
Correlation Approach in Defining Organizational Health and Safety Management Strategies

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Abstract:

Purpose: The research aimed to verify the applicability of the SWOT / TOWS method to the selection of organizational health and safety management strategies in manufacturing companies, with a focus on the correlation approach in the conducted research.

Design/Methodology/Approach: Determining a strategy in the field of health and safety management in nine production companies. The methodology of selecting a strategy was based on SWOT/TOWS methodology assumption. The input data for the research was: characteristics of the company's operations, description of the context of the company's operation, requirements of interested parties along with their criticality based on the prepared hierarchy of occupational health and safety(OHS) requirements.

Findings: The use of the correlation approach in determining the OHS management strategy allowed for estimating the strength of the impact of individual factors on the selection of OHS management strategies in a manufacturing company, identification of interactions between factors in 8 crosstables, and above all, determination of OHS management strategies, i.e. for 7 companies of the strategy aggressive, for the others it is conservative and defensive.

Practical Implications: Establishing a health and safety management strategy should be considered particularly important in the context of the challenges faced by enterprises resulting from the COVID-19 pandemic. As a result of the conducted research, it can be concluded that the SWOT / TOWS method enables the determination of an occupational health and safety management strategy.

Originality / Value: In the SWOT / TOWS method, attention should be paid to the dominant number of interactions and to the distribution of the weighted number of interactions. The article shows that there are correlations for which it is necessary to indicate an action strategy to a specific combination of factors, especially when the product of weights and the number of interactions indicates the priority of a strategy other than that adopted for the entire enterprise.

Keywords: Occupational health and safety strategy, SWOT / TOWS analysis, correlation.

JEL codes: D22, J81, L21.

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1. Introduction

The concept of security can be defined as the basic need of every human being, as well as the opposite of a threat (Justyński, 2019). Another meaning of the word is a state in which there is no risk of losing items of particular importance to humans, such as health, work, or respect (Gee, 2016). Gabryelewicz *et al.* (2015) referred to, *inter alia*, safety at work, treating this term as “a combination of three basic factors which shape the general framework of doing a job. It is created by the specifications of machines and devices operated by employees, administrative and legal regulations which must be observed when doing a job and psychosocial conditioning of employees” (Gabryelewicz *et al.*, 2015).

The concept of safety has acquired a new meaning among societies due to the COVID-19 pandemic. The need to ensure safety and its sense of safety accompanies a person every day, both at work and in everyday household chores, and even in their spare time. It is a kind of a new challenge that requires taking responsible decisions, better planning, organizing, executing, controlling, and improving activities. Entrepreneurs are responsible both for their safety, but also for the safety of their employees, which is why, according to the author, it is so important to adopt a health and safety management strategy in an enterprise tailored to its needs.

Occupational health and safety (OHS) is a set of rules and regulations that must be followed, as well as a set of research, organizational and technical measures aimed at guaranteeing the workers' working conditions so that they can be productive and not be exposed to the risk of an accident, or occupational disease and excessive physical and mental strain (WPRO, 2015; Hale and Ytehus, 2004). It is the employer's responsibility to meet the health and safety requirements in a given company. They were defined in the Act of June 26, 1974, the Labor Code (Journal of Laws 1974 No. 24, item 141) and include:

- taking responsibility for the health and safety at work in the workplace,
- the obligation to protect the health and life of employees, including proper organization of work, ensuring compliance with health and safety rules and regulations in the workplace, removing deficiencies, taking into account the protection of the health of adolescents, pregnant or breastfeeding employees, and disabled employees as part of the activities undertaken preventive measures, following the recommendations of the social labor inspector, executing orders, decisions, and orders issued by the bodies supervising working conditions,
- the obligation to provide employees with information about threats to health and life in the workplace, occupational risk at the workplace, rules of conduct in the event of a breakdown, actions taken to eliminate or reduce the occurring hazards, employees designated to provide first aid and manage activities during a fire and evacuation of employees, the obligation to cooperate with other employers, if their employees perform work on the same site (e.g., on the

- construction site, if there are several subcontractors), the obligation to provide resources necessary for first aid,
- the obligation to ensure that the workplaces meet the requirements of occupational health and safety, the obligation to ensure safe and hygienic conditions when working with machines and other technical devices, the obligation to assess and document the occupational risk occurring during work in a given position, the obligation to send employees for tests medical (initial, periodic and follow-up).

