Cluster Analysis as a Tool for Strategic Analysis at the State Level

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Abstract. *The article presents the evolution of the idea of approach to conducting strategic analysis of the state's environment, used to assess its functioning in the existing and forecasted conditions, which can also be used in the analysis conducted at lower levels of administration. The author presents one of the methods of strategic analysis used in the process of strategic planning in the field of national security. This method can also be successfully used when designing a defence strategy or police development strategy, as it precedes the process of formulating objectives and action concepts. According to the author, the advantages of the proposed method called cluster analysis are its universality, transparency and simplicity of application. The proposed method was preceded by reflections on the issues of strategic analysis related to the current practice of strategic planning in Poland, as well as similar to the presented taxonomic method, to finally focus the reader's attention on cluster analysis, a mathematical method of data grouping, which can be a proposal to conduct strategic analysis at the level of the state and its institutions.*

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Introduction

Planning a strategy at the state level, whether it concerns national security, military or police development strategies, is a difficult, complex and extremely time-consuming activity. The problems of effective, optimal planning in the modern world are currently deepened by the increasing variability and above all the unpredictability of events and processes occurring or likely to occur in the state environment. The dominant features of this environment have become uncertainty, chaos, multiplicity and a completely new quality of appearing changes. Meanwhile, in the practice of planning the activities of human-created organizations, very little attention is still paid to non-linear phenomena, complex and chaotic systems, processes with a high degree of complexity, turbulence and many similar processes. Although awareness in this area is already developing, in principle it does not go beyond universities and research institutions, rarely reaching (though relatively quickly there) commercial organizations serving their environment. The results of the attachment to the past, to the established, 'proven' patterns of activity, to the traditional way of perceiving the world around us, which is becoming less and less understandable, raise fears about the efficiency of functioning of various organizations created by man. This concern applies particularly to countries, as it is clear that these organisations are the ones that are the least able to cope with the uncertainty. Nevertheless, the current efforts are very often focused on solving current, immediate problems. Based on the knowledge available to us, reaching not very far into the future, more and more new concepts of action are planned,

which are often hopelessly incorrect. Sometimes, after just two or three years, it turns out that the strategic choices were completely wrong. These missed choices are not always due to bad will or lack of knowledge of the planners. They often reflect the lack of knowledge of the decision-makers responsible for the creation of such documents, their desire to 'handle' the matter quickly and without unnecessary problems, without getting involved in complex activities that require a lot of intellectual commitment. And this lack of knowledge results in the application of relatively simple analytical methods to increasingly complex security problems. The aim of this article is to present cluster analysis — a mathematical research method adopted for the purpose of strategic analysis in the field of security conducted at the state level, to review and evaluate the basic idea of conducting strategic analysis at the state level, used in planning practice as part of the process of designing various strategies on a macro scale, and then to indicate the emerging and, finally, according to the author, desirable directions of changes in the method of conducting strategic analysis. The proposal is preceded in the first part by a critical reflection on the idea of conducting the analysis in question nowadays, and also, in the second part. Without going into details, related to the research techniques and tools used within the framework of the discussed methods, in the following article will be presented: in the first part, the logic of the approach to strategic analysis currently used in planning practice in Poland, a reflection on the use of the taxonomic method as a tool of analysis at the state level. In the second part, there is a proposal to extend this analysis to include the taxonomic method of analysis of the state of national security by W.O. Kosewcow, the method which is no longer new, but is extremely intellectually valid. The third part presents the author's own method of using mathematical cluster analysis as a tool of strategic analysis, taking into account the growing complexity of the environment.

Strategic analysis in the practice of national security strategy planning — current situation

As highlighted above, strategic analysis is fundamental to the whole process of policy-making and state strategy development. In the operational sense, strategic analysis in the field of security is a set of activities carried out by the management of the state (its institutions, instruments), which serve to identify processes and events of high and very high impact, as well as processes and events new, poorly identified, so far not existing, which may determine the conditions for their survival and development in the future. In the instrumental sense, strategic analysis is a set of methods, techniques and tools to build an information base for the process of strategic planning and more broadly, strategic management in the field of security (defence, military). The categories mentioned above which have been collected in the course of the analysis, with different probability and impact strength indicators, make it possible to prepare a part of the information base for the purposes of strategy design. The first problem we encounter in the practice of planning national strategies is the question of where to place the analysis itself in the whole process. In the activities of small organizations serving

