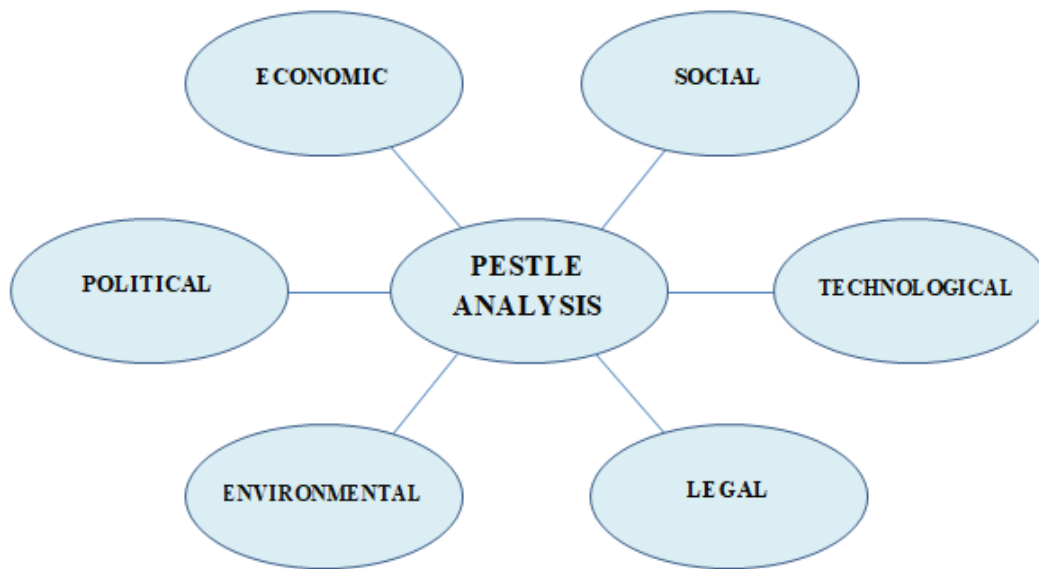## 2. THE PESTLE ANALYSIS – CONCEPT, ROLE, ELEMENTS, STEPS FOR CONDUCTION, ADVANTAGES AND DISADVANTAGES

The PEST analysis is a method that provides an insight on the macroeconomic picture of a particular examined industry. While the SWOT analysis concentrated on the internal state of a specific organization which operates in that industry, the PEST analysis pays attention on the factors outside the organization which also influence its activities but are uncontrollable from its position (The University of Sydney website, Marketing: PESTLE Analysis, 2021). The PESTLE analysis is an extended version of the PEST analysis and besides its four typical factors (political, economic, social and technological), includes the legal and environmental indicators as well. The

PESTLE tool provides a broader analysis and since the influence of the environmental and legal factors has greatly expanded the scope of strategic planning in the resent years, it is used in this article instead of the basic PEST version.

The PESTLE method provides essential information concerning external issues that might represent a threat for the organization; it analyses the weaknesses that could arise from them and the measures that are needed to be taken in the process of their overcoming. Moreover, it assisted the process of outlining the new opportunities and business prospects for the organization. That is why the PESTLE analysis is considered as a useful tool in the decision-making and strategic planning of any given organization.

The analysis's elements are the above mentioned factors which are graphically illustrated (*Graph 1. Factors in the PESTLE analysis*) and briefly explained.

Graph 1. Factors in the PESTLE analysis

- **Political** – this factor analyzes the government's policy regarding the industry in which the organization operates and includes the development and implementation of decrees, regulations and normative acts, the preparation of which is within the competence of the government. Relevant here are also the political stability on national and international level and the political leadership;
- **Economic** – here are included economic elements and performance indicators that directly affect the organization like inflation or interest rates, economic growth and fluctuations in the foreign exchange rates. They influence the pricing of products and services, the purchasing power of the consumers and through that the demand and supply in the industry in general (PESTLE Analysis, SWOT and Business Analysis Tools);
- **Social** – the social factor concentrates on the demographic and cultural impact that influence the industry's environment such as preferences, lifestyle choice, peaks in buying periods, workforce trends and others. These elements could affect the implementation of new products and services, as well as the distribution and marketing process of existing ones;
- **Technological** – technologies could have a significant influence on particular industry directly or indirectly. They could affect the innovation process and through that the market, consumer choices and buying power. Moreover, they could also stimulate the research and development processes, the automation and technological awareness (The University of Sydney website, Marketing: PESTLE Analysis, 2021);
- **Legal** – the legal factors are concentrated on the regulatory framework state of the industry, including not only laws concerning the consumer protection and tax policies, but also the marketing standards, patents and trademarks.
- **Environmental** – these factors are becoming more and more important due to the increasing scarcity of raw materials, the pollution of the environment and the climate change. Numerous organizations are establishing a

corporate social responsibility and are focusing on providing products made from sustainable sources in order to answer the customer's demands.