The above-mentioned obligations have been specified in detail in the Regulation of the Minister of Labor and Social Policy of September 26, 1997, on general provisions on health and safety at work (uniform text: Journal of Laws No. 169, item 1650, as amended) and in the Act of August 24, 1991, on fire protection. (uniform text: Journal of Laws No. 178, item 1380, as amended), which only includes issues related to fire protection.

The employers are held accountable for the fulfillment of their duties in the manner due by the National Labor Inspectorate (NLI), which is the Polish state body responsible for supervision and control of compliance with labor law (Marczewska-Kuźma, 2020). This institution focuses mainly on regulations related to occupational health and safety. In a situation where, during an inspection, the National Labor Inspectorate finds a breach of labor law, NLI may impose on the employer, for example, an order to stop work, use machines or punish them with a fine (Journal of Laws of 2007, No. 89, item 589). Also, an employee employed in a given company has a legal obligation to know and comply with the rules of occupational health and safety resulting from legal provisions and internal company regulations.

However, if employees find that the working conditions pose a threat to their life or health, they have the right to withdraw from performing the activities without bearing the consequences thereof (Journal of Laws 1974 No. 24 items 141). Due to the ongoing work to ensure health and safety conditions that take into account the strengths and weaknesses of the company, as well as the need to plan the control of their implementation, risk analysis in terms of threats and opportunities, and implementation of improvement actions, the author believes that the company's management should develop a safety management strategy, focused on health and safety at work.

The article presents the methodology of determining the occupational health and safety management strategy, together with an example of its application, in detail for one enterprise and generally for eight enterprises.

Strategy is defined as "the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (Chandler, 1962). Alkhafaji and Nelson (2003) referred to, *inter alia*, strategic management, treating this term as "the

process of assessing the corporation and its environment in order to meet the firm's long-term objectives of adapting and adjusting to its environment through manipulation of opportunities and reduction of threats". It is correct to say that "Strategy management and organizational culture positively influence organizational excellence" (Alhefiti, Ameen, and Bhaumik, 2019).

2. Material and Method

One of the common methods used for strategy selection is SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. When using the SWOT/TOWS analysis, it should be borne in mind that its procedure consists of several steps (Marczewska-Kuźma and Ostrowska, 2018; Sadłowska-Wrzesińska, Marczewska-Kuźma and Jakubowicz, 2020), i.e.:

1. Characteristics of the object and indication of the purpose of the analysis.
2. Identification of factors and assigning each of them to the appropriate segment of the SWOT matrix (strengths/weaknesses/opportunities/threats).
3. Estimating the strength of the influence of internal (S/W) and external (O/T) factors on the selection of a health and safety management strategy.
4. Assigning values to individual elements of the matrix affecting the tested object - values are expressed in the decimal system, but it should be remembered that the sum of the weights of the set is always equal to 1,
5. Identification of connections and possibilities of interactions between the classified activities into individual categories - 8 cross tables (SWOT analysis: S-O, S-T, W-O, W-T; TOWS analysis: O-S, O-W, T-S, T-W).
6. Interpretation of the results.
7. Summary of results from 8 cross tables.
8. Selection of a strategy:
 - aggressive, which is based on the most comprehensive use of the strengths of the organization and the opportunities for success,
 - conservative, which is recommended for organizations with predominant internal potential, in conditions where maximum strengths should be used to counteract threats,
 - competitive, which is based on the greatest possible use of development opportunities; a strategy used by organizations that have many chances of the positive performance of activities, e.g. by working on weaknesses (e.g. improving product quality, reducing costs),
 - defensive, which ensures the continued functioning of the system, while the given state of affairs is unsatisfactory; in this situation, defense measures are taken, such as cutting costs or stopping investments.

