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Abstract. The paper proposes to consider the use of such a classic risk analysis tool as a SWOT analysis in conjunction with the construction of a Markov model for further analysis of the elements of a SWOT matrix. A review of the areas of application of the SWOT analysis is suggested under the assumption that in all these cases, the approach described by the authors is also possible. It is proposed to use an extension of existing analysis methods based on the SWOT matrix, including TOWS and similar methods based on combinations of the effects of pairwise combinations of blocks of the SWOT matrix. We consider the option of constructing an adjacency matrix on the basis of the entire set of SWOT factors with its further analysis using both Markov methods and analysis of the number of connections that may arise in each particular case of applying this approach in an adjacency matrix of the corresponding order corresponding to the state when the matrix ceases to contain "empty" (equal to zero) elements. An example of a fragment of a real complex SWOT analysis implemented using Microsoft Excel software is given. It is proposed to use the described method in the management of portfolios and programs of projects of organizations

Keywords: project management, risk management, SWOT-analysis, dynamic SWOT, TOWS, Markov decision process.

1   Introduction

Statement of the problem and purpose of the study. At present, more and more often one has heard about the "death" of various classical instruments and management

methods. Unfortunately, it is often really difficult to disagree with the arguments of such critics, because the examples of their use or interpretation of the corresponding tools and methods make us recognize, at least, that this is a bad example. On the other hand, this does not mean that the methods themselves are unsatisfactory. Rather, those who use them unsuccessfully, and it seems that those who later deservedly criticize such examples, do not fully understand the scope of this or that tool and its purpose. The most striking example, perhaps of such criticism, is the most common (and distributed) tool, such as SWOT analysis. For example, in one of such aggressively negative works [1], where, it should be noted, there are really excellent examples of how "you don't need to do a SWOT analysis", information is given about other colleagues in the "camp of opponents of SWOT analysis), in particular, the words of authors such as Hill and Westbrook, who back in 1997 in their article "SWOT Analysis. It's time to recall the product" [2] provide such data: "Of the 50 companies analyzed, more than 20, including 14 consulting firms, used SWOT. But ... none of them used his results in the subsequent development of the strategy." It is the practical futility of this "analysis" that is behind the authors' proposal to abandon this «product."

Indeed, it is hard to disagree with this. So is it worth or not worth doing a SWOT analysis? This question is rather rhetorical. To make a decision "To do or not to do something?" for starters, you should ask yourself what you're going to do next with the results of this "Anything?" In the same way we can talk about PEST analysis[3], the creation of the 7K McKinsey model [4] and, in principle, about any other management tools - from the network diagram [5] to the responsibility matrix [6] in the project (program, portfolio). To understand "To do or not to do?" Something, probably, I would also like to understand if the result made will be the final result or is it still intermediate? And, if this is some kind of intermediate, auxiliary result, then the next question should be precisely the question "And what is to be done with this intermediate result?". Who needs it and why? Of course, if there is no answer to these questions, then it is fair to conclude that the work itself to create such an intermediate result is pointless! But for this, as correctly indicated in [7], you need to deal with the definitions.

2   Analysis of recent research and publications

The authors of the SWOT analysis are rightfully considered to be members of a group of scientists at Stanford Research Institute: R. Stewart (research leader), Marion Dosher, Otis Benepe and Albert Humphrey (Robert Stewart, Marion Dosher, Otis Benepe, Birger Lie, Albert Humphrey) [8].

And this source also noted that "exploring the organisation of strategic planning in companies on the Fortune's 500 list, they eventually came to a system called SOFT: Satisfactory, Opportunity, Fault, Threat. And only later this model was modified and renamed to SWOT. The SWOT model was first published in 1966, the final modification of the SWOT analysis was presented by the authors in 1973 [9].

Although, for the first time, the SWOT acronym was publicly announced in Harvard in 1963 at a conference on business policy issues by Professor Kenneth An-

drews, who is probably also worth mentioning as the "co-parent" of this method. It might still be fair to consider Dr. Heinz Weirich as a "follower" and, in what form, "co-author" of this method, for his very successful proposal to present SWOT as a 2x2 matrix in 1982 [10], without which (or "to which"), perhaps the use of this approach would not have become so wide, however, it is worth noting that his idea was to present the SWOT analysis as a TOWS analysis.