The main steps, necessary for the conduction of PESTLE analysis are as follows:

1. **Identifying the scope and content of the research** – it is reasonable to cover present and future aspects of the business area in which the organization operates, including the industry's characteristics and weaknesses, as well as different potential scenarios that might occur;
2. **Assigning a team of specialists** – this step includes not only forming a good team, but also escalating the appropriate responsibilities accordingly to the goals of the analysis and the desired outcomes;
3. **Gathering and processing of appropriate information** – the idea in this stage of the PESTLE analysis is to emphasize on the importance of up-to-date information regarding current issues or policies and procedures. Also, it is advisable to record the data in a proper form (e.g. created templates in advance or specifically designed programs for that matter);
4. **Analyzing the collected information** – the analysis of the gathered data is the most crucial step in the whole process and leads to the formulation of different issues that affect the organization, as well as defining their impact over the business. Based on that, an appropriate order for addressing them should be created and specific solutions in their overcoming are formulated;
5. **Presenting the stakeholders with the results** – the last step includes not only the discussion of the findings but also the decision-making process and the ongoing monitoring on the addressed issues (Pathak, R., 2021)

The positive aspects of the PESTLE analysis are regarding its ability to facilitate the business in defining the trends and factors outside the organization, to gain a better understanding of the external environment in the industry in which it operates and to spot in advance not only potential threats, but also opportunities (Oxford Collage of Marketing website, What is PESTLE Analysis).

Unfortunately, along with advantages the PESTLE analysis has some drawbacks that should be taken into account. Firstly, the data in connection to the examined factors is not easy to be gathered, especially when it comes to up-to-date information. Secondly, working with dynamic factors like these ones could lead to changes in the results and difficulties in prediction of the future outcomes. Thirdly, it is not providing a full picture for the organization's state because it concentrates only on external factors. That is why it is advisable to combine PESTLE with SWOT analysis in order to obtain internal factor's information as well (Frue, K., 2018).

3. THE PESTLE ANALYSIS FACTORS IN THE HARBOUR INFRASTRUCTURE

In general terms harbour is a facility located on the coast of a body of water and is used as a shelter for vessels or a provider of transportation services. It is a location for loading and unloading different types of cargo and postal items and could serve as a starting point for passengers traveling and hobby activities. Due to their importance, the harbours are usually part of the critical infrastructure of the countries and require special treatment and attention when it comes to their protection and safety. The destruction of the harbour infrastructure could affect negatively the political, economic or social life of particular society.

Some of the most important indicators in the PESTLE analysis of harbour infrastructure are presented as follows:

FACTORS	PESTLE analysis /Harbour Infrastructure/
Political	***Government policy*** The government policy is essential for the normal functioning of the harbour industry, representing a regulatory and control body of all harbour's actions. Government defines the tax, trade and funding policies without which the industry's activities are not possible. ***Political stability*** Another crucial indicator for the harbour infrastructure is the political stability. Internal political issues or pressure might have a serious negative impact on the trade policies or regulatory activities and affect the short and long-term operations of the harbour industry. ***Corruption*** Nowadays, the corruption represents a challenge not only for the harbour industry, but also for many aspects of the political, economic, social and legal activities. It could influence negatively the financial elements of the harbour, as well as its security, defense and reputation. ***Foreign trade policy*** Most of the harbour activities are connected to interaction and cooperation with other harbours outside the territory of a particular country, thus the foreign policies regarding the trade, and especially the trade restrictions, are essential for the normal functioning of these activities.
Economic	***Economic growth*** Economic growth means an increase in the need of goods and services. That would lead to a growth in the whole production process and through that to an increased demand of transportation activities. All that, bring higher profitability and more future prospects for the harbour industry (Deerod, K., 2018). ***Change in Interest level and Foreign exchange rates*** Both indicators affect the production cost, the pricing of goods and services, the investment in the field and the potential level of profitability. That is typical for the harbour infrastructure which should provide not only high-quality services at affordable prices, but also timely execution of financial responsibilities and secured atmosphere on its territory. ***Inflation and Unemployment*** The inflation and unemployment influence the business processes and transactions, as well as the disposable income and labor costs. Nevertheless whether the effect is positive or negative over the harbour industry, it should be taken into a serious consideration. ***Expected economic changes*** Another important component of the economic factor is the forecast of the economic changes. That could include globalization and expected economic growth, prospects for investment and increase in the working capacities in the industry.

