

LONG-TERM FORECAST THROUGH DELPHI METHOD OF THE RISK GROUPS THAT ARE A THREAT FOR THE NATIONAL SECURITY OF REPUBLIC OF BULGARIA IN THE NEXT 15 YEARS

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ABSTRACT: THE DELPHI METHOD WAS DEVELOPED BY THE US COMPANY RAND CORPORATION FOR THE REALIZATION OF A LONG-TERM FORECAST IN THE SCOPE OF 5 YEARS TO 30 YEARS. IT SYMBOLIZES THE NEED FOR AN EXPERT KNOWLEDGE WHICH NOWADAYS IS GENERATED NOT WITH THE AID OF INTUITIVE FORMS, BUT WITH THE USE OF SCIENTIFIC TECHNOLOGIES. THE METHOD WAS APPLIED BY A TEAM, IN WHICH THE AUTHOR WAS PART OF, IN ORDER TO FORECAST THE FUTURE RISK GROUPS THAT WILL PREVAIL IN THE NEXT 15 YEARS IN THE BULGARIAN SOCIETY AND WHICH WILL BE A REAL THREAT FOR THE NATIONAL SECURITY OF REPUBLIC OF BULGARIA.

KEY WORDS: STRATEGIC CENTER, RESEARCH CENTRE, NATIONAL SECURITY, LONG-TERM FORECAST, RISK GROUPS, THREAT FOR THE NATIONAL SECURITY. IT SYMBOLIZES THE NEED FOR AN EXPERT KNOWLEDGE WHICH NOWADAYS IS GENERATED NOT WITH THE AID OF INTUITIVE FORMS, BUT WITH THE USE OF SCIENTIFIC TECHNOLOGIES.

THE term Delphi cannot be taken synonymously. Many things identify with it – the ancient Greek polis of Delphi, Delphi – the computer programming language, as well as the method for expert evaluation and forecast – the Delphi Method.

THE Delphi Method for forecast and expertise was developed in 1953 by Olaf Helmer, Norman Dalkey, and Nicholas Rescher at RAND Corporation for research of military-strategic and military-technical problems.

RAND /RAND CORPORATION/ is an American strategic and research centre whose activity is focused on educational activities and charity in the interest of the social welfare and the national security, development and defining of new methods for analysis and new concepts.

THE DELPHI METHOD /DELPHI/ is also known under the names of the *Delphic Method* and the *Method of the Delphic Oracle*. They derive from the Greek town of Delphi, located at the foot of Mount Parnassus. There was a temple of Apollo there, who was famous for his oracle. The oracle for the ancient people was a sacred creature, through which the divinity spoke. The task of the oracles was mainly to forecast the future. Today, the DELPHI Method symbolizes the need for an expert knowledge which nowadays is generated not with the aid of intuitive forms, but with the use of scientific technologies.

As already noted, DELPHI was formulated at the beginning of 1950 by a RAND team. [2], [11], [22] Since then, the method has been applied in hundreds of researches worldwide, whose aims are various subjects like forecasting of social and political processes, long-term development of the technologies, the health consequences from the different concentrations of atmospheric pollutants, the safety of the components of nuclear reactors, etc. The method proves to be a practical and efficient way to reach to a fair evaluation of the reality in an insecure environment. In other variants, like for example the political matters, DELPHI is used for normative and research works, especially in the field of social policy and public health [21], like a communication technique, for interactive decision making and e-democracy. [4]

DELPHI is based on the principle that forecasts or decisions made by a structured permanent union of individuals are more accurate compared to those made by the unstructured groups. [8] This is designated with the term "collective mind". [14] This technique can be adapted for meetings of the *face-to-face* type, which is designated with the term *Mini-Delphi* or *Forecast discussion for evaluation*. Delphi is widely used for forecasting in business and in this case it has certain advantages over other structured approaches for market forecasting. [15] DELPHI is used mainly to facilitate the expert decision making of a group. [13]

THE DELPHI method is developed as a response to problems, connected with the conventional methods for evaluation and attitude formulated by a group, like the focus groups for example, which can create problematic and biased responses, due to the dominant opinion of self assertive and powerful leaders. [17] This method can be used for planning future actions, about possible scenarios as well as their social-economic consequences. For example it is widely used to generate forecasts in the field of technologies, education and other fields [12]. In its basis, the method serves to cast light on a situation, to define its priorities and develop future scenarios.

THE gist of the method lies in the structuring of the process to group communication and it is aimed at the creation of conditions for effective work group of experts on a complex problem. The DELPHI method is founded on independent questions, which allows to define the probability, significance and consequences of factors, tendencies and events, connected with the discussed problem. [10], [11], [21]

THE procedure for solving problems with the DELPHI method includes the setting up of two groups: 1. work group and 2. expert group. [2]

THE *work group* plays the role of an organizer and leader at the development of forecasts and coordinates the overall activity for the creation and shaping of the concepts of the future development. Its members have to be well aware with the technology of the method.

THE *expert group* includes prominent specialists in the respective field. The choice of experts is one of the most difficult and important tasks, whose solution to a greater extent conditions the specific results. The experts must not only be good experts in the given field, but also be broad minded, to be able to see the links of the forecast processes with the other processes and phenomena, as well as the consequences from them, to have a certain dose of imagination and creative potential.

