

Justyna Jurczak, PhD

Police Academy in Szczytno

e-mail: j.jurczak@apol.edu.pl

ORCID: 0000-0001-9847-5423

DOI: 10.26410/SF_2/24/1

SCENARIOS IN THE STRATEGIC PLANNING IN THE TURBULENT STATE ENVIRONMENT – PRACTICAL CONTEXT

Abstract

The main aim of the article was to present the practical use of the scenario planning method in security research in turbulent state environment. Scenarios of state's environment (realistic, surprise, pessimistic and optimistic scenarios) are useful tools while creating the multidimensional images of the future and are commonly used in long-term planning for the state security. A clear advantage of scenario methods, which are not simply extrapolations of past trends, is the possibility of multidimensional and multivariate anticipated future states conditions in the turbulent state's environment. Multivariant feature is therefore an important advantage of scenarios as they can be quite different depending on the selection of baseline categories (i.e. threats, opportunities, weaknesses and strengths).

For the article purpose, the construction of the scenario of state's environment was conducted – the optimistic type. In the article the main research method was Delphi method. The tools such as the multi-criteria matrix for threats and opportunities identification and evaluation in the forecast period, the scheme for evaluating key success factors, the TOWS matrix and scenario multi-criteria matrix were also used.

Key words

state security, scenario planning, turbulent environment, anticipation

Introduction

Nowadays the state security environment is characterized by such features as changeability, complexity and unpredictability¹, which significantly determine its functioning in the modern world. Regardless of the degree and scale of the state security problems to be solved, constructive thinking about the future requires taking analytical steps and consequently drawing conclusions of a long-term nature, including the dynamically changing conditions of its environment². In turbulent state environment reducing the time response to changes and increasing the flexibility of the state is a highly desirable feature³.

The results of strategic analysis in the field of state security allow their further evaluation from the point of view of their future development direction (forecasting)⁴. For this purpose, a number of different methods can be used: mathematical and statistical, as well as non-mathematical. Taking into account changes of a discontinuous nature⁵ which are revealed in the state security environment, one of the methods can be used successfully is scenario planning.

Scenarios, scenario methods, scenario planning, scenario management or scenario thinking – all those names refer to the creation of future multidimensional images and are commonly used in long-term planning for the state security and its institutions⁶. The development of the theory and practical application of these methods dates back to the 1960s⁷. In security studies scenario planning⁸ are used as so-called soft methods, because they do not provide specific knowledge about the future as they are developed on the basis of the knowledge of the scenario creators⁹, therefore they are of speculative nature. The usefulness of scenarios is particularly high in the process of qualitative forecasting, which makes it possible to establish multidimensional and multivariate possible future states conditions in the turbulent state's environment. Multivariant feature is therefore an important advantage of

1 See: J. Jurczak, *Projektowanie jako narzędzie planowania strategicznego w dziedzinie bezpieczeństwa*, Warszawa 2024, pp. 21-26; A. Dawidczyk, *Analiza strategiczna w dziedzinie bezpieczeństwa państwa. Wybrane metody*, Warszawa 2020, pp. 27-29.

2 R. Krupski, *Zarządzanie przedsiębiorstwem w turbulentnym otoczeniu*, Warszawa 2005; H. Gaspars-Wieloch, *Podjęmowanie decyzji w warunkach niepewności. Planowanie scenariuszowe, reguły decyzyjne i wybrane zastosowania ekonomiczne*, Poznań 2018.

3 P. Cabała, *Planowanie scenariuszowe w zarządzaniu bezpieczeństwem strategicznym przedsiębiorstwa*, Kraków 2012; K. Rupik, *Planowanie w turbulentnym otoczeniu*, „Master of Business Administration”, nr 4/2011, pp. 36-46.

4 More: A. Dawidczyk, *Analiza strategiczna w dziedzinie bezpieczeństwa...*; P. Daniluk, *Bezpieczeństwo i zarządzanie. Analiza strategiczna*, Warszawa 2015.

5 G. Gierszewska, M. Romanowska, *Analiza strategiczna przedsiębiorstwa*, Warszawa 2009, p. 49.

6 More: P. Daniluk, H. Wyligala, *Analiza zagrożeń sektorowych dla bezpieczeństwa*, Warszawa 2021, pp. 102-162.

7 K. Daszyńska-Żygadło, *Planowanie scenariuszowe – próba systematyzacji pojęć*, „Zeszyty Naukowe Uniwersytetu Szczecińskiego” 2011, nr 640/2011, pp. 388-390.

8 I. Penc-Pietrzak, *Zastosowanie planowania scenariuszowego w naukach o bezpieczeństwie*, „Przegląd Policyjny” 2018, nr 4(124)/2018, pp. 28-46; P. Daniluk, *Podjęcie scenariuszowe w badaniu bezpieczeństwa*, „Przedsiębiorczość i zarządzanie”, tom 19, zeszyt 1, część 3, pp. 141-152.

9 G. Gierszewska, M. Romanowska, *Analiza strategiczna...*, p. 56.

scenarios as they can be quite different depending on the selection of baseline categories (i.e. threats, opportunities, weaknesses and strengths).

Scenarios are also a useful tool for verifying the correctness of the strategic options (concepts), which enable the selection of them, considering its adaptability to the direction of processes development indicated by experts in the state's environment. The security concepts are juxtaposed with scenarios and on this basis a relatively objective assessment of the correctness of the assumptions made in terms of the actions planned for implementation¹⁰.