It is also worth noting a very comprehensive study on goals similar to our study, which, unfortunately, was discovered by the author almost when he completed his work. In this work [11], a chronometric table is also given, the data of which, on the whole, correspond to the results presented here.

As a "definition" we take the most restrained definition [12]: SWOT analysis - a method of strategic planning, which consists in identifying factors of the internal and external environment of the organisation and dividing them into four categories: Strengths (strengths), Weaknesses (weaknesses), Opportunities (opportunities), Threats (threats).

Although, today, he feels quite confident, for example, in the field of risk management, although he is still not always fully consciously applied there [13], and, if desired, one can find more "wider" definitions for SWOT- analysis, for example [14]: "SWOT analysis is a methodological tool designed to help companies and their employees optimize labor productivity, increase competitiveness, maximize potential and minimize risks", or "SWOT analysis is a business analysis method that your organisation can fulfill for each of its products, services and markets when deciding on the best way to achieve future growth. The process includes identifying the strengths and weaknesses of the organisation, as well as the opportunities and threats present in the market in which it operates." [7]. Actually, and ... that's it! This is the "method." In this definition, referring to "strategic planning".

3   Setting the objective

At least several areas of application of the SWOT method can be distinguished. At the same time, we will try to avoid "general definitions" such as "in the field of marketing." So, these may be the following areas:

3.1   Studies of dynamic changes in the environment of the company
Suggested research of dynamic changes in the company's environment based on the study of three separate SWOT lists of indicators that describe the external factors of threats and opportunities, internal factors of strengths and weaknesses. This approach is developing as a "dynamic SWOT analysis". Usually, when implementing a dynamic SWOT analysis, three planning horizons are used (past, present, future) or (present, near future, distant future) [15].

3.2   SWOT analysis in risk assessment and project management
It was noted in [16] that little is known and, of course, we use little SWOT analysis as a technology for assessing risks. Risk management, a specific branch of knowledge with which large companies work. It is important for them to implement all aspects of corporate governance, including risk management. Other enterprises and

organisations do not know and do not understand that SWOT analysis is actually a risk management technology. Let me remind you that "Risk" is a combination of the probability of an event and its consequences. The more likely the event and the more serious consequences are behind it, the greater the risk. It is very important that risk management includes the concepts of both positive and negative aspects of risk.

It is worth noting that in modern ISO standards, for example [17] and related documents, in particular [18] and [19], unfortunately, the abbreviation "SWOT" was not found.

3.3 SWOT analysis of competitive environment factors

Currently, within the framework of strategic planning technologies, SWOT analysis is considered as a separate stage in the assessment and structuring of information collected in accordance with the classic PEST models, Porter models, etc.

Each individual factor reflected in the model is evaluated from the position of the SWOT model. Next, a strategy is developed based on a joint analysis of factors and their SWOT models. An example of the use of SWOT analysis in conjunction with a modified 5-factor Porter model and the 7K McKinsey model is presented, in particular, in the training materials of the Belarusian State University [20].

3.4 SWOT analysis to study the factors that determine the choice of strategies

The methods for applying SWOT analysis to study the factors on which the choice of strategies depend are constantly being improved. So in 2003, prof. George Panagiotou suggested studying environmental factors using SWOT analysis according to the TELESCOPIC OBSERVATIONS scheme [21], also known as TOSF [22].

3.5 Methods of using SWOT analysis for a detailed study of factors affecting all aspects of the organization

A real discovery for the author was his acquaintance with the work [23] and such approaches as SWOT-RADAR SCREEN, Bipolar Conflict Graph and I-CCEM Framework for Crisis Problem Solving and Planning.

SWOT-Radar Screen ™ refers to the multi-level SWOT matrix at the following three levels: systems, subsystems and supersystems. For organisation, elements at different levels include the following: supersystem level (external resources); system level (internal resources - mainly intangible assets); the subsystem level (Internal Resources - Mostly Tangibles) includes information about such organisation subsystems (Business Unit (s), Enterprise (s), or Departments).

The above multi-level perspective of the system mainly uses ideas from the concept of a "multi-screen" in TRIZ [24], the logic of the "value chain" and "Five Forces" [25], as well as such an approach as the "Balanced Scorecard" [26].

