Methodology of Future Security Studies

The Proposal of New Prognostic Method for the Creation of Security Forecasts

Jan Valouch, Hana Urbančoková
The Faculty of Applied Informatics
Tomas Bata University in Zlin
Zlin, Czech Republic
e-mail: valouch@fai.utb.cz, e-mail: urbancokova@fai.utb.cz

***Abstract* – The security futurology is the science of the future, which deals with the theory, study and creation of variants of possible developments in the security situation. When creating reliable forecasts, it is necessary to use the scientific methods. Futurologists use a wide range of qualitative and quantitative forecasting methods. This article describes the basic assumptions of the proposal of a new universal prognostic method. An important aspect of the proposal is the efficiency, reliability, speed and the verifiability of method of forecasting of the security situation. An universal prognostic method for the creation of security forecasts does not currently exist.**

Keywords-security futurology; forecasting methodology; security forecast; security situation; futurologists.

I. INTRODUCTION

Futurology (also called futures studies) is an interdisciplinary science which aims to create forecasts in the form of visions and scenarios of possible developments. These forecasts are based on the application of rational and scientific findings and methods. Security is a subject of theoretical research, as a specialized part of social sciences. A part of future studies is a security futurology, which deals with the future and development of the security situation in social groups, objects, sectors, companies, regions, states, the universe, etc. Security futurology field includes:

- Military security,
- Economic security,
- Political security,
- Societal security
- Cultural security,
- Environmental security [1].

Besides the above mentioned sectors of security, many specific types of security exist, e.g., cyber security, data security, network security, energy security, food security, public security, human security, communications security, etc. [1].

Future studies are also classified according to the approach to the creation of a forecast into the following two groups:

- Explorative futurology (the aim is to search for answers to the question "What happens if….?"),
- Normative futurology ("What must be done for something to happen ....?").

Many predictions (technology, military, information technology (IT) security, etc.) were mistaken. For example: "I think there is a world market for maybe five computers," (T. Watson, CEO of IBM, 1943), “Cellular phones will absolutely not replace local wire systems,” (M. Cooper, inventor, 1981), “I predict the Internet in 1996 [will] catastrophically collapse,” (R. Metcalfe, 3Com, 1995), etc.

In the case of forecasting security situations, reliable and verifiable forecasts must be processed that help especially in the decision-making. Forecasts can be verified in several ways (application of multiple methods, expert correction, etc.). Other benefits of futurology studies include:

- Warning of the impacts of adverse developments,
- Support in seeking optimal solutions to the problems of society,
- Forecasting of future states,
- Support the preparation for the negative impacts
- Search for new ideas and of long term targets,
- Learning, extension of knowledge of stakeholders,
- Adaptation, increasing the ability to adapt.

Prognostic methods should permit the processing of forecasts in accordance with the fundamental principles of prognostication (complexity, systematicness, verifiability, determination, continuity, coordination, fortuitousness, efficiency, focus on practice, dynamism, quantification, method, etc.) [2].

Futurologists use a lot of scientific methods for predicting the future, but there is no universal method that can be used in forecasting of the security situation [5]. The procedure for designing new methods should include:

- Analysis of the subject of security futurology,
- Comparison of forecasting methods,
- Reliability analysis of forecasts of security development,
- The relationship between attacks (threats) and the technology and tools,
- A proposal of the optimal process of security forecasts formation
- A proposal methods and tools,
- Availability of techniques and tools, processing large volumes of data.

 ISBN: 978-1-61208-493-0

Section 2 describes the basics of forecasting methodology. A summary of forecasting methods is presented in Section 3. All specific methods will be explained in greater detail in future works.

There is no universal method that can be used in forecasting of the security situation. The main objective of this proposal is fast and reliable forecasting method. This method should be based on the specifications of the individual sectors of security.

II. METHODOLOGY OF FORECASTING

Future studies in their current form mainly include forecasting, planning, programming, future studies, future research, technological and social forecasting (foresighting), creation of alternative scenarios, the construction of indicators of future development etc.[5]

The prognosis is a key outcome of the process of forecasting. The prognosis is a statement about the future of the object or condition that is based on scientific facts. The prognosis does not indicate what will happen, but what could happen [6].

The forecasts should be based on the analysis of regularities of social and economic development, identification and evaluation of social needs and interests, identification and evaluation of economic and security goals and development priorities.

Basic phases of forecasting include:

- Identifying and defining the problem of prognosis,
- Preparation of process of developing forecasts
- Obtaining information,
- Sorting of information,
- Analysis of information
- Select suitable methods for creating forecasts,
- Implementation of selected methods,
- Elaboration forecasts,
- Stylization of forecasts,
- Verification of forecasts [5].

III. FORECASTING METHODS

Futurologists use a lot of scientific methods for forecasting the future. Application of an appropriate method is dependent on many factors, such as fields, type, range and target of forecast, time horizon, available data, knowledge and experience, etc. During the processing of a forecast, a combination of several forecasting methods is usually used. A basic classification of forecasting methods includes:

- qualitative methods
- quantitative methods [3].

Qualitative methods are based on knowledge, experience and opinion of experts. These methods are also referred to as subjective, reflection or intuitive. These methods are used in situations where there is not enough data from the past. The advantage of quantitative methods is the use of a relatively large amount of expert information. Conversely, the disadvantages are unsystematic evaluation of acquired information and also bias of experts. These methods are more suitable for long-term prognosis [4].

Quantitative methods (also referred to as objective methods, statistical methods) are based on application of statistical analysis of historical data [10]. These methods use mathematical models and equations for determining of time horizons in the future. These methods assume that the identified trends and their measurable indicators will continue well into the future [7]. The main advantage of the application of quantitative methods is an objective and accurate verification of predictions. These methods are suitable for the formation of short- and medium-term forecasts [2].