Therefore, scenario planning is a tool that can be used in the process of strategic planning in turbulent state environment with great success¹¹. The use of this method makes it possible to predict, as a result of the overlap of various threats, opportunities, weaknesses and strengths, how the situation in the state security environment may get in the expected forecast period. This is a long-term forecasting method of – the optimal time horizon for analyzing the future and dynamic changes in the state environment is 10 years.

Main part – the practical use of the method

In the literature there are four main groups of scenarios distinguished: 1) scenario of possible events, 2) simulation scenario, 3) scenario of organization environment and 4) scenario of processes in the organization environment¹². For the article purpose, the construction of the scenario of state's environment was discussed. In this group, four types of scenarios can be identified: realistic (most likely to happen) and surprise scenario, as well as optimistic and pessimistic scenarios.

Depending on the threats, opportunities, weaknesses and strengths, predictions of different nature can be developed. Thus: the realistic scenario is formed by sets of threats and opportunities with the highest probability of occurrence and at the same time the greatest strength of impact (positive or negative); the surprise scenario is set of threats and opportunities with the lowest probability of occurrence and at the same time the highest strength of impact; the pessimistic scenario is formed by threats characterized by the greatest negative impact on state security in parallel with opportunities of weak strength of impact in the context of the realization of the state national interest, the optimistic scenario is formed by grouping those opportunities of the greatest potential impact on the realization of state national interests in parallel with threats with the lowest rate of negative impact on state security¹³.

10 More: A. Dawidczyk, J. Jurczak, *Metodologia bezpieczeństwa w przykładach i zastosowaniach. Podręcznik akademicki*, Warszawa 2022, pp. 120-128; A. Dawidczyk, J. Jurczak, P. Łuka, *Metody, techniki, narzędzia nauk o bezpieczeństwie*, Warszawa 2019, pp. 113-115.

11 A. K. Koźmiński, *Zarządzanie w warunkach niepewności. Podręcznik dla zaawansowanych*, Warszawa 2004; K. van der Heijden, *Planowanie scenariuszowe w zarządzaniu strategicznym*, Kraków 2000; K. van der Heijden, *Scenarios and forecasting: Two perspectives*, „Technological Forecasting and Social Change” 2000, nr 65/2000.

12 G. Gierszewska, M. Romanowska, *Analiza strategiczna...*, pp. 53-69.

13 A. Dawidczyk, J. Jurczak, P. Łuka, *Metody, techniki, narzędzia ...*, p. 100.0

To provide a practical example of scenario planning in the field of state security it was essential to define the main research problem both with its subject. An important problem in the modern world is demographic change. Taking into account the available studies on the population in Poland, the progressive aging of the population and the marked decline in the number of births due to fewer women of reproductive age¹⁴, demographic security of Poland was set as the main research subject. Also, the following research problem was formulated: what types of situations may occur in Poland's demographic security environment in 2025-2035 as a result of the co-occurrence of threats and opportunities, as well as weaknesses and strengths identified in the framework of conducted strategic analysis?

At this research stage the Delphi method was used both with a multi-criteria matrix for identification and evaluation of threats (Table 1) and opportunities over time (Table 2) and a scheme for evaluating key success factors (Table 3).

Regardless the type of the problem situation, the development of scenarios of the state's environment is directly related to the results of strategic analysis of the state's environment¹⁵. For the purposes of the article seven threats and seven opportunities were identified respectively in each of the three spheres of the state's environment i.e. the sociosphere, biosphere and technosphere, in total of twenty one threats and twenty one opportunities. However, the identified factors are illustrative ones – at the state level such identification should include a dozen different categories in each sphere. Therefore, undertaken research proceeding was an informative, however the same algorithm can be successfully applied in the process of identifying an extensive catalog of threats and opportunities, as well as strengths and weaknesses in the state environment.

The grouping of collection of threats and opportunities in the multi-criteria matrix was conducted based on criteria of the strength of impact and probability of occurrence of each threat and opportunity depending on the scenario type (realistic scenario – R, surprise scenario – S, pessimistic scenario – P, optimistic scenario – O¹⁶). In table 1 the results of the analysis of existing and projected threats¹⁷ to state's demographic security over the 2025-2035 forecast were presented.

14 *Sytuacja demograficzna Polski jako wyzwanie dla polityki społecznej i gospodarczej*, pod. red. J. Hrynkiewicz, J. Witkowski, A. Potrykowska, Warszawa 2018; *Prognoza ludności na 2023-2060*, Główny Urząd Statystyczny, Warszawa 2023; *Rocznik demograficzny 2023*, Główny Urząd Statystyczny, Warszawa 2023.

15 A. Dawidczyk, J. Jurczak, *Metodologia bezpieczeństwa w przykładach...*, pp. 44-81; A. Dawidczyk, J. Jurczak, P. Łuka, *Metody, techniki, narzędzia...*, pp. 64-83.

