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Theoretical Aspects of Black Swan Scenarios and Predictable Events Techniques

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Abstract:
The need to know the future represents people's constant interest, manifested by the desire to see into the future. Therefore, the desire to know what is going to happen can have scientific characteristics, and the knowledge of the possible future can be foreshadowed by the use of certain correctly structured research topics, with the aim of obtaining forecasts. Particularly in the field of security, the evolution of a mechanism of anticipation can represent a point of rebirth of the methodology of security studies and a pragmatic way to analyze and construct strategic scenarios. Through the use of complete and coherent solutions aimed at practicing structured analytical techniques, the leaders of the political-military group have had access to scientifically based options in order to adopt a certain decision. However, in the security domain, it is difficult to control or define decisions subordinate to human will, this being the main impediment to anticipating the relations between the main actors at international. Scenario analysis, like other structured analytical techniques, is a complementary tool, not a substitute for the quantitative and qualitative methods of the social sciences. It is a tool that stimulates creativity, broadens perspectives, creates preconceived cognitive frameworks and generates new research questions. In addition, scenario analysis has another virtue, being a tool to support strategic planning that contributes to research, having political relevance in security and defense fields, That is, the research results adapt to the parameters of technical-political debates, becoming attractive for political decision-makers.

Keywords: *black swan, surprise event, impact event, international environment, scenario.*

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Scenario construction and analysis are two sides of the same coin. The scenario building process is fostered and challenged by analysis. It is a matter of asking and answering several questions like: "what if", imagining different faces of the future. (Barma Naazneen, Brent Durbin, Eric Lorber, Rachel Whitlark, 2016:117-135). Scenario building juxtaposes the possible outcomes of relevant causal variables in various expected and unexpected combinations in order to generate multiple future scenarios, some of them surprising but all of them plausible. For Michel Godety Pilippe Durance, "a scenario is an ensemble formed by the description of a future situation and the series of facts that allow the transition from the initial situation to the future situation". (Iver Neumann & Erik Overland, 2004:258-277)

According to Peter Schwartz, another reference author in future studies, scenarios are "narratives that can help us recognize and adapt to the changing aspects of the present environment". (Iver Neumann & Erik Overland, 2004:259) In order to differentiate it from "prediction", Heman Kahn chose the term "scenario", emphasizing its character as a fictional story. Scenarios are impressionistic images of possible futures that are created by combining different values of key variables. It has to be pointed out that the warping of some scenarios does not aim to predict the future, as Michel Godet states (Michel Godet & Philippe Durance, 2009:18): "all forms of prediction are illusionistic, and the future is not written, but is to be built. The future is multiple, indeterminate and open to a wide variety of possible futures". Certainly, knowing things in advance and what is going to happen is simply impossible, especially in the fields of study of Political Science and International Relations. Attention is directed to complex systems in which there are a large number of variables, with multiple interactions, unknown, with a high sensitivity to events and the influence of external factors of the system. The construction of scenarios does not aspire to capture all possible scenarios as their number would be unmanageable and the analytical technique would lose its usefulness, because, I insist, the goal is not to guess what will happen, but to learn from future alternatives. Intuitively, we tend to view the future as a projection of the present, with linear and incremental changes.

Multiple visions of the future help us become aware of possible disruptions, the causal relationships between the variables that shape the scenarios, the impact and relevance of change processes in general, and how they may affect a particular organization or state. (Iver Neumann & Erik Overland, 2004:278) One important thing is to overcome simplistic, linear, and deterministic views of the processes we want to change in order to avoid the mental biases that contaminate analysis, groupthink, tunnel vision, and other biases in calculating probabilities. Thus, making assumptions about unconventional values in the identified uncertainties is itself instructive and helps us to accept the discontinuity. On the other hand, scenario building aims at ordering and systematizing the enormous amount of available information by visualizing a limited number of future worldviews. In order do this, we divide knowledge between what we assume and what we know, and scenario analysis will be closely associated with strategic planning, which allows the identification of early warning signs and risk assessment of each course of action based on the identified uncertainties. (Michel Godet & Philippe Durance, 2009: 19) Scenario analysis itself is different from strategic planning, but we could say that it is a necessary precondition for it. (Iver Neumann & Erik Overland, 2004:257)