Also in this article, so widely quoted by us, it is indicated that a multi-level SWOT matrix with high-quality descriptions of strengths and weaknesses, opportunities and threats is called, according to the authors, SWOT-Radar Qualitative Screen ™. When strengths and weaknesses, opportunities and threats are quantified, balanced and aggregated, a multi-level SWOT matrix is called the SWOT-Radar Quantitative Screen ™. Those, its use is possible both during the qualitative and quantitative analysis of the organisation.

3.6 Methods of using SWOT analysis for a detailed study of factors present in conflict situations

In SWOT-Radar Quantitative Screen ™, the content of strengths and weaknesses is summarized in an indicator such as "current degree of conflict". Mathematically, and using, for example, multicriteria analysis [27]. Also in the same paper, an approach is described as the Bipolar Conflict Graph ™ (King, 2003), which refers to a graph depicting the relationships between two variables that are usually described at the parametric level or the level of the performance indicator. The general sets of variables in the bipolar conflict diagram can describe the following:

Type I: desired parameter [P (+)] compared to the undesired parameter [P (-)]

As for the SWOT analysis, the "desired" parameter refers to the "strength" or "opportunity" indicator. An "unwanted" parameter refers to "weakness" or the "Threat" indicator.

Type II: desired parameter [P (+)] versus desired parameter [P (+)]

3.7 Methods of applying SWOT analysis for problem solving and crisis planning

Let us cite as an example, with reference to the same source [23], a description of such an approach as I-CCEM Framework for Crisis Problem Solving and Planning:

I-CCEM Approach for Problem Solving and Crisis Planning. The structure, which integrates SWOT analysis, Bipolar Conflict Graph ™ and TRIZ, is called I-CCEM ™. This acronym, I-CCEM, means the following: "Perfect conflict creation, elimination and management." The main tools for the I-CCEM ™ infrastructure are the CD-MAGIC cycle, SWOT-Radar Screen ™, and Creative Web Template ™. Central to the structure of the CD-MAGIC cycle and the Creative Web Template is the Creative Web model. Creative Web is a common model and macrostructure for solving creative problems. At the meso level, Creative Web could be roughly translated into the CD-MAGIC cycle. The abbreviation, "CD-MAGIC", is an extension of the well-known "DMAIC" process [28], a process that is popularized by Six Sigma methodology [29]. Added "C" and "G" to "DMAIC" to emphasize the "Collect" and "Generate" modules; Generate-module includes the Evaluate / Select process. The Creative Web Template ™ is used to document, research, and generate ideas. Table 2 of the cited document [23] also contains information on TRIZ tools that were structured in accordance with the Creative Web modules. The structure of I-CCEM ™ in particular is used in the activities of such a giant as Microsoft Corporation [30]. The main purpose of the application of the described example in [28] is to illustrate the basic use of tools, rather than a detailed strategic analysis of Microsoft Corporation itself.

3.8 Methods of applying SWOT analysis to solve personal development problems and problems.

Of course, it would be strange if, for such a long history of using SWOT analysis in business, there would have been no attempt to transfer this technique to a specific person (person). There are a huge number of such attempts, on the whole slightly differing from each other, for example [31].

3.9 Methods of using SWOT analysis to apply the above and other tasks of business analysis

SWOT, as a technique, is also mentioned in a collection of instruments such as BUSINESS ANALYSIS TECHNIQUES 72 Essential Tools for Success, published by British Informatics Society Limited (BISL), a division of BCS - The Chartered Institute for IT [32].

3.10 Methods of applying SWOT analysis for use in the field of "forecasting the future."

SWOT analysis is also one of the techniques used in conducting "foresight" studies [33].

The goal of the paper is: to give a modern reading of the well-known tool of SWOT analysis, to determine the areas of its application in the new conditions of enterprise development, and also to propose a mathematical apparatus based on Markov chains for analyzing a set of factors included in the SWOT analysis, which would make the most efficient use of this tool in risk management practice both in project activities and organization management.

4 Research Methods

As an example of the use of SWOT analysis in the practice of managing a real organisation, the following analysis can be cited for the needs of risk management. It was carried out on the basis of the "extended model" - when the analysis of the interactions between all elements of each block was carried out, and not only in the influence of, for example, "block S" on "block O", as in the examples considered above, but also taking into account the interactions and inside the "blocks" themselves. The results of this analysis are presented in Fig. 1. If there was an influence of one factor on another, a unit was put in the corresponding cell, in the absence, zero.