16 A. Dawidczyk, J. Jurczak, P. Łuka, *Metody, techniki, narzędzia...*, p. 100.

17 The minus sign (-) symbolizes threat, it is not a mathematical sign.

Table 1. The multi-criteria matrix for threats identification and evaluation in 2025–2035

Megatrend		Demographic change		
Challenge		Population aging		
Threat	Trend	Strength of impact (-1 ÷ -5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
SOCIOSPHERE				
1. Negative population growth	Growth	-4 R_4	0,5 R_4	-2,0
	Stabilization	-3	0,3	-0,9
	Regression	-2 S_9 0_5	0,2 S_9	-0,4
2. Drop in fertility rate	Growth	-3	0,5	-1,5
	Stabilization	-5 P_3	0,3	-1,5
	Regression	-3 S_5	0,2 S_5	-0,6
3. Change of the family model	Growth	-3	0,3	-0,9
	Stabilization	-2 0_2	0,5	-1,0
	Regression	-3 S_6	0,2 S_6	-0,6
4. The burden on the health care and pension system	Growth	-5 R_5 P_4	0,4 R_5	-2,0
	Stabilization	-3	0,4	-1,2
	Regression	-3 S_7	0,2 S_7	-0,6

Megatrend		Demographic change		
Challenge		Population aging		
Threat	Trend	Strength of impact (-1 ÷ -5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
5. Society pauperization	Growth	-3 0_9	0,4	-1,2
	Stabilization	-3	0,4	-1,2
	Regression	-3 S_8	0,2 S_8	-0,6
6. Social concerns caused by lower security level	Growth	-3	0,3	-0,9
	Stabilization	-3	0,4	-1,2
	Regression	-2 0_3	0,4	-0,8
7. Lack of skilled workers and specialists – stifling production and development of the economy	Growth	-5 R_1 P_2	0,5 R_1	-2,5
	Stabilization	-4	0,4	-1,6
	Regression	-3 S_1	0,1 S_1	-0,3
BIOSPHERE				
8. Natural resources depletion	Growth	-4 P_6	0,3	-1,2
	Stabilization	-4	0,3	-1,2
	Regression	-3	0,4	-1,2
9. Increased air pollution – more greenhouse gas emissions	Growth	-4 P_7	0,3	-1,2
	Stabilization	-4 R_8	0,4 R_8	-1,6
	Regression	-3	0,3	-0,9
10. Increased volume of waste and its illegal dumping	Growth	-3	0,3	-0,9
	Stabilization	-4 P_10	0,3	-1,2
	Regression	-3	0,4	-1,2

Megatrend		Demographic change		
Challenge		Population aging		
Threat	Trend	Strength of impact (-1 ÷ -5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
11. Biodiversity loss	Growth	-3 O_10	0,3	-0,9
	Stabilization	-3	0,4	-1,2
	Regression	-3	0,3	-0,9
12. Environmental degradation caused by urbanization	Growth	-4 P_8	0,3	-1,2
	Stabilization	-4 R_6	0,5 R_6	-2,0
	Regression	-3	0,2	-0,6
13. New epidemics and diseases, including infectious diseases	Growth	-5 P_1	0,3	-1,5
	Stabilization	-5 R_2	0,5 R_2	-2,5
	Regression	-4 S_3	0,2 S_3	-0,8
14. Natural disasters – floods, droughts	Growth	-3	0,3	-0,9
	Stabilization	-3	0,4	-1,2
	Regression	-3	0,3	-0,9
TECHNOSPHERE				
15. Increased demand and energy consumption	Growth	-4 R_7	0,5 R_7	-2,0
	Stabilization	-4 P_5	0,3	-1,2
	Regression	-4 S_4	0,2 S_4	-0,8

Megatrend		Demographic change		
Challenge		Population aging		
Threat	Trend	Strength of impact (-1 ÷ -5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
16. Disruption of electricity supplies	Growth	-3	0,3	-0,9
	Stabilization	-2 0_1	0,4	-0,8
	Regression	-2	0,3	-0,6
17. Phishing for sensitive data using malware	Growth	-4 R_9	0,4 R_9	-1,6
	Stabilization	-3	0,4	-1,2
	Regression	-2 S_10 0_6	0,2 S_10	-0,4
18. Identity theft	Growth	-3	0,4	-1,2
	Stabilization	-3	0,4	-1,2
	Regression	-2 0_4	0,2	-0,4
19. Sensitive data leakage	Growth	-3	0,3	-0,9
	Stabilization	-3	0,4	-1,2
	Regression	-3	0,3	-0,9
20. Digital inequalities	Growth	-4 R_3	0,6 R_3	-2,4
	Stabilization	-3	0,3	-0,9
	Regression	-2 S_2 0_7	0,1 S_2	-0,2

Megatrend		Demographic change		
Challenge		Population aging		
Threat	Trend	Strength of impact (-1 ÷ -5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
21. Limited access to medical innovations	Growth	-4 R_10	0,4 R_10	-1,6
	Stabilization	-4 P_9	0,4	-1,6
	Regression	-2 O_8	0,2	-0,4

Legend: R_n – realistic scenario; S_n – surprise scenario; P_n – pessimistic scenario; O_n – optimistic scenario.

Source: own research based on G. Gierszewska, M. Romanowska, *Analiza strategiczna...*, p. 202–203.

While identifying and evaluating opportunities the potential sustainable benefits to the state's demographic security were taken into account, as well as the possible consequences of not taking advantage of them, which may result in a slowdown in the state's development in this area – the detailed results were presented in table 2.