In turn, scenario analysis allows the implementation of an assessment prior to the strategy through the narrow vision of the future, thus increasing the sensitivity to the

different factors that would shape it. Scenario planning or their analysis has its origin in the military concept of the Second World War, in1940, but was consolidated as an organizational planning model in 1950 and introduced by Herman Kahn who worked for the United States Department of Defense. In 2003, Peter Schwartz writes "Inevitable Surprises", a book in which he delves into the field of the future based on events such as September 11, the war in Iraq, global warming and the development of China, as it turned out to be the future of humanity in the years that have followed. In recent years, scenario planning has revived interest in academia, where various methodologies for scenario design, development, and implementation have emerged. The word scenario has generated a lot of confusion, over time resulting in different meanings and concepts, but always having the same background of future thinking. In general, the words that relate to the definition of the scenario are: "planning", "imaginings", "projections" and "analyses" of knowledge. A first definition of scenarios says that they are hypothetical sequences of events constructed to focus attention on causal processes and decision-making. (Herman Kahn & Anthony Wiener, 1967: 250)

A simplified definition considers the scenario to be the description of a potential or possible future, exploring the joint effect of several events. A simplification of the concept would be to define scenarios as representing images or imagined paintings of potential futures. By capturing several images of the future we create the picture that can give us the uncertainties of the political, economic, military prospective of a state or organization. Since its inception, scenario planning has developed various methodologies, categorized into three major categories: the logical and intuitive one, the prospective one and the probabilistic/probable one. The first, the logical one, proposed by Herman Kahn, in 1967, was characterized by being a completely qualitative scheme based more on intuition and judgment than on scientific support. The first approach in employing quantitative methods was the introduction of structural algorithms and mathematical models to define and evaluate each stage. (Georgantzas Nicholas & William Acar, 1995: 25) Peter Wack was the first to develop a procedural methodology based on a series of well-structured steps, in which he admits qualitative methods, based on Kahn's conception. (Michael Porter, 1985: 250) Michel Porter introduces the term "industrial scenarios", stating that this type of scenarios are of an industrial nature under a macroeconomic approach.

Factors that contribute to improving the construction of scenario analysis:

✓ *Special subject knowledge* is an essential requirement. It would be frivolous to elaborate scenarios on an object of study about which we have only basic notions. Expert knowledge makes it possible to identify key actors, understand their interactions, recognize factors with strategic impact and carry out a detailed analysis of possible relationships between them. Expert knowledge is also needed in prospective surveillance, as it makes it possible to know critical information circulating in specialized forums and facilitates the detection of a process of change or even the beginning of a "black swan"; (Nassin Nicholas Taleb, 2018:29)

✓ *Imagination* is another important factor stimulated by collective reflection. If there is no other option, it is preferable to perform the analysis and construction of individual scenarios than not to do it at all. (Garry Peterson, Graeme Cumming, Stephen Carpenter, 2022) Optimal results appear when there is a multidisciplinary team of open-minded people who stimulate your imagination through brainstorming and collective reflection. In addition, seminars of experts not involved in the project can be organized, as a result strengthening the issue. For example, possible

scenarios of Romania's future geostrategic position in international relations issues in the Black Sea area will be outlined based on a workshop resulting from the collection of written information from specialized documents. For obvious reasons, creativity is the basis of creating scenarios, and there should also be a lot of boldness. If fifteen years ago a set of current events had been presented in the media, we would certainly have considered it false. Likewise, many of the milestones that will happen from now until the year 2032/'35 may seem crazy. This idea must be kept in mind in order not to censor the scenarios;

✓ *Using theories to articulate and inspire scenarios.* Theories help to explain reality because they are made up of principle, logical reasoning and hypotheses with a greater or lesser degree of contrast. It makes no sense to reinvent the wheel every time we approach a phenomenon. A theory-free scenario analysis exercise may be more useless than one based on a solid theoretical background; (Garry Peterson, Graeme Cumming, Stephen Carpenter, 2022)