the environment, analysis is a relatively isolated process, as a rule starting planning and closed in time. This pattern, due to the lack of deeper experience, is now also being transferred to the state level. Thus, the environmental data collected by a specific working group is the basis for planning information and, in practice, does not return to the problem anymore. In the planning practice of such a large organisation as the state, however, this cannot be the case. Analysis in the functional sense is a process that once started, does not finish along with the collection of data and what is more, it does not finish at all within the started process. First of all, this is due to the size of the organisation as large as the state, as well as the greater than ever turbulence and unpredictability of the environment. The turbulence of its processes may cause the data adopted for the purpose of analysis to become outdated during the strategy planning process. Therefore, the analysis should accompany all planning work, starting from the creation of an information platform and ending with the implementation, constantly providing new data, enabling modification of previously adopted solutions (e.g. concepts or structures), updating the obtained partial results, etc. This process is iterative until the end of planning. In practice, however, this is unfortunately not the case. Due to the fact that the preparation of a complete strategy at the state level, e.g. the Strategic National Security Review, takes at least one year, the data obtained at the beginning of the process, in its final phase, are often out of date.. The second problem worth noting is the content-related scope of the analysis. Generally, it is quite common to use modelling of the universal organisation's environment borrowed from organisational and management theory and adopted for national use. In such a model, spheres are distinguished in the environment of the state: external and internal, divided by sector into the biosphere, technosphere and sociosphere, which is additionally separated in terms of subject matter (fig 1). The advantage of such an approach is the possibility of conducting strategic analysis without any subjective, objective or process-related rigid limitations. In the proposed system, strategic analysis can be conducted in relation to states — the main players in international relations, non-state, supranational, international, private organizations, and finally problems — biosphere and biocenosis, technological development, and artefacts. Unfortunately, in the planning practice, this analysis typically involves answering the question: *how is it?* what is actually at the core of a simple analysis. But not the strategic analysis. Although the mere multiplicity of identified processes and events makes it possible to qualify this analysis as strategic, due to the time range it is no longer so. The strategy concerns long-term processes. Always. So how to decide what will happen in years, let's say, ten or fifteen, on the basis of the finding of some category today, here and now? Not appropriate but necessary in such a case may be to align the chronological series. This is the minimum of what can and must be done to make the results of the analysis credible, to make them rational. In reality, however, this does not happen. One stops at the obtained results of what is and concludes on their basis, for example, on the security expenditure for the next, say, ten or twenty years. There is no question of simulations, testing of possible development of processes over time. But even the extrapolation of trends and the determination of a weighted average for a particular process has a single character in this case. This means that we are making the alignment of series for specific processes with a certain

frequency of occurrence. These processes still remain isolated, reducing the results of the analysis to a collection of the most relevant, from the analyst's point of view, single trends, which will then form a set of reduced categories (e.g. ten risks and as many opportunities at national level). The rule is therefore simple: threat — response (counter-measure concept). These categories are then found in the texts of the strategies being developed. Is this an approach that sufficiently explains the nature of processes taking place in the environment? Definitely not. Never before in the history, changes in the environment of countries, and all organizations in any case, have been so rapid. Never before have these changes caused such profound transformations in the functioning of these organizations, often setting the possibility of their development and even their duration on the knife edge. Frequency, imprecision and novelty of changes, as well as an increase in the speed of their occurrence cause that only correctly, but above all, as widely as possible, conducted analysis, taking into account not tens, but hundreds of processes in the whole wealth of their overlapping, producing common directions of influence, may be the basis for developing effective concepts of action. As H.I. Ansoff has long observed, '...in the near future the level of turbulence of most changes will oscillate between the feeling of turbulence, recognition of the source and impact assessment. Such a low level of knowledge, at which an organisation has to start to act, is a critical challenge for it. It is becoming common that in some cases the point of turbulence is delayed in relation to the necessary response. This makes the planned security response activities of a state delayed before they are even undertaken.[1] The analytical practice presented and applied nowadays coincides with the views of Euclides from more than two thousand years ago, which assumes compression of complexity. This method is based on the assumption that out of all very complex situations it is possible to extract a small number of simple explanations (axioms) that explain the nature of complexity. Unfortunately, this is no longer the case today. The discussed method of strategic analysis in the scope of searching for simple threats and opportunities as basic categories does not stand the test of time and in practical terms is too simplistic. Above all, however, it does not prepare the state to catch new changes, which reflect the overlapping of dozens of processes of different strength. In fact, it is both the macro-processes and the micro-processes that have a fundamental impact on its safety, and all of them should be the subject of analysts' investigations. The approach taken in practice is therefore far from sufficient. In particular, its qualitative dimension, which is most often based on the views and assessments of decision-makers who choose the most appropriate options from among those presented by analysts, is questionable. Let us establish: at present, the state and its institutions are affected by hundreds of processes and events. Some of them are strong signals, such as terrorism in its various forms. However, there are so-called weak signals, events which, usually underestimated, are rejected, ignored in the process of strategic analysis. And this is a mistake. These weak signals relatively quickly turn into strong threats and the reaction time to their occurrence is very late. Even if we look at the simplified model of the state's environment and problem sectors presented above, we may suspect in advance that at the level