Table 2. The multi-criteria matrix for opportunities identification and evaluation in 2025–2035

Megatrend		Demographic change		
Challenge		Population aging		
Opportunity	Trend	Strength of impact (1 ÷ 5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
SOCIOSPHERE				
1. Positive population growth	Growth	+3 S_1	0,1 S_1	+0,3
	Stabilization	+3 P_8	0,3	+0,9
	Regression	+4 R_3	0,6 R_3	+2,4
2. Beneficial family-friendly policies	Growth	+3	0,3	+0,9
	Stabilization	+4	0,4	+1,6
	Regression	+2 P_3	0,3	+0,6

Megatrend		Demographic change		
Challenge		Population aging		
Opportunity	Trend	Strength of impact (1 ÷ 5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
3. Legalization of civil partnerships	Growth	+2 S_2 P_4	0,1 S_2	+0,2
	Stabilization	+3	0,2	+0,6
	Regression	+4 R_1	0,7 R_1	+2,8
4. Society wealth	Growth	+3 S_6	0,2 S_6	+0,6
	Stabilization	+3 R_10	0,6 R_10	+1,8
	Regression	+3 P_7	0,2	+0,6
5. Blurring of social differences	Growth	+3	0,3	+0,9
	Stabilization	+3	0,3	+0,9
	Regression	+2 P_2	0,4	+0,8
6. GDP growth	Growth	+4	0,2	+0,8
	Stabilization	+5 S_4 O_4	0,2 S_4	+1,0
	Regression	+4 R_4	0,6 R_4	+2,4
7. Increase in demand for specific services dedicated to the elderly	Growth	+4	0,4	+1,6
	Stabilization	+4	0,4	+1,6
	Regression	+2 S_3 P_5	0,1 S_3	+0,2

Megatrend		Demographic change		
Challenge		Population aging		
Opportunity	Trend	Strength of impact (1 ÷ 5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
BIOSPHERE				
8. Widespread use of renewable energy sources	Growth	+4 O_8	0,3	+1,2
	Stabilization	+4	0,3	+1,2
	Regression	+3	0,4	+1,2
9. Environmental protection activities	Growth	+3 P_9	0,3	+0,9
	Stabilization	+4 R_5	0,5 R_5	+2,0
	Regression	+3 S_7	0,2 S_7	+0,6
10. Effective waste management – recycling and resource recovery	Growth	+3 S_8	0,2 S_8	+0,6
	Stabilization	+4	0,4	+1,6
	Regression	+3 P_10	0,4	+1,2
11. Sustainable policies for biodiversity conservation	Growth	+2 P_1	0,3	+0,6
	Stabilization	+4	0,4	+0,8
	Regression	+2	0,3	+0,6
12. Controlled waste collection and disposal	Growth	+3 S_9	0,2 S_9	+0,6
	Stabilization	+4 R_6	0,5 R_6	+2,0
	Regression	+3	0,3	+0,9

Megatrend		Demographic change		
Challenge		Population aging		
Opportunity	Trend	Strength of impact (1 ÷ 5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
13. Universal access to medical innovations	Growth	+5 0_5	0,3	+1,5
	Stabilization	+4	0,3	+1,2
	Regression	+4	0,4	+1,6
14. Treatment of rare and infectious diseases	Growth	+5 0_1	0,3	+1,5
	Stabilization	+5 R_7	0,4 R_7	+2,0
	Regression	+4	0,3	+1,2
TECHNOSPHERE				
15. Use of renewable energy-based power generation	Growth	+4 0_9	0,4	+1,6
	Stabilization	+4	0,4	+1,6
	Regression	+3 S_10	0,2 S_10	+0,6
16. Replacing non-renewable transportation technologies with hydrogen technology	Growth	+3	0,3	+0,9
	Stabilization	+4 0_10	0,4	+1,6
	Regression	+4	0,3	+1,2
17. Artificial intelligence industrialization	Growth	+3	0,3	+0,9
	Stabilization	+4	0,4	+1,6
	Regression	+5 0_7	0,3	+1,5
18. Automated processes	Growth	+4 S_5	0,2 S_5	+0,8
	Stabilization	+4 R_8	0,5 R_8	+2,0
	Regression	+5 0_6	0,3	+1,5

Megatrend		Demographic change		
Challenge		Population aging		
Opportunity	Trend	Strength of impact (1 ÷ 5)	Probability of occurrence (0,1 ÷ 0,8)	Multiplier
19. Widespread use of IT tools by the elderly	Growth	+4	0,4	+1,6
	Stabilization	+4	0,3	+1,2
	Regression	+2 P_6	0,3	+0,6
20. Bio-, nanotechnology and genetic engineering growth	Growth	+5 O_2	0,4	+2,0
	Stabilization	+5 R_2	0,5 R_2	+2,5
	Regression	+3	0,1	+0,3
21. Digitalization of work	Growth	+5 O_3	0,3	+1,5
	Stabilization	+5 R_9	0,4 R_9	+2,0
	Regression	+3	0,3	+0,9

Legend: R_n – realistic scenario; S_n – surprise scenario; P_n – pessimistic scenario; O_n – optimistic scenario.

Source: own research based on G. Gierszewska, M. Romanowska, *Analiza strategiczna ...*, *op. cit.*, p.202–203.

The process of state's potential analysis was also carried out. The activities undertaken at this stage made it possible to identify the state's strengths and weaknesses in the field of demographic security in cross-section of the basic resources at the state's disposal in this area. The systematization of weaknesses and strengths was conducted according to the subject criteria – as it was with threats and opportunities. Also, identified factors were exemplary – for the article purposes nine factors were identified and evaluated (table 3).