✓ *Good knowledge of history,* in particular, that related to the field we are going to study. If we were to quote the words of Mark Twain, we could say that history does not repeat itself, but it rhymes. In addition to using historical analogies, it is interesting to carry out exercises that we could call retrospective: to go back ten fifteen years and identify the main factors that determined the current situation. Perhaps today some of these factors continue to play a key role in the evolution of mankind. A detailed knowledge of history provides perspective, reminds us that strategic surprises exist, and of course helps analyze the relationships between various factors with many nuances; (Paul Schoemaker, 1993: 193)

✓ *Experience.* Like many other skills, screenwriting technique is learned through practice. In other words, a knowledge of the whole probematic of events teaches us how to construct scenario; (Gill Ringland, 1997:6-18)

In its turn, scenario analysis allows the implementation of an assessment before the elaboration of a strategy on the future, increasing the sensitivity to the factors that can shape it. Once we have clearly focused on an idea regarding the development and analysis of scenarios and have noticed its importance, we want to see how they are constructed, taking into account the literature that considers the following steps important:

✓ Step 1. Defining the basic parameters of the analysis

In all research it is necessary to define: the object of study, the time horizon, the geographical area. For example: the external relations of Romania and the Great Powers in the 2032 time horizon; (Frances O'Brien, 2004: 709-722)

✓ Step 2. Identification of research needs

This step is transversal in each of the phases I will bring to light. As the technique is applied, I will discover gaps in information and assumed certainties will be called into question, which is why they need to be researched. Research is another virtue of scenario analysis that helps us discover the unknown of relevant problems. The identification of research needs is also applied to the final phase of prospective monitoring, aimed at tracking the evolution of indicators. Moreover, the results can be made concrete through an updated list of sources; (Peter Schwartz, 1996:120)

✓ Step 3. Identification of the main actors involved

Continuing with the example of step 1, in addition to Romania, it would be necessary to include international actors as well as other particularly relevant external actors; (Walker Storberg, 2003:211-222)

    ✓   Step 4. Identifying the basic trends and their impact

These are major trends that will significantly affect the reality we are studying and will most likely remain active, or intensify during this research. Trends represent the essential part of the context that will condition the future and could be translated as engines/drivers of change. In other works, there is a distinction between trends and engines/drivers, understanding the former in a broader and more comprehensive way. The selection of megatrends logically depends on the subject under study, but in any case it is advisable to carry out an exploration covering all relevant dimensions. (Pierre Wack, 1985) This can be helped, for example, by the STEP analysis which comes from the acronym political, economic, social and technological, but it is also called PEST or PESTEL, two more letters can be added which come from ecological and legislative. To stimulate the imagination about the impact on the research itself, it can also be useful to carry out a SWOT analysis. In the case of scenario development, we must take into account megatrends that will continue to exist. An example of a megatrend, which represents a phenomenon of uncertainty for Romania, can be the population that is in full aging process. In other cases, geographic constraints or natural resources may be relevant to the subject being studied. They are, therefore, variables whose value in "X" years can represent a high degree of approximation;

    ✓   Step 5. Identification of key uncertainties - game changers

In the Global Trends documents these uncertainties are called "drives game changers". It is about imagining what can significantly affect the future evolution of our object of study and whose behavior is less predictable than that of underlying trends. In order to examine the various dimensions in search of game changers, it is also convenient to resort to SWOT and PESTEL techniques or a combination of both. (Susan Lynham, 2002:221-241) After identifying a first set of variables, all significant, it is convenient to assign each a numerical value according to its impact and level of uncertainty. 20Once this is done, we must pay special attention to the variables that have a high level of impact and uncertainty, since many relevant scenarios can be derived from them. In other situations, it will not be appropriate to just distinguish between stable trends and key uncertainties, but it will be necessary to identify all the drivers in the same sequence through a traditional strategic analysis. For example, in the case of a recent armed conflict, where it is difficult to identify stable trends, the choice of one or more methods of analysis is not subject to only one criterion, and depending on the system we are analyzing and, depending on time available, it may be advisable to apply a cross-impact matrix analysis of the factors that make up the system to know their levels of influence and dependence. Identifying the driving forces of the future, which as mentioned before, include both stable trends and key uncertainties, is the most important task of foresight work, because it is this identification that connects the present to alternative futures.