[1] Ansoff H.I, Zarządzanie strategiczne. Warsaw, 1985, p. 85.

of the state, its services: police or armed forces, the number of threats in each sphere goes into tens. On the scale of the whole problem in hundreds. To sum up: the presented idea of strategic analysis, which does not take into account not only weak signals, but also does not consider the overlapping of individual threats and opportunities, creating a new strategic sequence in the environment is simply insufficient.

Cluster analysis

Below is presented an original idea of using a mathematical method of data grouping, called cluster analysis, for the purpose of strategic analysis in the field of state security.[2] According to the author, conducting strategic analysis at the state level requires taking into account the entire complexity of the environment, all processes and events occurring there. It is even more important to connect these events and processes with each other, to determine their mutual impact, to reflect on their dynamics resulting from co-occurrence in specific conditions. The times when a single threat triggered a particular single reaction are gone. Though one would actually like to say so. Unfortunately, the facts contradict it. In practice, such a pattern still applies. Thus, a specific threat is assigned a specific reaction. The system: threat — reaction is present in every strategy of our country. Often we also hear about the need to react to emerging threats. So it is a matter of selecting a dozen or so threats and preparing to oppose them. And yet every potential opponent knows that if the state has prepared itself for, say, eleven threats, he will prepare the twelfth, to which there will be no answer. Twenty years ago, when I was working in the Department of Strategy of the National Defence Academy, its former manager, Colonel dr Cezary Rutkowski, had long been writing about the need to change this way of thinking. Today, after 20 years, I'm pessimistic. Not only has nothing changed in this matter, but you can even say, that the old views are definitely consolidated. The well-coordinated, valuable scientific teams cease to exist because their members in one way or another do not fit into the visions of the ruling ones, who usually have no idea about this science, and the results of their research are being fragmented and dispersed throughout the country. I allowed myself to make this remark because our country really needs to work out what I would call a Polish strategic school today. Then developing another security or defence strategy, preparing and conducting strategic reviews of security, defence or armed forces would no longer be a methodological problem, and therefore the basis for their development. However, it is time to come back to indicating the method of grouping large amounts of data in order to take into account, within the framework of strategic analysis, most of these processes and events that can be captured in the course of research activities. In simple terms, the idea is to organize the very large sets of data collected during

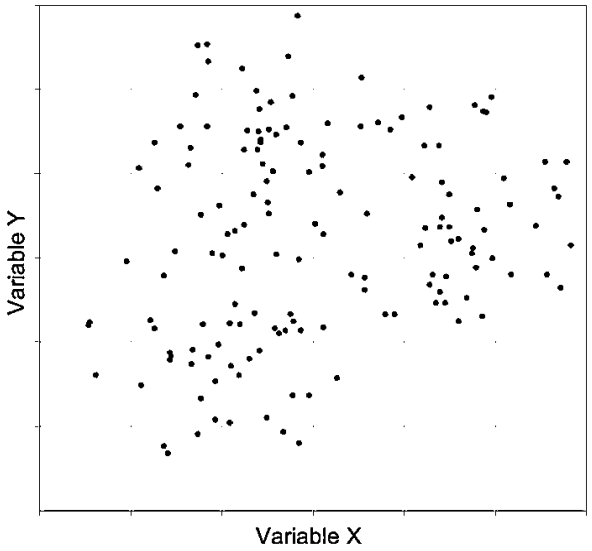
[2] This article was already partially discussed in a slightly different form in the book by: Dawidczyk A, Jurczak J, Łuka P, Metody, techniki, narzędzia nauk o bezpieczeństwie. Warsaw, 2019. However, I am still working on the construction of the method and trying to improve it. In the case of this article the conclusions concerning the scope of application of the method look different.

the analysis, to put them together into certain classes of objects, which could be used as an information basis for designing security policy objectives and then developing strategies. Before presenting how the method is used, attention should be paid to the fact that there is a division between hierarchical and non-hierarchical (k- optimization) methods. The approach proposed below belongs to a set of non-hierarchical methods, and therefore the results obtained do not build hierarchies. Objects are assigned to those clusters whose centres of gravity are closest in terms of Euclidean distance.[3] These concepts will be discussed on the following pages.