For further research described using the SWOTxSWOT matrix "assembled" according to the indicated principle, it is necessary to carry out some more actions.

Firstly, to carry out its "reorganisation" so that there are no "empty" elements in it, so that mathematical methods can be used for further analysis. Thus, an "adjacency matrix" was formed for the entire "system of elements" consisting of a set of "factors" grouped by the corresponding "blocks". Moreover, in the considered example, the following "sequence" of blocks in the risk matrix is demonstrated, which allows maximum use of information on the structure of mutual influences (connections) of the entire system of elements, as shown in Fig. 2.

In the presented logic, the following four "submatrices" are clearly visible - SOxSO, SOxTW, TWxSO and TWxTW. Each of them, in turn, is "assembled" from four more "sub-submatrices", for example, SOxSO is "assembled" from four blocks such as SxS, SxO, OxS and OxO.

Similarly, the TWxTW submatrix can be interpreted, but with a negative sign. If SOxSO could be considered as a "value multiplier", then TWxTW should be considered as a "threat multiplier", not to say "crises" or "catastrophes" (including for cases of considering both organisational and technical systems).

P/N		+	+	+	+	-	-	-	+	+	+	+	-	-	-	-
	FID	S1	S2	S3	S4	W1	W2	W3	O1	O2	O3	O4	T1	T2	T3	T4
+	S1		1	1	1	0	1	0	0	1	1	1	1	1	1	1
+	S2	1		0	1	1	1	0	0	1	1	1	1	1	1	1
+	S3	0	1		1	1	1	1	0	0	1	0	1	1	1	1
+	S4	1	1	0		1	1	1	0	1	1	1	1	1	1	1
-	W1	1	1	1	1		1	1	0	1	1	1	1	1	0	1
-	W2	1	1	0	1	0		1	0	0	1	0	1	1	0	1
-	W3	0	1	1	1	1	0		0	1	1	1	0	1	1	1
+	O1	0	1	1	1	1	0	0		0	1	1	0	1	0	1
+	O2	1	1	1	0	0	1	1	0		1	1	1	1	1	1
+	O3	1	1	1	1	1	1	0	0	1		1	1	1	1	1
+	O4	1	1	1	1	1	1	1	1	1	1		1	1	1	1
-	T1	1	1	0	1	1	1	0	0	1	1	1		1	1	1
-	T2	1	1	1	1	1	0	1	0	1	1	1	0		1	0
-	T3	0	1	1	1	1	0	0	0	1	1	1	0	1		1
-	T4	1	1	1	1	1	0	0	1	0	1	0	0	1	0	

Fig 1. The logic of the "full SWOT" model in the form of the SWOTxSWOT matrix (screenshot for author's Excel model file fragment).

P/N		+	+	+	+	+	+	+	+	-	-	-	-	-	-	-
	FID	S1	S2	S3	S4	O1	O2	O3	O4	T1	T2	T3	T4	W1	W2	W3
+	S1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	0
+	S2	1	0	0	1	0	1	1	1	1	1	1	1	1	1	0
+	S3	0	1	0	1	0	0	1	0	1	1	1	1	1	1	1
+	S4	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1
+	O1	0	1	1	1	0	0	1	1	0	1	0	1	1	0	0
+	O2	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1
+	O3	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1
+	O4	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
-	T1	1	1	0	1	0	1	1	1	0	1	1	1	1	1	0
-	T2	1	1	1	1	0	1	1	1	0	0	1	0	1	0	1
-	T3	0	1	1	1	0	1	1	1	0	1	0	1	1	0	0
-	T4	1	1	1	1	1	0	1	0	0	1	0	0	1	0	0
-	W1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	1
-	W2	1	1	0	1	0	0	1	0	1	1	0	1	0	0	1
-	W3	0	1	1	1	0	1	1	1	0	1	1	1	1	0	0

Fig. 2. Logic of converting a "full SWOT" in the form of the SWOTxSWOT matrix the SOWT-SOWT matrix (screenshot for author's Excel model file fragment).