    The "black swan theory", or the event of "black swan" type is a metaphor that encapsulates the concept of a surprise event with a strong impact. The theory was developed to explain:

    ✓   The disproportionate role of large impact, difficult to predict and strange events that are outside the field of normal expectations of history, science, finance and technology;

    ✓   The incompatibility of the probability of rare consecutive events using scientific methods – due to the very nature of small probabilities;

✓ Psychological biases that make people individually and collectively blind to uncertainty and unaware of the massive role of the strange event in the historical field.

Unlike the previous "black swan" philosophical problem, the "Black Swan theory" refers only to large-scale unexpected events, their consequences, and their dominant role in history. These events, considered extreme exceptions, collectively play much larger roles than ordinary events. Black swan events were described by Nassin Nicholas Taleb in his book from 2007– revised and completed in 2010. Nassin Taleb refers to almost all great scientific discoveries, historical events and artistic achievements as "black swans" – undirected and unexpected. He points to examples of black swan events: the Internet, World War I, the 9/11 attacks. The term black swan is a Latin expression, the reference of which means, a rare bird on earth similar to a black swan. When this phrase was coined, it was assumed that the black swan never existed. The importance of similitude lies in its analogy with the fragility of any system of thought. A set of conclusions can potentially be eliminated once any of its fundamental postulates are disproved. In this case, the observation of a single black swan would invalidate the underlying logic of the sentence, as well as any reasoning that will follow from that underlying logic. In 16th century London, the above phrase was considered a London idiom which derived from the old world assumption that all swans must be white, as all historical records of swans reported that they had white feathers. In that context, a black swan was impossible or at least non-existent.

After a London expedition led by the explorer Willem de Vlamingh on the Swan River in 1697, in which he discovered black swans in Western Australia, the term was transformed to indicate that a perceived impossibility could later be disproved. Specifically, Nassim Taleb says: "what we call a black swan actually represents the triplet of the following words: rarity, extreme impact and retrospective predictability." (Nassin Nicholas Taleb, 2018:29) A small number of black swans explains almost everything in our world, from the success of ideas and religions, to the dynamics of historical events, or the events of our personal lives. (Nassin Nicholas Taleb, 2018:30) Based on the criteria mentioned by the author, we can identify the following characteristics of black swan events:

✓ The event is a surprise;
✓ The event has a great impact;
✓ After a first analysis, the event could have been an expected one - for example: the relevant data were available, but were not observed.

The main point of Nassin's book is not to try to predict black swan events, but to build resilience to the negatives that arise in order to take advantage of the positives. Nassin argues that banks and commercial firms are extremely vulnerable to black swan events, being exposed to larger than predicted losses. Nassin refers to epistemological limitations in some parts of the domains covered by decision-making. These limitations are of two types: philosophical-mathematical ones and known human epistemic biases. The philosophical problem is about the decrease in knowledge when it comes to rare events, because they are not visible in past samples and therefore require a strong priori, or what we might call a theory of extrapolation. Consequently, events depend more and more on theories when their probability is small. (Nassin Nicholas Taleb, 2018:31) If we look into another part of knowledge we can say that it can be uncertain and the consequences are great, requiring even greater robustness. Before Nassin Taleb, some clarification was needed for those familiar with the notion of the improbable, such as

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David Hume, John Stuart Mill, and Karl Popper, who focused on the problem of induction in logic, specifically that of drawing general conclusions from specific observations. Nassim Taleb's Black Swan event has a unique, high-impact core attribute. His argument is that almost all events have consequences from history and come from the unexpected, and people have convinced themselves that these events are explainable in hindsight/prejudice.