The aim of cluster analysis is to organize objects (i.e. in our case, threats and opportunities) into groups so that objects belonging to the same group are as closely related to each other as possible, while at the same time being as little related as possible to objects from other groups. In other words, the grouping means dividing a set of objects into subgroups in such a way that the similarity of objects belonging to one subgroup is the greatest while similarity of objects belonging to different subgroups is the least. It should be stressed, however, that cluster analysis detects structures among threats and opportunities, but it does not explain why they occur, which is beneficial for the process of creating objectives. The essence of the proposed method is to identify and order not entire groups of similar (in the sense of the adopted criteria) threats and opportunities. The results obtained in this way make it possible to relate them still to previously identified national interests, which makes it possible to design security policy goals. The idea is that its use should result in the identification of the most important indicators that have the greatest impact on national security and thus determine the selection of priority policy objectives from a wide range of all the objectives identified. This is about juxtaposing the aggregated values of threats/opportunities (groups, i.e. threat classes/opportunities) to the aggregated national interests (interest groups) in the field of security, and not in a simple relationship: threat — interest — political goal. Such an approach makes it possible to formulate security policy goals of greater capacity and more broadly relating to the conditions of state functioning. It is also better suited to the needs of designing a national security strategy, in which the characteristic feature of the goals being designed is their relative generality and comprehensiveness. Let us recall that cluster analysis is the process of dividing a set of data into subsets called clusters (classes) according to a specific criterion. The result will be to identify not so much specific threats / opportunities, but to elaborate their classes. Additionally, the purpose of classification is to detect unknown classes, similarities between objects that are sometimes overlooked, omitted, etc. in the course of normally conducted strategic analysis. This is particularly important for events and processes that are usually rejected at the outset and which, according to the analysts, are very unlikely to occur. To put it simply, it is about placing the data collected during strategic analysis in a coordinate system and then grouping them into data sets (objects in a two-dimensional space) (Figure 1).

[3] Nowak-Brzezińska A, Systemy analizy danych — podejście statystyczne, [in:] Wakulicz-Deja A (Ed.), Wybrane zagadnienia analizy danych. Warsaw, 2013, p. 156.

Fig. 1. Cluster analysis — the idea of grouping



Source: Cluster Analysis. Resources for empirical methods, Hochschule Luzern. *Electronic source*: https://www.empirical-methods.hslu.ch, *accessed*: 10.12.019.

The source of data remains the previously developed multi-criteria risk/chance reduction matrices (a classic tool for qualitative and quantitative risk/chance assessment by an expert method). The threats/opportunities collected in the tables during the preliminary part of the strategic analysis were assessed in terms of the strength of impact and probability of occurrence, and they were given weights, which was the basis for the reduction (Table 1.).

Table 1. Data for the purpose of cluster analysis

Content of the threat	Tendency	The strength of influence from -1 ÷ –5	Probability 0 – 1	Weight
Military Sphere				
The deepening of political contradictions within the state, which can lead to anarchy	development	- 5	0,7	-3,5
	stability	- 3	0,2	-0,6
	regress	+ 1	0,1	+0,1

Source: own elaboration based on: Gierszewska G, Romanowska M, Analiza strategiczna przedsiębiorstwa. Warsaw, 1997, p. 276.

The adaptation of the method requires first of all a description of the concepts and terms used within its framework, as well as the general conditions that set the framework for its applicability. The prerequisite for separating classes is to determine the way of comparing objects (threats/opportunities) and to establish a standard for describing the tested objects (i.e. to identify a set of diagnostic features). As far as the first condition is concerned, in practice, the comparison of objects is carried out using measures of difference (i.e. distance d) and similarity (p). The set of methods that allow to calculate the distance d between the objects and are most commonly used include: urban distance, which is an absolute value from a simple difference between the values of i-ities for the tested objects x and y:

$$\mathbf{d(x,y)} = \sqrt{\sum_i |x_i - y_i|}$$

and the Euclidean distance, which is the square root of the difference between the values of the features for the tested objects x and y, where: x_i, y_i are the vectors of the values of the features of the compared objects in the p-dimensional space (respectively, the value vectors are: $[x_{(i)1}, x_{(i)2} \dots x_{(i)p}]$ $oraz$ $[y_{(i)1}, y_{(i)2}, \dots y_{(i)p}]$