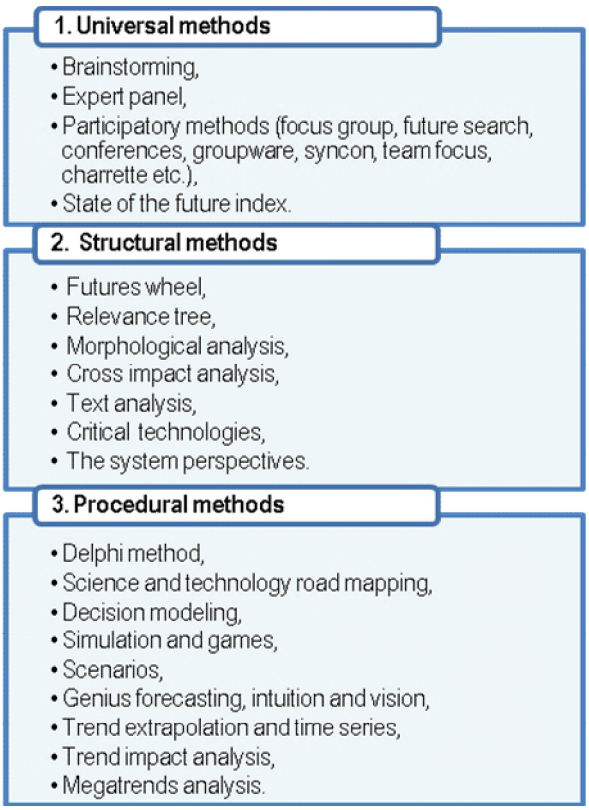

Figure 1. Classification of forecasting methods

In contrast to the aforementioned classification of forecasting methods in accordance with the degree of subjectivity, the same group of methods can be classified also according to the application within the prognostic activities:

- Universal method
- Structured methods,
- Procedural methods [3][4].

Universal methods are widely used and are suitable for processing of most types of forecasts within different time periods and different sectors. Structural methods are applicable in identifying and exploring the object of interest and its structure. Procedural methods are used primarily for processing of chronological sequence analysis of monitored indicators in different periods of time. Procedural methods are particularly suitable for creating of development trends of monitored objects to the future [7][11].

 ISBN: 978-1-61208-493-0

Figure 1 shows the list and classification of forecasting methods. A more detailed explanation of the methods can be found in [4].

IV. APPLICATION OF METHODOLOGY

The new method (universal quantitative and qualitative method, which is based on the specifications of individual sectors of security) can be applied for example in military security. Military security includes, for example, the following predictions:

- Military conflicts,
- Arms spending,
- Development of missile technology,
- Development in military structures, organizations,
- Development of the number of persons in the armed forces, and determining the roles of the armed forces,
- The cooperation of the armed forces and their participation in the Alliance,
- Methods of warfare,
- Content of military doctrinal documents,
- Military art, strategy, operational art, tactics,
- Military education,
- Development of science and research in the military,
- Method of preparing troops,
- Military capabilities,
- The possibility of the defense industry, etc.

The new approach is especially well suited for predicting military security [8][9].

V. CONCLUSION AND FUTURE WORK

Futurologists use a lot of scientific methods for forecasting the future. The field of security futurology uses universal, structural and procedural methods. There is no universal method that can be used in forecasting of the security situation. The new method should be based on the specifications of the individual sectors of security (military, political, societal, economic and environmental security). The method should combine and optimize the qualitative and quantitative methods. Scenario methods are very useful for predicting the security situation. An important requirement is the rapid collection of expert and statistical data and processing them using computer technology.

REFERENCES

[1] J. Eichler, International security in the early 21st century. Prague: DoD CR, AVIS, 2006, 304 p. ISBN 80-7278-362-2. In Czech.

[2] J. Valouch, “Forecasting methodology”, in Security Technologies, Systems and Management , vol 5, Czech Republic Zlín: VeRBuM, 2015, pp. 34-50. ISBN 978-80-87500-67-5. In Czech.

[3] M. Potůček (ed.), Manual of forecasting methods. Prague: Sociological publishing company (SLON). 2006, 196 p. ISBN 80-86429-55-5. In Czech.

[4] N. Slocun, Participatory Methods Toolkit. A Practitioners Manual. Brusels: King Baudouin Foundation, 2003, 167 p. ISBN 90-5130-447-1.

[5] F. Petrášek, Futurology study. Prague: Oeconomica. 2009, 274 p. ISBN 978-80-245-1517-5. In Czcech.

[6] M. Zeman, Cautionary forecasting. Prague: Horizont. 1998, 200 p. ISBN 80-7012-095-9. In Czcech.

[7] L. Buřita, “Prognostic methods and their applications in the defense sector”, in: Defence and Strategy. vol 1, Czech Republic, Brno, 2015, pp. 47-60.

[8] J. Valouch, “Basics of security futurology”, in Security Technologies, Systems and Management , vol 5, Czech Republic Zlín: VeRBuM, 2015, pp. 17-33. ISBN 978-80-87500-67-5. In Czech.

[9] O. Vejmelka, Military explanatory dictionary of selected operational concepts. Prague: DoD Czech Republic, 2004. 359 p.

[10] World futures studies federation. [online]. c. 2016. Available from: http://www.wfsf.org/. [retrieved: May, 2016]

[11] S. Hendrych, The Treatise on futurology. [online]. c. 2015. Available from: www.hendrychst.cz /. [retrieved: June, 2016]