The SOxTW submatrix should be considered as a "stabilizing" component of the system, which allows you to level out negative effects in the internal and external environment of the organisation with existing internal strengths and the ability to use external capabilities.

The TWxSW submatrix, in turn, should be considered as a "destabilizing" component, capable of annihilating certain organisational strengths (positive internal factors), and "nullifying" opportunities that are outside the organisation.

Further analysis of the adjacency "matrix" built on such principles (as well as the completely obvious "1" and "0" in this matrix - the presence or absence of the influence of a particular element in the row on another specific element in the column, taking the diagonal elements equal to zero). Methods of analysis of such systems have been described previously [34, 52].

If we conduct further research of the constructed system under the assumption that it is Markovian, then we can draw conclusions about the potential presence of such factors in the existing system, in particular, by constructing transient diagrams based on the determination of transition probabilities.

For the example under consideration (the factors themselves - their names and descriptions - in this case, we do not demonstrate due to the fact that this is a real business system), when constructing the primary simplified model, it was suggested that the transitions from one state to another be considered equally probable. Thus, the matrix of transition probabilities was constructed, as shown in Fig. 3:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	0,00	0,09	0,09	0,09	0,00	0,09	0,00	0,00	0,09	0,09	0,09	0,09	0,09	0,09	0,09	1,00
2	0,09	0,00	0,00	0,09	0,09	0,09	0,00	0,00	0,09	0,09	0,09	0,09	0,09	0,09	0,09	1,00
3	0,00	0,10	0,00	0,10	0,10	0,10	0,10	0,00	0,00	0,10	0,00	0,10	0,10	0,10	0,10	1,00
4	0,08	0,08	0,00	0,00	0,08	0,08	0,08	0,00	0,08	0,08	0,08	0,08	0,08	0,08	0,08	1,00
5	0,08	0,08	0,08	0,08	0,00	0,08	0,08	0,00	0,08	0,08	0,08	0,08	0,08	0,00	0,08	1,00
6	0,13	0,13	0,00	0,13	0,00	0,00	0,13	0,00	0,00	0,13	0,00	0,13	0,13	0,00	0,13	1,00
7	0,00	0,10	0,10	0,10	0,10	0,00	0,00	0,00	0,10	0,10	0,10	0,00	0,10	0,10	0,10	1,00
8	0,00	0,13	0,13	0,13	0,13	0,00	0,00	0,00	0,00	0,13	0,13	0,00	0,13	0,00	0,13	1,00
9	0,09	0,09	0,09	0,00	0,00	0,09	0,09	0,00	0,00	0,09	0,09	0,09	0,09	0,09	0,09	1,00
10	0,08	0,08	0,08	0,08	0,08	0,08	0,00	0,00	0,08	0,00	0,08	0,08	0,08	0,08	0,08	1,00
11	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,00	0,07	0,07	0,07	0,07	1,00
12	0,09	0,09	0,00	0,09	0,09	0,09	0,00	0,00	0,09	0,09	0,09	0,00	0,09	0,09	0,09	1,00
13	0,10	0,10	0,10	0,10	0,10	0,00	0,10	0,00	0,10	0,10	0,10	0,00	0,00	0,10	0,00	1,00
14	0,00	0,11	0,11	0,11	0,11	0,00	0,00	0,00	0,11	0,11	0,11	0,00	0,11	0,00	0,11	1,00
15	0,13	0,13	0,13	0,13	0,13	0,00	0,00	0,13	0,00	0,13	0,00	0,00	0,13	0,00	0,00	1,00

Fig 3. Transition probability matrix for the considered SWOTxSWOT matrix structure (screenshot for author's Excel model file fragment).

Based on the presented matrix, it is possible to construct the corresponding diagrams (Figure 4), which visually show the influence of the system of factors under consideration in their interaction, which is especially important at the initial stage of the project implementation, or the organisation's activity (which, until it reaches a stable state, is also, rather, still is a "project" ("program", "portfolio") in the context of a "temporary enterprise").