$$\mathbf{d(x,y)} = \sqrt{\sum_{\mathbf{i}} (\mathbf{x_i} - \mathbf{y_i})^2}$$

The most natural way of determining the distance is based on the Euclidean metric and this measure is adopted for further use, although the Czebyszew measures and power measures are also used in this work are not discussed. However, comparison of similarities can be done using Pearson's linear correlation factor or an angular measure, which are not presented in this paper either, although they are commonly used. However, the choice of the method of determining the distance between the objects is always a decision of the analyst conducting the study. Establishing a standard for the description of the tested objects determines the comparability of the attributes used in the study, and the methods of data standardization serve this purpose. Therefore, it is a matter of scaling the input (initial) data to a small, specific range, for example to the range [0.1], which is the range most useful during data mining. Among the applied data normalization methods, the Min-Max method is proposed for further consideration. The method allows to perform linear transformation of the input data (primary data) most often to the range [0.1] according to the formula:

$$V` = \frac{V - min}{\max - min} * (new_{\max - new\_\min}) + new\_min,$$

where alternately V and V` are the values before and after normalisation, [min, max] is the original range where the input data are stored, while [new_min, new_max] is the new target range[4] . As part of the proposed method, we will use

[4] Nowak-Brzezińska A, Przygotowanie danych, [in:] Wybrane zagadnienia analizy…, pp. 25–26.

J.B. Mac Queen's k-means algorithm, also called cluster analysis[5] . The purpose of classification is to minimize variability within clusters and maximize variability between clusters. To carry out the analysis we will need: a set of objects with their assigned attributes (features), making the attributes comparable, i.e. normalization and selection of the distance measure (in our case the Euclidean distance). A. Nowak-Brzezińska proposes that the algorithm for calculating k-means should take the following form:

1) Divide the data set into k-groups in a random way,[6] 2) Count the centre (centroid) of each group, 3) Divide the objects, assigning them to the group whose centre is the closest to each other, 4) Repeat from step 2 until the groups are stabilized (no new changes). There will be seven steps in the proposed method, but the essence of the method itself will not change.

Firstly, the initialisation, i.e. the initial division of objects into k-focus. However, there is a basic problem with the number of clusters: what number of clusters should be distinguished? The researcher himself can determine how many clusters should be distinguished. Then cluster analysis algorithms classify objects according to the number of clusters indicated by the researcher. A. Szymańska indicates that the STATISTICA program has been programmed to search through cluster algorithms in order to select an appropriate number of clusters. This option, called a v-shaped cross-check, makes the algorithms determine the number of clusters themselves, the researcher only indicates their maximum and minimum number.

Releasing the number of possible clusters makes it possible to describe the studied objects more precisely, i.e. to make a more accurate classification[7] . We will continue to stick to the postulated above method of random indication of the number of groups. This is also the first stage in the discussed method. For an easier understanding of the essence of analytical activities, two classes of objects are presented below. In practice, there may be from ten to a dozen or so such classes at the state level.

Each of the threats / opportunities is assessed according to the criteria of probability and impact strength. But as far as these data could previously be simply self-multiplied for the purpose of their reduction, here, due to the need to place comparable values in the coordinate system, they should first be normalized and

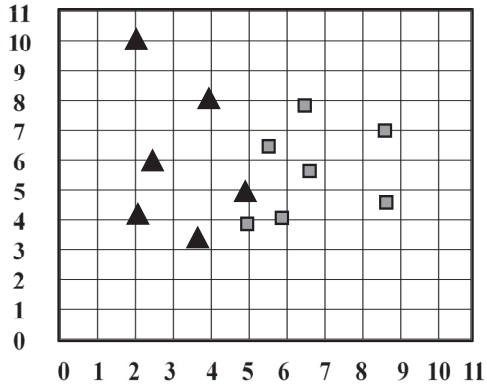
[5] MacQueen J.B, Some Methods for classification and Analysis of Multivariate Observations, Proceedings of 5-th Berkeley Symposium on Mathematical Statistics and Probability, University of California Press, Berkeley,1967.

[6] Using an object grouping method called the k-means method, the algorithms first determine the number of clusters and then select objects to them so that they are as similar as possible to other objects in the cluster and as different as possible from objects in other clusters. The algorithms classify objects in such a way that the variance inside the clusters is as small as possible and the largest possible variance between clusters. The procedure includes a solution. This is an F-Fisher statistic which, as we know, compares the inter-cluster variance with the intra-cluster variance. When the intergroup variation is large and the intragroup variation is small we have the most desirable situation. When clusters differ and are filled with objects similar to each other in such a situation, the F-Fisher value is large and the differences between clusters are statistically significant'; quoted for: Szymańska A, The use of cluster analysis using the data mining method to draw profiles of the examined persons in psychological research. *Studia Psychologiczne*, 2017, Vol. 55, Issue 1, p. 30. *Electronic source:* http://www.studiapsychologiczne.pl, *accessed:* 15.12.2019.