Table 3. Key success factors scheme in in subsequent forecast periods

No.	Factor	1÷3 years			4÷6 years			7÷9 years			10÷12 years		
		Z	O	W	Z	O	W	Z	O	W	Z	O	W
1.	What is the percentage of people of retirement age in relation to the total number of population?	1	2	2	2	2	4	2	2	4	3	1 (W)	3
2.	What is the level of social welfare and health care for citizens?	2	1	2	2	2	4	2	3	6	2	3 (M)	6
3.	How effectively is the policy activation of labor of the elderly people implemented?	1	1	1	1	1	1	1	2	2	2	2 (M)	4
4.	What is the level of public environmental awareness?	1	2	2	1	3	3	2	4	8	2	4 (S)	8
5.	What is the level of environmental protection in Poland?	2	2	4	2	2	4	2	2	4	2	3 (M)	6
6.	What is the percentage of deaths of people of working age in relation to the total number of deaths in Poland?	1	3	3	2	3	6	2	2	4	2	1 (W)	2
7.	What is the contribution of Polish know-how to technology development in medicine?	1	2	2	2	2	4	3	3	9	3	3 (S)	9
8.	To what extent do elderly people use commonly available electronic tools?	1	2	2	1	3	3	1	3	3	1	4 (M)	4
9.	What is the level of the state's energy reserves?	2	2	4	2	2	4	2	3	6	3	4 (S)	12

Legend: Z – factor significance (1 – less importance, 2 – medium importance, 3 – high importance);

O – factors initial evaluation – (1,2 – weakness – W, 3 – medium level – M, 4,5 – strength – S);

W – weighted average for factors' significance and initial evaluation.

Source: own research based on A. Dawidczyk, *Analiza strategiczna...*, s. 88.

In table 3 the identification and evaluation of state's demographic security key success factors for was described. Identified factors can determine the success or failure in pursuing national interests in the field of demographic security. As it was already underlined scenarios are used in long-term forecasting, so for further research procedure factors' significance and its' evaluation over a period of 10÷12 years were taken into consideration. To determine whether a factor is a strength or weakness for

a state's demographic security it should be compared with factor significance. Thus, the consideration of weighted average for each factor allowed to aggregate them into four collections¹⁸:

- great weaknesses (1÷3): the percentage of people of retirement age in relation to the total number of population, percentage of deaths of people of working age in relation to the total number of deaths in Poland;
- relative weakness and categories of medium importance (4÷7): the level of social welfare and health care, the policy activation of labor of the elderly people, the level of environmental protection in Poland, the extent of commonly used of available electronic tools by elderly people;
- strengths (8÷11): the level of public environmental awareness, the contribution of Polish know-how to technology development in medicine;
- very strong strengths (12÷15): the level of the state's energy reserves.

The categories identified in strategic analysis (threats, opportunities, weaknesses and strengths) allowed to carry on the further research procedure. To develop each of the four types of state's environment scenarios it is essential to analyze the strengths of impact of each threat and opportunity both with its' probability of occurrence and along with identified and evaluated weaknesses and strengths. In order to systematical presentation in of the collection of threats and opportunities useful in the scenarios building process, the method of reduction and a TOWS¹⁹ matrix were used. In four TOWS matrixes an aggregation of threats and opportunities was conducted respectively: the highest probability of occurrence and at the same time the greatest strength of impact (positive or negative) – the realistic scenario (table 4), the lowest probability of occurrence and at the same time the highest strength of impact – the surprise scenario (table 5), threats characterized by the greatest negative strength of impact on state security in parallel with opportunities of weak strength of impact in the context of the realization of the state national interest – the pessimistic scenario (table 6) and opportunities of the greatest potential strength of impact on the state national interests in parallel with threats with the lowest rate of negative strengths of impact on state security – the optimistic scenario (table 7). Each of TOWS matrixes was also updated with state's weaknesses and strengths – again for this research purpose, just ten threats and ten opportunities were aggregated in TOWS matrixes.

18 This research interprets the catalogue of factors projected over a period of 11÷15 years' time, which was intentional and remains in relation with identified previously threats and opportunities. When conducting the analysis at the state level, all forecast periods should be taken into account for the identified and subject-ordered factors.

19 The classic SWOT analysis starts with the identification, assessment and extrapolation of strengthens and weaknesses, opportunities and threats. In security studies, the reverse of the original (SWOT) acronym TOWS (Threats, Opportunities, Weakness, Strengths) was used.

Tabel 4. The TOWS matrix – realistic scenario

<p><u>Threats (external, negative)</u></p> <p>R_1: Lack of skilled workers and specialists – stifling production and development of the economy (SOCIOSPHERE)</p> <p>R_2: New epidemics and diseases, including infectious diseases (BIOSPHERE)</p> <p>R_3: Digital inequalities (TECHNOSPHERE)</p> <p>R_4: Negative population growth (SOCIOSPHERE)</p> <p>R_5: The burden on the health care and pension system (SOCIOSPHERE)</p> <p>R_6: Environmental degradation caused by urbanization (BIOSPHERE)</p> <p>R_7: Increased demand and energy consumption (TECHNOSPHERE)</p> <p>R_8: Increased air pollution – more greenhouse gas emissions (BIOSPHERE)</p> <p>R_9: Phishing for sensitive data using malware (TECHNOSPHERE)</p> <p>R_10: Limited access to medical innovations (TECHNOSPHERE)</p>	<p><u>Opportunities (external, positive)</u></p> <p>R_1: Legalization of civil partnerships (SOCIOSPHERE)</p> <p>R_2: Bio-, nanotechnology and genetic engineering growth (TECHNOSPHERE)</p> <p>R_3: Positive population growth (SOCIOSPHERE)</p> <p>R_4: GDP GROWTH (SOCIOSPHERE)</p> <p>R_5: Environmental protection activities (BIOSPHERE)</p> <p>R_6: Controlled waste collection and disposal (BIOSPHERE)</p> <p>R_7: Treatment of rare and infectious diseases (BIOSPHERE)</p> <p>R_8: Automated processes (TECHNOSPHERE)</p> <p>R_9: Digitalization of work (TECHNOSPHERE)</p> <p>R_10: Society wealth (SOCIOSPHERE)</p>
<p><u>Weaknesses (internal, negative)</u></p> <ol style="list-style-type: none"> 1. The percentage of people of retirement age in relation to the total number of population. 2. The percentage of deaths of people of working age in relation to the total number of deaths in Poland. 3. The level of social welfare and health care. 4. The policy activation of labor of the elderly people. 5. The level of environmental protection in Poland. 6. The extent of commonly used available electronic tools by elderly people. 	<p><u>Strengths (internal, positive)</u></p> <ol style="list-style-type: none"> 1. The level of the state's energy reserves. 2. The level of public environmental awareness. 3. The contribution of Polish know-how to technology development in medicine.