Similar elements of the analysis have already been successfully used previously [35]. The next step in conducting such an "extended" SWOT analysis may be to visu-

alize the considered system of factors in terms of identifying, on the one hand, the most "strong", "influencing" factors, regardless of the sign of their influence, on the entire system under consideration.
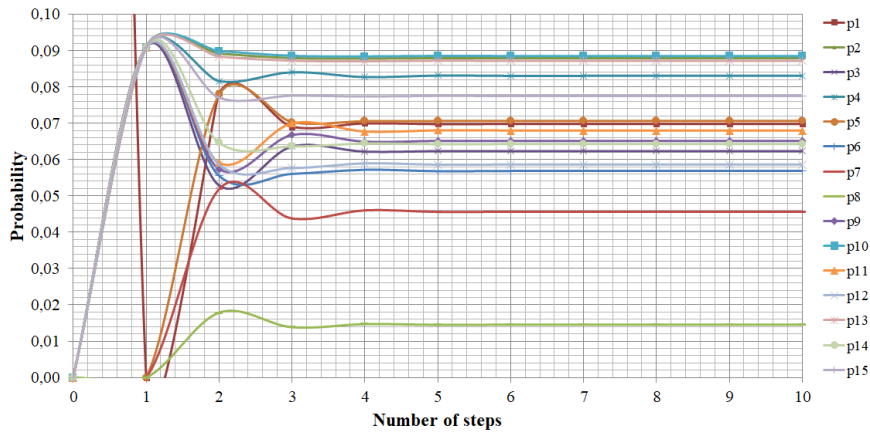

Fig. 4. Visualization of transients for the considered structure of the elements of the SWOTxSWOT matrix (screenshot for author's Excel model file fragment).

On the other hand, the identification of those factors that will be most susceptible to influence from the whole system as a whole, but through the influence of its specific elements. Similar logic was used in the analysis of the ICB IPMA model [36, 53].

Having carried out such transformations, we obtain the following "system landscape" for the considered system of factors (Fig. 5).

	to	S2	O3	T2	S4	T4	S1	O4	W1	O2	T3	S3	W2	T1	W3	O1	SUM
from		2	10	13	4	15	1	11	5	9	14	3	6	12	7	8	
O4	11	130	130	130	122	118	109	103	107	104	103	93	94	94	72	23	1532
W1	5	117	117	117	110	107	94	95	94	93	89	84	81	81	61	18	1358
S4	4	116	116	116	107	106	94	92	94	90	92	82	84	84	64	19	1356
O3	10	116	115	116	109	106	94	94	94	92	91	83	81	81	60	18	1350
S2	2	107	108	108	101	99	86	86	87	84	86	76	77	77	57	17	1256
T1	12	108	108	108	101	99	86	86	87	84	86	76	77	76	57	17	1256
S1	1	106	106	106	100	97	85	87	84	85	81	77	74	74	55	16	1233
O2	9	104	104	104	95	95	86	85	84	82	80	74	75	75	58	16	1217
T2	13	103	103	102	96	92	85	79	83	78	78	72	70	70	56	18	1185
W3	7	100	100	100	94	92	79	80	79	78	77	71	70	70	53	15	1158
S3	3	94	94	94	86	86	78	76	74	75	75	69	70	70	53	16	1110
T3	14	92	92	92	87	85	71	74	72	72	70	65	63	63	47	13	1058
O1	8	82	82	82	76	76	64	67	63	64	62	58	57	57	43	11	944
T4	15	79	79	79	73	72	66	61	63	62	61	55	56	56	44	14	920
W2	6	78	78	78	71	72	64	62	60	61	59	57	57	58	45	13	913
SUM		1532	1532	1532	1428	1402	1241	1227	1225	1204	1190	1092	1086	1086	825	244	

Fig. 5 "System landscape" for the considered structure of the elements SWOTxSWOT matrix in a table view (screenshot for author's Excel model file fragment).

The resulting representation allows, in turn, to carry out further segmentation, the simplest version of which will be to divide the matrix under consideration into 4 quadrants. The first (upper left) will include the elements with the greatest influence (in this case, it could be elements 11, 5, 4, 10, 2, 12, 1), as well as those that experience the greatest influence (2, 10, 13, 4, 15, 1, 11) — as an example of applying Pareto rule [37] logic for future decision.

This information can significantly help in prioritizing the work with the factors under consideration (as happened in this real example, for which the visualizations presented were constructed, but without specifying the set of the most significant factors involved in the analysis).