[7] *Ibid.*, p. 28.

thus linearly transformed to a range of [0.1], according to the Min-Max method proposed above. While probability measures are already within the range [0.1], the forces of influence of such a procedure require. Only after the input data to the common dimension have been normalized can they be initially allocated to K-groups (Fig. 2). Standardisation of data is the second stage in our method.

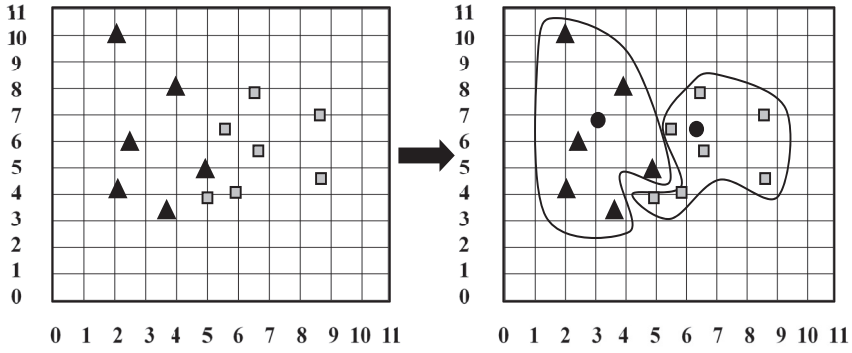
Fig. 2. Random selection of K-objects in the coordinate system. K =2



Source: own elaboration

The third stage is the calculation of initial measures, i.e. the centroid[8] of each group (in Figure 3 it is marked with a black circle). Cluster means, so called centroids, can be selected in several ways: random selection of k observations, selection of k first observations, selection in such a way as to maximize cluster distances. One of the most frequently used methods is to run the algorithm several times and select the best model when the initial cluster centres were selected at random[9] (Fig. 3).

Fig. 3. Allocation of objects to groups and calculation of cluster resources (classes)



Source: own elaboration

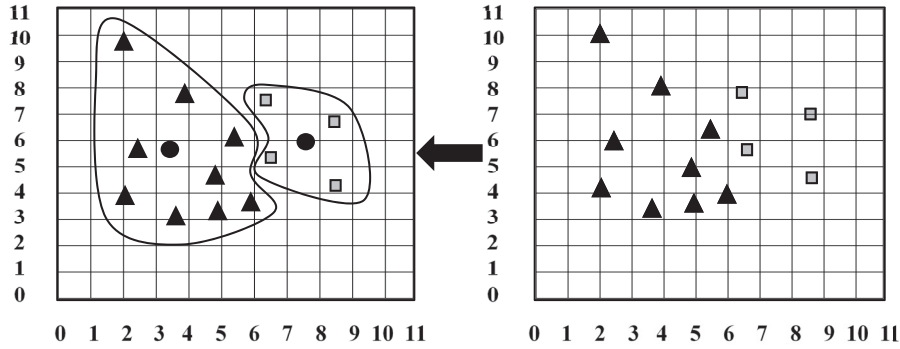
[8] Centroid — the middle of all points in cluster.

[9] Kajstura A, Metoda k-średnich. *Electronic source:* http://www.statystyka.az.pl, *accessed:* 4.04.2017.

The fourth stage involves calculating the distance of individual objects from the cluster centres. We use here the Euclidean distance, according to the formula presented above. In the fifth stage — for the next observation (iteration) we compare distances from all clusters and assign the object to the cluster to which the centroid is closest. Stage six — we set out new means of cluster. Most often the centre of the cluster is the point whose coordinates are the arithmetic mean of the coordinates of the points belonging to the given cluster (Fig. 4). The seventh stage is based on repeating the action until we observe that there are no transfers of objects between clusters.

Therefore, the condition for the end of the optimisation process is that the maximum number of iterations, fixed in advance, is exceeded or the class structure is stabilised. The results obtained in this way make it possible to determine which threats represent the groups and have the greatest influence on the realization of national interests. It also makes it possible to determine which threats accompany the representative and to presume to what extent they will affect the representative and what sequence they will give him or her, given that it is usually not just one threat, but the sum of these threats, their co-existence, that shape the conditions of state security in times, in which a very large number of risks from different crops affect the state in a consistent manner.