Source: own research.

Table 5. The TOWS matrix – surprise scenario

<p>Threats (external, negative)</p> <p>S_1: Lack of skilled workers and specialists – stalling production and development of the economy (SOCIOSPHERE)</p> <p>S_2: Digital inequalities (TECHNOSPHERE)</p> <p>S_3: New epidemics and diseases, including infectious diseases (BIOSPHERE)</p> <p>S_4: Increased demand and energy consumption (TECHNOSPHERE)</p> <p>S_5: Drop in fertility rate (SOCIOSPHERE)</p> <p>S_6: Change of family model (SOCIOSPHERE)</p> <p>S_7: The burden on the health care and pension system (SOCIOSPHERE)</p> <p>S_8: Society pauperization (SOCIOSPHERE)</p> <p>S_9: Negative population growth (SOCIOSPHERE)</p> <p>S_10: Phishing for sensitive data using malware (TECHNOSPHERE)</p>	<p>Opportunities (external, positive)</p> <p>S_1: Positive population growth (SOCIOSPHERE)</p> <p>N_2: Legalization of civil partnerships (SOCIOSPHERE)</p> <p>S_3: Increase in demand for specific services dedicated to elderly (SOCIOSPHERE)</p> <p>S_4: GDP GROWTH (SOCIOSPHERE)</p> <p>S_5: Automated processes (TECHNOSPHERE)</p> <p>S_6: Society wealth (SOCIOSPHERE)</p> <p>S_7: Environmental protection activities (BIOSPHERE)</p> <p>S_8: Effective waste management – recycling and resource recovery (BIOSPHERE)</p> <p>S_9: Controlled waste collection and disposal (BIOSPHERE)</p> <p>S_10: Use of renewable energy-based power generation (TECHNOSPHERE)</p>
<p>Weaknesses (internal, negative)</p> <ol style="list-style-type: none"> 1. The percentage of people of retirement age in relation to the total number of population. 2. The percentage of deaths of people of working age in relation to the total number of deaths in Poland. 3. The level of social welfare and health care. 4. The policy activation of labor of the elderly people. 5. The level of environmental protection in Poland. 6. The extent of commonly used available electronic tools by elderly people. 	<p>Strengths (internal, positive)</p> <ol style="list-style-type: none"> 1. The level of the state's energy reserves. 2. The level of public environmental awareness. 3. The contribution of Polish know-how to technology development in medicine.

Source: own research.

Table 6. The TOWS matrix – pessimistic scenario

<p><u>Threats (external, negative)</u></p> <p>P_1: New epidemics and diseases, including infectious diseases (BIOSPHERE)</p> <p>P_2: Lack of skilled workers and specialists – stifling production and development of the economy (SOCIOSPHERE)</p> <p>P_3: Drop in fertility rate (SOCIOSPHERE)</p> <p>P_4: The burden on the health care and pension system (SOCIOSPHERE)</p> <p>P_5: Increased demand and energy consumption (TECHNOSPHERE)</p> <p>P_6: Natural resources depletion (BIOSPHERE)</p> <p>P_7: Increased air pollution – more greenhouse gas emissions (BIOSPHERE)</p> <p>P_8: Environmental degradation caused by urbanization (BIOSPHERE)</p> <p>P_9: Limited access to medical innovations (TECHNOSPHERE)</p> <p>P_10: Increased volume of waste and its illegal dumping (BIOSPHERE)</p>	<p><u>Opportunities (external, positive)</u></p> <p>P_1: Sustainable policies for biodiversity conservation (BIOSPHERE)</p> <p>P_2: Blurring of social differences (SOCIOSPHERE)</p> <p>P_3: Beneficial family-friendly policies (SOCIOSPHERE)</p> <p>P_4: Legalization of civil partnerships (SOCIOSPHERE)</p> <p>P_5: Increase in demand for specific services dedicated to the elderly (SOCIOSPHERE)</p> <p>P_6: Widespread use of IT tools by the elderly (TECHNOSPHERE)</p> <p>P_7: Society wealth (SOCIOSPHERE)</p> <p>P_8: Positive population growth (SOCIOSPHERE)</p> <p>P_9: Environmental protection activities (BIOSPHERE)</p> <p>P_10: The effective waste management – recycling and resource recovery (BIOSPHERE)</p>
<p><u>Weaknesses (internal, negative)</u></p> <ol style="list-style-type: none"> 1. The percentage of people of retirement age in relation to the total number of population. 2. The percentage of deaths of people of working age in relation to the total number of deaths in Poland. 3. The level of social welfare and health care. 4. The policy activation of labor of the elderly people. 5. The level of environmental protection in Poland. 6. The extent of commonly used available electronic tools by elderly people. 	<p><u>Strengths (internal, positive)</u></p> <ol style="list-style-type: none"> 1. The level of the state’s energy reserves. 2. The level of public environmental awareness. 3. The contribution of Polish know-how to technology development in medicine.