The visualization of "peaks" and "lowlands" obtained in this way, by analogy with the physical maps of the world, can be even more visualized from a tabular representation.

The resulting matrix, for greater clarity, can be converted by built-in Excel functionality to a surface chart, for which the use of the word "landscape" will be as natural (Fig. 6).
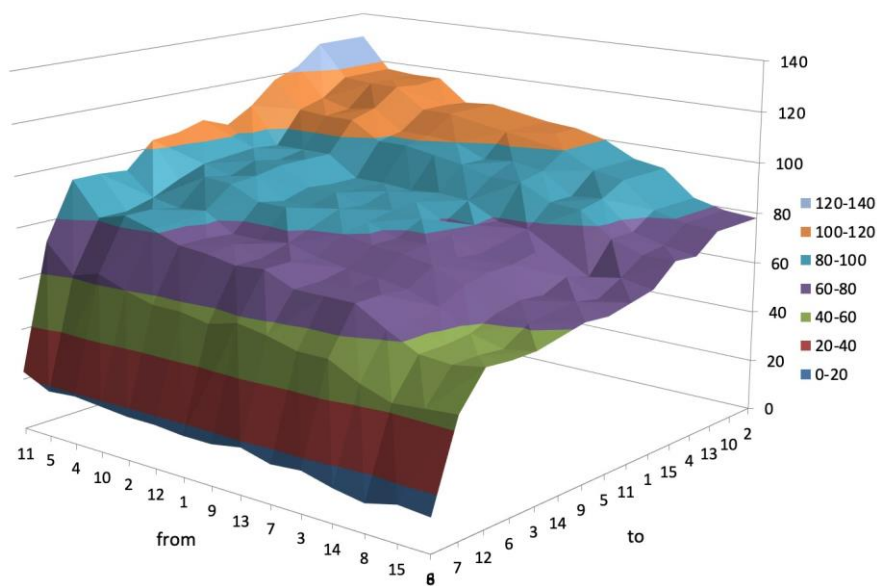

Fig. 6. " System landscape" for the considered structure of the elements SWOTxSWOT matrix in a graphical representation (screenshot for author's Excel model file fragment)

5 Recommendations for using SWOT analysis

And finally, the final task of the study was "to give appropriate recommendations on the use of SWOT analysis." We use for this purpose the time-tested way of working

with "problem trees", transforming them into "decision trees". Why rework the previously obtained list of restrictions:

5.1. The simplest use of the SWOT analysis element is to use the "SWOT matrix" itself as a tool for structuring the available information. This, at a minimum, helps to visualize the main factors.

5.2. The task of assessing, in a first approximation, the mathematical expectation of certain events represented (located) in the corresponding segments of the "SWOT matrix" should be considered in the context of the particular issue (situation) under consideration. Formulating recommendations based on this information is the work of a good analyst, preferably armed with statistical data in the context of a specific organization and context.

5.3. To conduct a SWOT analysis, attract experts with a very deep understanding of the current state and development trends of the market, or prepare to conduct a very large amount of work on the collection and analysis of primary information to achieve this understanding.

5.4. No matter how you try to "take everything into account" when creating the "SWOT matrix" table (including unnecessary factors or the loss of important factors, incorrect estimation of weight coefficients and mutual influence), there will always be a risk that decision-making based solely on the "SWOT matrix" may still lead to incorrect conclusions and erroneous strategic decisions.

5.5. The interpretation of the resulting model, and therefore the quality of conclusions and recommendations, strongly depends on the qualifications of the experts conducting the SWOT analysis.

5.6. Fight possible threats to the quality of the SWOT analysis itself:

• Excessive lists of strengths and weaknesses, opportunities and threats - "all about everything" - are not needed! Consider only what lies in the context of the problem (project, program, portfolio) in question!;

• Ensure prioritization of factors!;

• Try to ensure that the factors are described as specifically as possible (in relation to the issue in question);

• Remember that everything that is in the "Internal Factors" ("Strengths" and "Weaknesses") is always facts and only facts;

In addition to the recommendations already presented here, made on the basis of the analysis of restrictions, one probably will not be able to give any new "super-recommendations", moreover, such people have already been found - someone with the release of the "Fundamental" SWOT analysis guide " [18], and someone just "Useful" [38]. Some of these recommendations may already be directed to a specific organisation [39], some are explicitly used in the educational process, including with the ability to access [40].