Both SWOT and TOWS are methods of strategic analysis used to study the inside of an organization and its environment. When conducting a SWOT analysis, one should focus on the effective use of strengths, taking into account the environmental conditions, and limit weaknesses (Jasiulewicz-Kaczmarek and

Stachowiak, 2016; Saniuk and Saniuk, 2014; Azimi *et al.*, 2011). When analyzing TOWS, the opposite assumption should be made - the company's strategy consists of skillful adaptation of the company to the signals coming from its environment. Therefore, the analysis begins after identifying opportunities and threats in the environment. These factors should be analyzed in the field of OSH management, assessing the possibility of using opportunities or eliminating threats by the enterprise.

The mapping of an occupational health and safety management strategy was carried out in nine manufacturing companies. The methodology of selecting a strategy was used in line with the assumptions of SWOT / TOWS. Preparation for the analysis consisted of selecting nine teams together with the moderator of the works, whose function was performed by the author. The input data for conducting analyzes have been prepared, i.e. the characteristics of the company, the description of the context of the company's operation in internal and external terms (following point A.1 of PN-ISO 45001: 2018), the requirements of the interested parties were summarized along with their criticality).

It is also worth noting that "The fulfillment of the OHS management system's requirements gave the organization the possibility of effective risk management, which in turn contributed to the reduction of number, severity and frequency of accidents, increasing employee awareness of threats and their consequences" (Ewertowski, 2020).

The article presents in the results of analyzes in the field of the strategy carried out for one of the nine surveyed enterprises, and for the remaining ones, the collective results of the analysis. The purpose of the SWOT / TOWS analysis was to identify the key internal (strengths and weaknesses) and external (opportunities and threats) factors of the selected enterprise in the context of the selection of the health and safety management strategy. Goal setting is the first step of the strategic analysis method. The remaining steps are covered in further sections.

3. Results

Factors influencing the company's health and safety management strategy have been identified and these factors have been organized concerning the four areas of the matrix, i.e. strengths, weaknesses, opportunities, and threats - following step two of the analysis. The importance of factors classified into four analytical categories of the SWOT / TOWS analysis was estimated, i.e., strengths (S), weaknesses (W), opportunities (O), and threats (T), which is summarized in Table 1. The weight value for individual factors was established, inter alia based on internal data of the enterprise, consultation with employees, competitive assessment of the enterprise.

Table 1. Estimating the strength of the impact of individual factors on the selection of a health and safety management strategy in a manufacturing company

Code /Weight	Internal factors		Code /Weight	External factors		
	Strenghts			Opportunities		
S1	0,1	Experienced production Staff	O1	0,3	Cooperation with state authorities	
S2	0,3	Systematic measurement of nuisance factors (noise, dust, lighting)	O2	0,1	Promotion and education of the society in the sense of security by external organizations	
S3	0,1	Low accident rate	O3	0,25	Attempting to implement the requirements of PN ISO 45001	
S4	0,3	Daily safety checks	O4	0,15	Possibility of obtaining funding from the EU	
S5	0,2	OSH training	O5	0,2	Employee involvement in actions to improve health and safety	
	Weaknesses			Threats		
W1	0,3	Employees do not comply with applicable laws	T1	0,25	Change of health and safety regulations	
W2	0,25	The company's financial problems (lack of funds for the development of OSH)	T2	0,25	Unavailability of appropriate personal protective equipment	
W3	0,2	Incorrectly conducted occupational risk assessment	T3	0,15	Difficulties in finding employees on the market due to insufficient vocational education	
W4	0,15	No health and safety management system	T4	0,15	A competitive company that has implemented an OHS management systems	
W5	0,1	Lack of IT support for OHS	T5	0,2	Products safety requirements defined by international customers	

Source: Own work.

In Tables 2 and 3 of the matrix systems (step 4 and 5 of the SWOT / TOWS analysis), both the number of interactions, which is the number of relations between the factors assigned to two groups each time, as well as the rank of features assigned to the range from 1 to 5. Each table has been described with conclusions - following the assumptions of step 6.