Social	***Demographic aspects*** As demographic aspects are considered the age, race, gender, household size, age distribution, population growth, etc. They could affect the harbour industry in both ways – firstly, as a consumer characteristics, and secondly, as a personnel and work force characteristics. ***Consumer preferences*** This indicator is of significant importance for every kind of product or services that are presented to the consumers, including harbour ones. It could guide the whole production process, the marketing strategies and distribution approaches. It is affected by the consumers' views, lifestyle trends and career attitudes. ***Security and Defense*** The security and defense are one of the most basic human needs, essential for the normal and effective functioning of the harbour industry. The safety on the territory of the harbour infrastructure is important not only for its clients but also for its personnel. ***Social-cultural differences*** The modern world is inhabited by milliards of people from different cultures, race and social strata. That could influence their lifestyle, preferences and consumer models. This is especially distinctive for the transportation sector, the part of which is the harbour industry.
Technological	***Technological improvement*** Technological stimuli, automation and innovation levels are in constant transition and improvement. They take a role in the whole production process and provision of final goods and services. The technological innovations benefits not only the harbour infrastructure, but also the surrounding communities and stakeholders (Simons, N., 2014) ***Research and Development*** Here are included the research of new technologies, the development of proactive measures and the introduction of technological transfer. Better technologies means movement of shipment and cargo from vessels in a safe and timely manner (Simons, N., 2014) ***New approaches*** New approaches for production, distribution, marketing and digitalization could affect positively the mandatory and supplemental processes in the harbour organization and even reduce the resources needed. ***International influence*** The international influence is an important innovation force leading to better technological awareness and competitive advantage as well. This might be of crucial importance for the security and defence of particular harbour infrastructure.
Legal	***Laws and Regulations*** There are numerous laws and regulations concerning the harbour infrastructure. Most important of them are those regarding the labor, tax and trade laws, the efficiency standards and the safety and security regulations. ***Customer's protection*** Here are included different types of laws like customer protection laws, health and security laws, General data protection regulation (GDPR) and even the framework ensuring the lack of discrimination. ***Copyright, Patents and Intellectual property*** Every organization should make an effort to protect its intellectual rights and respectively not to interfere with the intellectual rights of another organization. That is why this factor should be taken into account before entering a competitive industry like harbour one (Fern Fort University website, Clean Harbours, Inc. PESTEL & Environmental Analysis).

	Climate change
Environmental	The climate change creates uncertainty to the harbour infrastructure due to the changes in weather phenomena which might result in difficulties in managing some types of cargo transportations, as well as causing issues for the infrastructure's assets which are vulnerable to those climate changes (Paraskevas, Ts., 2020).
	Environmental Pollution
	The pollution of the environment has a serious negative effect not only over the nature, but also over the human life inside and outside the harbour industry. That is why every action in attempt to reduce the pollution means a positive impact on human health (Christodoulou, An., Cullinane, K., 2019).
	Corporate Social Responsibility (CSR)
	CSR brings awareness among the organization and the industry in which it operates, and outside as well. In that way CSR could set a tone for positive change and environmental-friendly improvements.

4. BEHAVIORAL ANALYSIS PROGRAMS IN THE PROCESS OF OVERCOMING THE POTENTIAL THREATS OUTLINED BY THE PESTLE ANALYSIS

Behavioral analysis is a useful tool for detection of hostile individuals and abnormal behavior. It is based on the idea that suspicious individuals manifested a body language different than the one of regular individuals with no hostile intent. Most of the behavioral analysis programs are designed as artificial intelligence platforms to timely and effectively detect suspicious behavior. That is why such programs could be implemented as an instrument which provides information about abnormal behavioral activities outside and inside an organization.

As a part of the critical infrastructure, the harbour itself, constantly deals with numerous weaknesses, threats and risks to its security. The presented PESTLE analysis outlines potential issues from outside the particular infrastructure and the behavioral analysis platforms can facilitate the process of overcoming some of them.

This kind of programs is especially useful on a territory of crowded places like the critical infrastructure itself. Millions of people are using the transportation services for traveling or transmission of goods and the harbour infrastructure is a typical example of that. The bigger the number of individuals on the harbour territory, the higher the risk of terrorist attacks, illegal actions or hostile intents. The social factor in the PESTLE analysis points out the importance of the security and defense not only for the harbour's customers but also for the personnel that works there. In crowded infrastructures the execution of monitoring and access control is a challenge which could be assisted by the behavioral analysis programs.

They are environmental-friendly and even expensive for initial investment, they are undoubtedly a long-term assets that could be beneficial for the future security of the organization and in that manner reduce additional costs for preserving safety and security. However, some specific issues should also be taken into a consideration before their implementation.

Based on the fact that the harbour is used by people with different demographic characteristics and preferences, the introduction of behavioral analysis should be applied in consideration of those distinctions. The programs should be bias free in order to function effectively and without any discrimination. As a solution to that is the existence of a human factor in the whole process of creation and observation the work of the behavioral analysis program at any given moment. It should not be used as an independent platform, but as a supplemental one. The individuals who operate with such programs are supposed to be well trained and experienced to analyze the results.

Another important issue to be taken into account in the implementation of behavioral analysis is the legal aspect. Firstly, there is a need of specific legal framework to regulate its usage and monitoring. Without it, the results from the detection of suspicious behavior might not have the lawful ensuring. Secondly, the personal data of the affected individuals should be protected. That includes measures for its collections and regulations for operating with it.

Last but not least, the behavioral analysis programs should be designed and implemented in accordance to the needs of the particular harbour. Although some elements might be universal, specific and unique ones are crucial for the effectiveness of the programs at the given infrastructure.

5. CONCLUSION

The PESTLE analysis provides important information for the outside factors that affect the activities of the harbour organization as a component of the critical infrastructure. It is especially useful for detecting external issues that could negatively influence the everyday operations on its territory and threaten the safety of its personnel and

consumers. The behavioral analysis programs could facilitate the process of overcoming the negative social indicators and could preserve the security of the harbour infrastructure in accordance to its specific needs and requirements.

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