It is worth mentioning separately the place of SWOT in the list of tools and methods in other fields of activity, for example, in the already mentioned risk management [41], human resource management [42], decision making [43], project management [44].

Next stage in practical use this proposed representation SWOT can be use "System landscape" matrix (Fig.5) as a "Decision matrix" and calculate all desirable criterious.

For example, for the considered structure of the elements SWOTxSWOT matrix presented a set of some most popular criterious (Fig.7).

FID	min	max	1-V / P	V / O	Hurwitz R	Rmax	MaxiMax R	Rmax	MaxiMin (Wald) R	Rmax	BL R	Rmax	HL R	Rmax	LL R	Rmax
11	23	118	0,6	0,4	61	61	118	118	23	23	68	68	41	41	1532	1532
5	18	107	0,6	0,4	53,6		107		18		59,8		34,7		1358	
4	19	106	0,6	0,4	53,8		106		19		60,1		35,4		1356	
10	18	106	0,6	0,4	53,2		106		18		59,6		34,6		1350	
2	17	99	0,6	0,4	49,8		99		17		55,5		32,4		1256	
12	17	99	0,6	0,4	49,8		99		17		55,4		32,4		1256	
1	16	97	0,6	0,4	48,4		97		16		54,3		31,3		1233	
9	16	95	0,6	0,4	47,6		95		16		54		31,2		1217	
13	18	92	0,6	0,4	47,6		92		18		52,1		31,6		1185	
7	15	92	0,6	0,4	45,8		92		15		50,9		29,4		1158	
3	16	86	0,6	0,4	44		86		16		49,5		29,4		1110	
14	13	85	0,6	0,4	41,8		85		13		46,3		26,3		1058	
8	11	76	0,6	0,4	37		76		11		41,5		23,2		944	
15	14	72	0,6	0,4	37,2		72		14		40,7		24,7		920	
6	13	72	0,6	0,4	36,6		72		13		40,5		24		913	

Fig.7. "System landscape" for the considered structure of the SWOTxSWOT matrix elements with calculated set of decision making criterious (screenshot for author's Excel model file fragment).

The main recommendation, perhaps, will be the recommendation that those who are going to use the SWOT analysis clearly understand that the SWOT matrix itself (which, with some flaws, but many have already learned to do) only allows you to "pack" collected facts about the internal and external organisational environment, but everything is not an "analysis". For the effective use of this method, it is worth at least familiarizing yourself with the description of its application practice, analyzing examples of its use, understanding the mathematical apparatus, in the case of using more complex modifications of the analysis - using "weights", "probabilities", "impact assessment", etc. d., both in quantitative measurements and with the use of qualitative scales. For example, the already mentioned "Fundamental Guide to SWOT Analysis" [18], as well as other examples of the analysis, similar to [45], may turn out to be a useful resource.

Also, if you understand the practical effect of the application of this method, it is worth listening to the recommendation to do it regularly [46].

And so that the "base" for such a dynamic comparison is suitable for comparison, develop your own set of forms and templates for analysis [47], for example, taking the set as the basis [48]. In case you need to visualize the data obtained, it may be worth considering the use of specialized software, for example, similar [49]. And if you need something to work in the field of education, it will be useful to consider the functionality of such a system [50]. If you are interested in using SWOT analysis in a small business, then you may be interested in the following selection of tools [51].

6 Conclusions

As seen from the results of the study, the SWOT analysis has its own, very interesting and rich history. It was created directly "inside" a serious practice-oriented project aimed at analyzing the problems of more than "real" organizations. The use of this method is very useful in many fields of activity, including even such as "competitive intelligence".

In general, the SWOT model helps to make better decisions - both large and small. It allows you to evaluate the effectiveness of actions - from launching a new product or service to merging with another organization or acquiring a subsidiary. SWOT is a method that, when used correctly, gives only positive results.

On the other hand, as even this small study showed, SWOT penetrated a huge number of other methods and approaches, complementing the analysis tools in various fields of activity. Perhaps this is worthy of a separate, more in-depth study of this kind of relationship, for example, using an approach similar to that applied to the analysis of the relationship of the elements of competence of project managers.

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