Source: own research.

Table 7. The TOWS matrix – optimistic scenario

<p><u>Threats (external, negative)</u></p> <p>O_1: Disruption of electricity supplies (TECHNOSPHERE)</p> <p>O_2: Change of family model (SOCIOSPHERE)</p> <p>O_3: Social concerns caused by lower security level (SOCIOSPHERE)</p> <p>O_4: Identity theft (TECHNOSPHERE)</p> <p>O_5: Negative population growth (SOCIOSPHERE)</p> <p>O_6: Phishing for sensitive data using malware (TECHNOSPHERE)</p> <p>O_7: Digital inequalities (TECHNOSPHERE)</p> <p>O_8: Limited access to medical innovations (TECHNOSPHERE)</p> <p>O_9: Society pauperization (SOCIOSPHERE)</p> <p>O_10: Biodiversity loss (BIOSPHERE)</p>	<p><u>Opportunities (external, positive)</u></p> <p>O_1: Treatment of rare and infectious diseases (BIOSPHERE)</p> <p>O_2: Bio-, nanotechnology and genetic engineering growth (TECHNOSPHERE)</p> <p>O_3: Digitalization of work (TECHNOSPHERE)</p> <p>O_4: GDP GROWTH (SOCIOSPHERE)</p> <p>O_5: Treatment of rare and infectious diseases (BIOSPHERE)</p> <p>O_6: Automated processes (TECHNOSPHERE)</p> <p>O_7: Artificial intelligence industrialization (TECHNOSPHERE)</p> <p>O_8: Widespread use of renewable energy sources (BIOSPHERE)</p> <p>O_9: Use of renewable energy-based power generation (TECHNOSPHERE)</p> <p>O_10: Replacing non-renewable technologies in transportation with hydrogen technology (TECHNOSPHERE)</p>
<p><u>Weaknesses (internal, negative)</u></p> <ol style="list-style-type: none"> 1. The percentage of people of retirement age in relation to the total number of population. 2. The percentage of deaths of people of working age in relation to the total number of deaths in Poland. 3. The level of social welfare and health care. 4. The policy activation of labor of the elderly people. 5. The level of environmental protection in Poland. 6. The extent of commonly used available electronic tools by elderly people. 	<p><u>Strengths (internal, positive)</u></p> <ol style="list-style-type: none"> 1. The level of the state's energy reserves. 2. The level of public environmental awareness. 3. The contribution of Polish know-how to technology development in medicine.

Source: own research.

The categories aggregated in the TOWS matrixes enable anticipation of the future and answering the question: what might happen in the state’s demographic security environment between 2025 and 2035 as a result of the co-occurrence of threats and opportunities and forces and vulnerabilities. By combining (grouping) sets of threats and opportunities along with weaknesses and strengths that were aggregated in each scenario, unconsidered variants of changes in the state’s security environment and new problem situations that may arise in the future were anticipated.

For the article purpose, a set of categories aggregated in the optimistic scenario was selected for further work. The prediction derived from the categories identified in optimistic scenario was the demographic renewal of the country – stopping the depopulation of Poland, which may determine the long-term possibilities of economic and social development of Poland. The use of a multi-criteria scenario description matrix allowed detailed description of the derived prediction (table 8).

The criteria and descriptive features used in the matrix tool were intentional, as they are always function of the security research problem. The structure of the scenario, its capacity and scope always depend on the problem situation and the level of detail of the solutions sought. For the purpose of this article ten criteria were identified as being relevant to the anticipated situation.

Tabel 8. The multi-criteria matrix of optimistic scenario– the demographic renewal of the country

No.	Criteria	Descriptive features					
1.	Time	Currently	In 2 years’ time	In 2 to 5 years’ time	In 5 to 10 years’ time		
2.	Place	Province		District		Municipality	
3.	Actions to strengthen the family	Financial security for families	Housing security for families		Family-friendly labour market		Legalization of civil partnerships
		Availability of diverse forms of children care and elderly care		Improving the quality and organization of education	Availability of diverse financial and material support instruments		Promoting a culture conducive to strengthening family ties
4.	Actions to provide health care	Guaranteed availability of public health services	Widespread prevention and increase of the effectiveness of disease treatment		Reimbursement of medical procedures of infertility	Highly specialized medical care	Health education

No.	Criteria	Descriptive features					
5.	Action to raise living standards	Investing in human capital	Retirement security system		Tackling inequalities	Infrastructure growth	
		Transparent and friendly tax system	Stability employment for people of working age		State support for people entering the labour market	Improving access to e-services	
6.	Fertility rate	Below replacement level		At a replacement level	Above replacement level		
7.	Family model	Partnership	Disproportionately feminine		Traditional	Disproportionately masculine	Other
8.	Population size	< 26 m	27 – 32 m		33-38 m	38 m <	
9.	Number of people of working age	< 20 m			21-23 m	24 m <	
10.	Number of people aged 65 and more	< 7 m		8-9 m		10 m <	

Source: own research.