Table 2. Identification of the interaction between (S) and (O) - SWOT

S / O	S1	S2	S3	S4	S5	Weight	Number of interactions	Products of weight and interactions	Rank
O1	1	1	1	1	1	0,3	5	1,5	1
O2	0	0	0	0	1	0,1	1	0,1	5
O3	1	1	1	1	1	0,25	5	1,25	2
O4	0	0	1	0	0	0,15	1	0,6	4
O5	1	0	1	1	1	0,2	4	0,8	3
Weight	0,1	0,3	0,1	0,3	0,2				
Number of interactions	3	2	4	3	4				

Products of weight and interactions	0,3	0,6	0,4	0,9	0,8
Rank	5	3	4	1	2
Sum of interactions	32/2				
Sum of products	7,25				

Source: *Own work.*

Table 2 presents the results of the analysis of the interactions between strengths and opportunities. Based on the answer to the question: will the identified strengths allow to take advantage of the opportunities? the result of the sum of interactions was 32, which is 64% of the maximum value of the interaction that can be obtained from the tested system. The total sum of the products of weights and interactions was 7.25. Due to the factors listed in Table 2, it is worth mentioning that the higher the value of the sum of the number of interactions, the greater the company's potential enabling the use of market opportunities in the applied OHS management strategy in the analyzed enterprise.

3.1 Examples of Interactions between Strengths and Opportunities

- the value of 1 in the S2 / O1 statement means that systematic measurement of nuisance factors (noise, dust, lighting), and the possibility of establishing positive cooperation with the National Labor Inspectorate,
- a value of 0 in the S3 / O2 statement means that there is no relationship between conducting daily safety inspections and the possibility of obtaining EU funding.

Table 3 presents the results of the analysis of the interactions between threats (T) and strengths (S).

Table 3. *Identification of the interaction between (T) and (S) – TOWS*

T / S	T1	T2	T3	T4	T5	Wei ght	Number of interactions	Products of weight and interactions	Rank
S1	1	1	1	1	1	0,1	5	0,5	1
S2	0	0	0	0	0	0,2	0	0	5
S3	0	1	1	0	0	0,1	2	0,2	3
S4	0	0	0	0	0	0,3	0	0	5
S5	1	1	0	0	0	0,2	2	0,4	2
Weight	0,25	0,25	0,15	0,15	0,2				
Number of interactions	2	3	2	1	2				
Products of weight and interactions	0,5	0,75	0,3	0,15	0,2				
Rank	2	1	3	5	4				
Sum of interactions	18/2								
Sum of products	3								

Source: *Own work.*

Based on answers to the question: Will threats weaken strengths? the obtained sum of interactions equal to 18, which is 36% of the maximum number of interactions that can be obtained in the tested system. The total sum of the products of weights and interactions was 3. Based on the obtained data, it can be concluded that the smaller the number of interactions in the analyzed system, the better the enterprise is directed to managing failures in the field of OHS management.

3.2 The Examples of Interactions between Threats and Strengths

- the value of 1 in the T2 / S1 statement means that there is a negative correlation between the change in health and safety regulations and the strength of the company regarding the provision of health and safety training, it results from the need to update the content of the training on an ongoing basis and the risk related to possible delays in updating the training,
- a value of 0 in the T4 / S4 statement means that there is no correlation between running a business by a competing company in which an OH & SMS has been implemented, and the daily safety reviews carried out in the surveyed enterprise.

Implementing the methodology of selecting a health and safety management strategy presented in point 2 of the article, the necessary analyzes were carried out in nine production companies. A collective summary of the designated strategies for nine production companies, designated F1-F9, is presented in Table 4. The designation F2 was used for the company, the results of the detailed analysis of which are presented in Tables 1-3.