Fig. 4. Iteration. Re-calculation of the means of purchase. New cluster measures (classes)



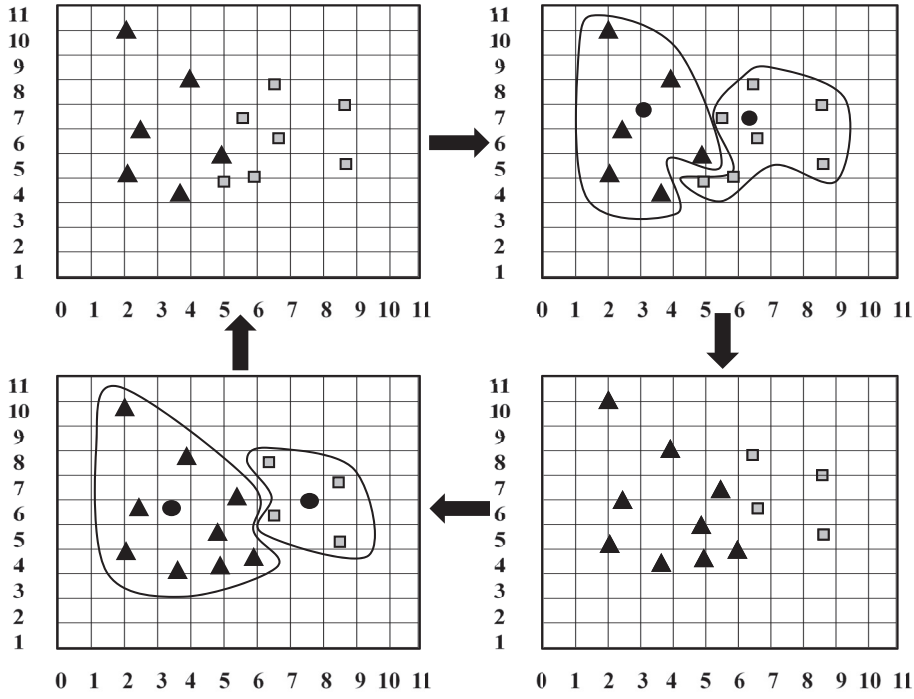
Source: own elaboration

So prepared database is an information base for designing security policy objectives with a large scale integration. This means that the degree of availability of interests is verified by the cluster (class) of threats, not a single threat (Fig. 5). The proposed method organizes large amounts of data into classes of objects, but it does not prejudge the completeness of the created sets. In its essence, it is similar to F. Zwicky's[10] morphological method, in which morphology is understood as 'a total methodology of thinking and acting consisting in perceiving such a picture of reality, in which all the more important structural connections between objects,

[10] Zwicky F, Discovery, Invention, Research — Trough the Morphological Approach. Toronto, 1969.

phenomena, ideas and actions would be transparently taken into account[11] . The collections obtained in this way are not yet ready-made classes of objects whose description on another collection, i.e. national interests, makes it possible to outline the objectives. However, it allows for their careful analysis and derivation, after reduction, of the classes of objects which constitute the information basis for designing security strategy objectives, police or armed forces development strategy objectives, etc. Finally, it is worth noting that within the framework of individual classes there are, for example, threats coming from various spheres of state functioning: social, economic, religious, or technical-technological.

Fig. 5. Determination of clusters (classes) of threats / opportunities



Source: own elaboration

This enables the analyst to consider many different categories, study their impact on each other and determine their further development. Especially since the objectives included in the security strategy are very general in nature and at the same time contain a great number of components that determine their final form. The proposed approach may therefore be a ready-made method of strategic analysis on large data sets used at the level of the State and its security institutions. However, it should be stressed that the proposed method is not only used to identify and aggregate large sets of threats and opportunities for national

[11] Trocki M, Wyrozębski M, Zastosowanie analizy morfologicznej w naukach o zarządzaniu. *Organizacja i Kierowanie*, 2014, Vol. 2, Issue 162, pp. 27–28.

security. Crisis management may be an excellent application of the method. Within the framework of the concept of crisis management at all levels of state administration, crisis management plans are prepared, under which, apart from the mere identification of specific threats, the answers to the question of their development, overlapping, creation of new, so far absent situations are sought. The application of cluster analysis makes it possible to draw conclusions as to the directions of the development of the situation, as a combination of specific threats belonging to a group (class) of identified objects.