The optimistic scenario for the state’s demographic renewal developed for the purpose of this article is illustrative and fragmentary. However, using the exact tool – a multi-criteria scenario description matrix – it is possible to develop three other scenarios of the state’s environment: the realistic scenario, the surprise scenario and the pessimistic scenario. For each case of the indicated scenario type must be preceded by the aggregation of basic categories in the TOWS matrix – according to the specific security research. Using **the expert method** made it possible to plot the individual variants expected to occur during the assumed forecast period. The scenario in tabular form and the mapping of the individual characteristics relevant to the identified criteria make it possible to write down the textual content of the scenario. Due to editorial constraints, the development of a textual version of the optimistic scenario – the prediction of the state’s demographic renewal – was not described.

Conclusions

The author’s intention and the main objective of the undertaken research was to demonstrate the usefulness of scenarios as a qualitative forecasting tool in the field of security in changeable, unpredictable and complex state security environment. A clear advantage of scenario methods, which are not simply extrapolations

of past trends, is that they take into account abrupt, multivariate and heterogeneous changes in state's environment²⁰. The use of scenarios in the field of security makes it possible to define diverse pictures of the future which, unlike classical forecasts, do not deal with single elements of the state's environment, but comprehensively take into account the occurrence of many factors simultaneously²¹ (threats, opportunities, weaknesses and strengths) and which may result in state's survival and its' future growth.

The use of scenarios in security research enables not only the avoidance or minimization of threats, the maximum exploitation of opportunities and identified state's strengths and the continuous strengthening of its weaknesses, but also it allows flexible and rapid state adaptation to the dynamically changing conditions of its environment.

Bibliography

- Cabała P., *Planowanie scenariuszowe w zarządzaniu bezpieczeństwem strategicznym przedsiębiorstwa*, Kraków 2012.
- Daniluk P., *Bezpieczeństwo i zarządzanie. Analiza strategiczna*, Warszawa 2015.
- Daniluk P., *Podejście scenariuszowe w badaniu bezpieczeństwa*, „Przedsiębiorczość i zarządzanie”, tom 19, zeszyt 1, część 3.
- Daniluk P., Wyligala H., *Analiza zagrożeń sektorowych dla bezpieczeństwa*, Warszawa 2021.
- Daszyńska-Żygadło K., *Planowanie scenariuszowe – próba systematyzacji pojęć*, „Zeszyty Naukowe Uniwersytetu Szczecińskiego” 2011, nr 640/2011.
- Dawidczyk A., *Analiza strategiczna w dziedzinie bezpieczeństwa państwa. Wybrane metody*, Warszawa 2020.
- Dawidczyk A., Jurczak J., Łuka P., *Metody, techniki, narzędzia nauk o bezpieczeństwie*, Warszawa 2019.
- Dawidczyk A., Jurczak J., *Metodologia bezpieczeństwa w przykładach i zastosowaniach. Podręcznik akademicki*, Warszawa 2022.
- Gaspars-Wieloch H., *Podejmowanie decyzji w warunkach niepewności. Planowanie scenariuszowe, reguły decyzyjne i wybrane zastosowania ekonomiczne*, Poznań 2018.
- Gierszewska G., Romanowska M., *Analiza strategiczna przedsiębiorstwa*, Warszawa 2009.
- Gierszewska G., Wawrzyniak B., *Globalizacja. Wyzwania dla zarządzania strategicznego*, Warszawa 2001.
- Jurczak J., *Projektowanie jako narzędzie planowania strategicznego w dziedzinie bezpieczeństwa*, Warszawa 2024.
- Koźmiński A. K., *Zarządzanie w warunkach niepewności. Podręcznik dla zaawansowanych*, Warszawa 2004.
- Krupski R., *Zarządzanie przedsiębiorstwem w turbulentnym otoczeniu*, Warszawa 2005.

20 G. Gierszewska, B. Wawrzyniak, *Globalizacja. Wyzwania dla zarządzania strategicznego*, Warszawa 2001, p. 180.

21 K. Zimmewicz, *Współczesne koncepcje i metody zarządzania*, Warszawa 1999, p. 126.

- Penc-Pietrzak I., *Zastosowanie planowania scenariuszowego w naukach o bezpieczeństwie*, „Przegląd Policyjny” 2018, nr 4(124)/2018.
- Prognoza ludności na 2023-2060*, Główny Urząd Statystyczny, Warszawa 2023
- Rocznik demograficzny 2023*, Główny Urząd Statystyczny, Warszawa 2023.
- Rupik K., *Planowanie w turbulentnym otoczeniu*, „Master of Business Administration” 2011, nr 4/2011.
- Sytuacja demograficzna Polski jako wyzwanie dla polityki społecznej i gospodarczej*, pod. red. Hryniewicz J., Witkowski J., Potrykowska A., Warszawa 2018.
- Van der Heijden K., *Planowanie scenariuszowe w zarządzaniu strategicznym*, Kraków 2000.
- Van der Heijden K., *Scenarios and forecasting: Two perspectives*, „Technological Forecasting and Social Change” 2000, nr 65/2000.
- Zimniewicz K., *Współczesne koncepcje i metody zarządzania*, Warszawa 1999.

About the autor

Justyna Jurczak – doctor of social science in the field of internal security. She is an academic teacher and researcher at the Institute of Prevention Service, the Faculty of Security and Legal Science at the Police Academy in Szczytno, Poland. Her main areas of scientific interests are: security methodology, strategic planning in the field of security, hate speech and hate crimes, mass events security and contemporary state threats. She has been involved in national and international security research projects.