One problem, taken into consideration by Nassin, would be the playful label, whereby the unstructured randomness found in life resembles the structured randomness in games. This follows from the assumption that the unexpected can be predicted by extrapolating variations in statistics based on past observations, especially when these statistics are assumed to be samples of a bellshaped curve. These concerns are often highly relevant in financial markets, where major players use risk models, which imply a normal distribution, although market returns often have substantial distributions. (Nassin Nicholas Taleb, 2018:32)

More generally, decision theory, based on a fixed universe or model of possible outcomes, ignores and minimizes the effect of events that are outside the model. For example, a simple model of daily stock market earnings might include extreme movements such as Black Monday 1987, when markets around the world crashed, but it cannot model the market crash after the attacks of September 11, 2001. For an event to be determined as a black swan event, it must meet three requirements:

- ✓ To be rare;
- ✓ To have a big impact;
- ✓ Despite its rare condition, human nature must invent explanations for its existence, to turn it into an explainable and predictable falsehood. (Nassin Nicholas Taleb, 2018:34)

According to Nassin, a small number of black swans are able to explain almost everything about our world, from the success of ideas and religions to the dynamics of events in our personal lives. Nassin's book can be considered, in itself, a black swan, in which the author tries, through explanations and narratives full of anecdotes, to explain how human beings think they know more than we really do. It is also a lucid reasoning about the folly of reducing the complexity of the social, psychological, financial, historical world to simple phenomena that never predict anything, since almost everything we see is created by the phenomenon of noticing certain aspects of accidental scientific discoveries. That's why the black swan theory is what we usually call model risk. That is, more dangerous than a bad model is a model that has worked so far to explain the reality and now it can be believed it can also serve to explain the future reality. (Nassin Nicholas Taleb, 2018:45)

Some examples of black swans that could turn things around.

In the event of a significant US withdrawal? This hypothesis envisages a withdrawal of the USA from its position as a security stronghold in South-Eastern Europe, as a consequence of the occupation of Ukraine by Russia, of the policy of Russification carried out by Russia in this area of Europe, and as a result of a greater energy independence. Following the secret treaties signed between China and Russia, the two states will turn Ukraine into a buffer country with a majority population of Chinese origin. In this situation, we can say that Washington will only deal with its domestic institutional and financial problems. Firstly, there would be a slow reduction in the military budget, although new developments such as drones and digital surveillance

could supersede this problem. At the same time, the US could increase its influence through new trade agreements. A hypothetical return to isolationism could fuel rivalries among the Great Powers for control of the sphere of influence. For this reason, the ability of Americans to collaborate with new partners will be the key of the world configuration in 2040.

What if China collapsed? In this scenario, Beijing faces many problems: an overvalued real estate market, high local debt, an opaque banking system, an aging population, rising labor costs, territorial disputes, rising pollution, energy dependence, food insecurity, corruption and shortages institutional. In the absence of statistics, and given the uncertainty generated by a political system not subjected to the test of an economic recession, many analysts speculate a collapse of the Asian giant. An economic imbalance would severely affect commodity exports, strain and disrupt the US financial situation, and destabilize global stability. In fact, a negative but more likely scenario would be that China's economy would fall into a middle-income trap, in other words, it would stagnate in the per capita income between $5,000 and $12,000 per year. In such a situation it would be unable to regain its share in the international market through a low workforce.

What will happen if the Eurozone disintegrates? The disintegration of the Eurozone could trigger a widespread suspension of payments that would immediately plunge the entire global financial system into great chaos. European countries that do not have a strong financial system will feel a decrease in the purchasing power of their national currency, and inflation and costs would skyrocket. The impact on the global financial system would be systemic and would likely lead the world economy into a prolonged recession. Ultimately, the European single market would be suspended and the credibility of the European Union would be hopelessly undermined. For Romania, the collapse of the European Union would represent a great collapse, a social, political and military imbalance.