Table 4. Selection of a OH & SMS strategy for manufacturing companies

Strategy/ Company code	F1	F2	F3	F4	F5	F6	F7	F8	F9
A	1	1	1	1	1	2	1	3	1
Number of interactions	72	70	54	55	50	58	52	40	42
Weighted nr of interactions	14,5	14,5	11,8	11,4	10,2	12,1	9,5	8	9,4
Cn	2	4	2	4	4	1	2	4	4
Number of interactions	44	30	44	34	16	62	39	36	28
Weighted nr of interactions	8,4	3,75	9,9	6,45	3,4	11,8	9,1	7,6	9,75
Cm	3	2	4	3	2	4	4	2	2
Number of interactions	42	50	29	46	34	40	38	44	36
Weighted nr of interactions	8,8	10,7	6,6	9,7	5,55	9,3	7,7	9,75	8,45
D	4	3	3	2	3	3	3	1	3
Number of interactions	34	46	42	52	32	52	47	48	30
Weighted nr of interactions	7,1	9,65	8,6	10,6	6,45	11,4	10,1	10,5	9,35

Selected strategy	A	A	A	A	A	Cn	A	Cm	A
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Symbols: A - aggressive strategy; Cn - conservative strategy; Cm - competitive strategy; D - defensive strategy

Source: *Own work.*

Enterprises F1, F2, F4, F6, F8 belong to the group of small and medium-sized enterprises, and F3, F5, F7, F9 to large enterprises. The dominant strategy for managing occupational health and safety in the studied group of enterprises was the aggressive strategy, while the competitive strategy was ranked second, conservative was third, and defensive was fourth. Based on the list, it can be concluded that the strengths of most enterprises allow the use of opportunities arising on the market related to activities aimed at ensuring safe and hygienic working conditions, and it can also be concluded that the opportunities will be magnified by the identified strengths of the enterprise.

4. Conclusions

The purpose of the SWOT / TOWS analysis was to identify the priority internal factors, i.e., the strengths and weaknesses of the facility, and the external ones, i.e., threats and opportunities for selecting a health and safety management strategy. By implementing the SWOT / TOWS research methodology, the author draws attention to the following dependencies:

- when analyzing the collective results of the interactions taking place in the SWOT / TOWS method (see Table 4), attention should be paid not only to the dominant number of interactions but also to the distribution of the weighted number of interactions (the product of weights and the number of interactions). It may be necessary to indicate an action strategy for a specific combination of factors, especially when the product of weights and the number of interactions indicates the priority of a strategy different than in the strategy adopted for the entire enterprise. Such a situation can be recognized in the scope of the analysis of the F6 and F7 companies. The F6 company, taking actions to take advantage of market opportunities in the analysis of strengths, should apply an aggressive strategy, which, due to the weighted interaction, turns out to be dominant in this system of factors. threats should apply a defensive strategy in this system of factors,
- compiling groups of factors in which the relationships are examined as a consequence of the negative factor impact (matrices with questions: Will the identified weaknesses prevent the use of opportunities? Will the identified weaknesses strengthen the impact of threats? Will the threats weaken the strengths? Weaknesses?), the expected value is the smallest possible number of interactions, i.e. equal to zero. Enterprises caring for their market position will not strive to strengthen the negative factor (weaknesses and threats), as well as to weaken the possibility of using a positive factor attributed to strengths or opportunities by compiling groups of factors in which relations are examined as

a consequence of the impact of a positive factor (matrices with questions: Will the identified strengths make it possible to take advantage of the opportunities? Will the identified strengths help to overcome the threats? Will the opportunities increase the strengths? Will the opportunities help overcome the weaknesses? have been included in the selection of a strategy for OSH management.

- particularly important in this type of research is the meticulous preparation of input data, appropriate selection of research groups, and analyzing the progress of the work carried out together with the representatives of the enterprise, which was used in this research.

In the author's opinion, determining the OHS management strategy should be considered particularly important in the context of the challenges faced by enterprises resulting from the COVID-19 pandemic. As a result of the conducted research, it can be concluded that the SWOT/TOWS method enables the determination of an occupational health and safety management strategy.

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