Conclusions

The article presents the evolution of the idea of an approach to conducting a strategic analysis of the state's environment, designed to evaluate its functioning in the existing and forecasted conditions, which can also be used in the analysis conducted at lower levels of administration. The advantages of the proposed method called cluster analysis are its universality, transparency and ease of application. As a result, a method enabling the grouping of a large number of threats/opportunities into specific classes has been proposed, which in consequence enables not only the generation of a specific sequence, i.e. mutual overlapping of threats/opportunities, but also, as a consequence, the design of security policy objectives of high capacity, taking into account the influence of many factors at once. Cluster analysis in this perspective is a proposal of the author of this study, although its origin is derived from mathematics. Here it has been adopted. It should be emphasized that the presented method is only a part of the world's achievements in this field. The number of methods, techniques and tools used for strategic analysis of state security is globally large and growing. The author hopes that the application of cluster analysis in security research will become even a small step to improve this field of research.

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***Streszczenie.** W artykule przestawiono ewolucję idei podejścia do prowadzenia analizy strategicznej otoczenia państwa, służącą do oceny jego funkcjonowania w istniejących i prognozowanych warunkach, możliwą do wykorzystania także w ramach analizy prowadzonej na niższych poziomach administracji. Autor przedstawia jedną z metod analizy strategicznej wykorzystywanej w procesie planowania strategicznego w dziedzinie bezpieczeństwa narodowego. Metodę tę można z powodzeniem stosować również podczas projektowania strategii obronnej względnie strategii rozwoju policji, ponieważ poprzedza proces formułowania celów i koncepcji działania. Zaletami, zdaniem autora, proponowanej metody zwanej analizą skupień, są jej uniwersalność, przejrzystość i łatwość zastosowania. Zaproponowana metoda została poprzedzona rozważaniami dotyczącymi zagadnień analizy strategicznej związanych z obecną praktyką planowania strategicznego w Polsce, a także podobną do prezentowanej metodą taksonomiczną, by w końcu skupić uwagę czytelnika na analizie klastrów, matematycznej metodzie grupowania danych, mogącej być propozycją prowadzenia analizy strategicznej na poziomie państwa i jego instytucji.*

***Zusammenfassung.** In dem Artikel wurde die Entwicklung von Ideen zur Durchführung von strategischen Umweltanalysen eines Landes präsentiert. Seine Verfasserin stellt eine der Methoden von den stategischen Analysen vor, die im strategischen Planungsprozess im Bereich der nationalen Sicherheit verwendet wird. Diese Methode kann auch erfolgreich bei der Entwicklung einer Verteidigungsstrategie oder einer Strategie zur Entwicklung der Polizei eingesetzt werden, weil sie dem Prozess der Formulierung von Zielen und dem Konzept des Handelns vorausgeht. Laut der Verfasserin liegt der Vorteil der vorgeschlagenen Methode, die als Clusteranalyse bezeichnet wird, in ihrer Universalität, Transparenz und Benutzerfreundlichkeit. Der vorgeschlagenen Methode gingen Überlegungen zu Fragen der strategischen Analyse im Zusammenhang mit der derzeitigen Praxis der strategischen Planung in Polen sowie eine ähnliche Methode wie die vorgestellte Methode voraus — dh. die taxonomische Methode. In dem Artikel konzentriert die Autor die Aufmerksamkeit des Lesers auch auf die Analyse von Clustern, eine mathematische Methode zur Datengruppierung, die ein Vorschlag für die Durchführung strategischer Analysen auf der Ebene des Staates und seiner Institutionen sein kann.*

***Резюме.** В статье представлена динамика развития идеи подхода к проведению стратегического анализа состояния окружающей среды государства, используемого для оценки его функционирования в существующих и прогнозируемых условиях, что также может использоваться при анализе, проводимом на более низких уровнях государственной*

администрации. Автор представляет один из методов стратегического анализа, применяемый в процессе стратегического планирования в области национальной безопасности. Данный метод может также успешно применяться при разработке стратегии обороны или стратегии развития полиции, поскольку он предшествует процессу постановки целей и разработки концепции деятельности. По мнению автора, преимуществами предлагаемого метода, называемого кластерным анализом, являются его универсальность, транспарентность и простота применения. Предложенному методу предшествовало рассмотрение вопросов, касающихся стратегического анализа, связанных с существующей практикой стратегического планирования в Польше, а также похожего таксономического метода, чтобы в итоге сосредоточить внимание читателя на кластерном анализе, математическом методе группировки данных, который может стать предложением по проведению стратегического анализа на уровне государства и его учреждений.