In the event of a technological collapse of considerable proportions? Given the complexity of the technological environment, a massive failure could affect critical management and infrastructure systems causing plane, rail, or power plant accidents. In many areas of activity, the development of technological and computer networks has exceeded our ability to manage them, which can give rise to serious problems. For example, an error in high-frequency automated trading in the stock market could create a major financial panic. Technological progress and the growing share of non-state actors can make states more vulnerable to asymmetric shocks. Increasing access to advanced technologies by state and non-state actors could lead to system failures through the emergence and rapid spread of cyberterrorism.

Conclusions

In conclusion, the use of tangible scenario planning in strategic planning brings many advantages, such as making key decisions in an operational area and reducing risk by ignoring small changes within the organization. However, scenario planning is only effective in contexts where the reason for building them is known and cannot be used in every situation. It is important to establish indicators to detect if a scenario is becoming a reality and scenario planning does not end with their design. Scenarios should be developed in an organization to study the factors of a situation and identify threats, opportunities, various approaches, evaluate alternative policies and actions, and increase creativity in decision making. Although scenario planning is an area of study related to

strategic planning, there is increased interest in the use of these tools in academia and business following the development of various methodologies. History is not just a sequence of inevitable events, but can be changed by unforeseen events like black swans. Globalization multiplies the effect of these events and can affect the world economy in a rapid and asymmetrical way. Examples of recent black swans include the COVID-19 pandemic and the armed conflict in Ukraine, which have had strong repercussions on markets and put the global recovery at risk. The Russian invasion of Ukraine represents one of the most significant humanitarian crises in Europe since the Second World War.

References:

Barma Naazneen, Brent Durbin, Eric Lorber, Rachel Whitlark, (2016), *Imagine a World in Which: Using Scenarios in Political Science*, International Studies Perspectives, nr. 17, pp. 117-135

Frances O'Brien, (2004), *Scenario planning*: L*essons for practice from teaching and learning*, European Journal of Operational Research, pp. 709-722.

Garry Peterson, Graeme S. Cumming, Stephen R. Carpenter, (2003), *Scenario Planning: A Tool for Conservation in an Uncertain World*, Retrieved from: https://www.jstor.org/stable/3095355

Georgantzas Nicholas, William Acar, (1995), *Scenario-Driven Planning: Learning to Manage Strategic Uncertainty*, Quorum Books. New York, pp. 20-25.

Gill Ringland, (2003), *Scenario planning: persuading operating managers to take ownership.* Retrieved from:https://www.researchgate.net/publication/263309815_Scenario_planning _persuading_operating_managers_to_take_ownership

Herman Kahn, Anthony Wiener, (1967), *The year 2000, a framework for speculation on the next thirty-tree years*, The Hudson Institue, Washington, pag. 250.

Iver Neumann, Erik Overland, (2004), *International Relations and Policy Planning: The Method of Perspectivist Scenario Building*,International Studies Perspectives, nr. 5, pp. 258-278

Michel Godet, Philippe Durance, (2009), *La prospective estrategica para las empresas y los territories*, nr. 10, pp. 18-19

Michael Porter, (1985), *Competitive advantage: creating and sustaining superior performance*, New York, pp. 250-275.

Nassin Nicholas Taleb, (2018), *Lebăda Neagră: Impactul cel mai puțin probabil*, Editura: Curtea Veche Publishing, București.

Paul Schoemaker, 1993, *Multiple Scenario Development: Its Conceptual and Behavioral Fondation*,Retrieved from: https://www.jstor.org/stable/2486922, pp. 193-213

Peter Schwartz, (1996), *The Art of the Long View: Planning for the Future in an Uncertain World,* Currency Doubleday, New York, pag 122.

Pierre Wack, (1985), *Scenarios: Shooting the Rapids. Harvard Business Review*, Retrieved from: https://hbr.org/1985/11/scenarios-shooting-the-rapids

Susan Lynham, (2002), *The general method of theory-building research in applied disciplines*, Advances in Developing Human Resources, nr. 4, pp. 221-241.

Walker Storberg, (2003), *Comparison of the Dubin, Lynham, and Van de Ven Theory-Building Research Methods and Implications for HRD.* Human Resource Development Review, Sage Publications nr. 2, pp. 211-222.

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