ONE of the most important procedural questions in the use of DELPHI is to choose the *right way of communication between the work group and the experts* – usually this happens via mail. The experts generate ideas independent from one another, while filling the first questionnaire, sent by the work group, and after that return it back. The members of the work group make a general conclusion from the responses as a group consensus and send anew this conclusion with a second questionnaire, which requires the confirmation of the opinion of the respective expert. Based on this conclusion the polled, anew and independently evaluate their previous responses. The main idea is that a position, accepted with a consensus leads to a better solution after several rounds of anonymous group evaluation. The procedure can continue several rounds, but no significant change happens after the second one. [2], [15]

AN important feature is that the experts do not gather at a joint discussion. Usually the specialists are many, coming from different fields, and they are approached with a letter, asking for their expert evaluation on a given problem. The received expert-evaluations are examined and sent back to the experts but exchanged, i.e. the expert A's evaluation is given to expert B, and the expert B's evaluation to expert A and etc, with the requirement to give their opinion on them. This allows each expert, while getting acquainted with different evaluation to correct his or her position of to ground his or her thesis in a better way and to evaluate the evaluation sent by another expert. Thus, through the way of integration, of the consecutive clarifications, a finer decision is reached than it would have been reached just on the basis of the initially received evaluations. In essence, through the DELPHI Method and its procedures the process for collecting and analysis of information is optimized. This method is a systematic approach towards the collective thinking, carried out through feedback of the opinions. The fact, that it takes as a base the individual intuition and the observations of many scientists and specialists makes it extremely useful for the management of a number of social-economic processes and management of the social organizations. [11]

The DELPHI Method could be used at the solution of different economic, political and social problems, connected with the national security of each country. There are various paths for its practical application at:

- development of various forecasts and plans;
- designing the directions of the innovative activity;
- evaluation of the consequences of polluting the environment;
- development of social policy and social strategies;
- looking for opportunities for better use of the factors of production;
- looking for reserves for increasing the economic activity, etc.

THE forecasts, based on DELPHI, are an attempt to predict the development of one or another side of the national security and they are within a perspective from 20 to 30 years. This prognostic method was used for the first time outside the USA in Japan for the aims of the national and field technological forecasting. A total 6 researches have been conducted there since 1970. Later on, following the Japanese example, such forecasting researches have been conducted in Germany, France, Great Britain, Spain, South Korea, among others. The peak of this method came after the 1990s.

THE number of the experts, Delphi-participants, in these countries is different – from 123 in Spain to 25,000 (during the first stage) in South Korea. They have been chosen according to different criteria, among which: level of scientific and research activity in a

given field, participation in the creation of the national welfare, improvement of the quality of life, competitiveness, expected deadlines for the implementation of new developments.

JAPAN not only has the longest history in the realization of forecasting evaluations of the national technological development among all countries worldwide, but also has the most effective practice in the use of these forecasts in terms of the overall orientation of the national scientific and technical fields. The management of the science and technology in the country is coordinated through strategic research programs, fundamental applied researches of different institutes, which carry their opportunity for the technological forecasting.

THE governments of Latin America and the Caribbean successfully use the DELPHI Method in the public-private sector as a way to identify the most urgent challenges in front of the regional and national policies. A result of this is the fast changes both in the whole society and by means of the technological policy. In this sense, the DELPHI Method can contribute to the overall estimate for the realization of policies. [14]

A number of methodological innovations have been introduced in the use of the DELPHI technique since 1970s.

THE main innovations in the use of the method are coming from the use of computer-based and later on web-based DELPHI. According to Turoff and Hiltz, in the computer-based DELPHI [25]:

- the iteration of DELPHI, which is divided into three separate circles, can be exchanged by a single process of uninterrupted interaction, which allows the participants to change their evaluations at any time;
- the statistical response of the group can be updated in real time and can be shown every time when some of the participants submit a new evaluation.

ACCORDING to Bolognini, the web-based DELPHI offers two more possibilities, which are significant in the context of the interactive politics and the e-democracy. [4]

THE *web-based communication structures Hyperdelphi* [25], [27]:

1. They allow the participation of a big number of participants.
2. As a matter of fact, it can be used two or more levels, representing different groups of the society, such as politicians, experts, citizens. The coordinator may assign them tasks, mirroring their different roles and experience and make them interact in the scope of the communication. For example the politicians and experts may interact in the scope of the main panel, while they receive information, provided by a *virtual community* of citizens, associations, etc., participating as one side of the discussion. These web-based communication structures he calls *Hyperdelphi (HD)* and they provide bigger flexibility and adaptivity of the interactive character of the digital communication. [27]

THE DELPHI Method has both its strong and weak sides.

THE strong sides of DELPHI are connected with the fact that it allows the experts to work semi-asynchronously and thus, that the participants may respond to ideas better grounded. The discussion happens within the range of a period of several days via the use of e-mail. Some worrying manifestations of the group dynamics are removed, which arise at the decision-taking process, such as the impact of highly charismatic or authoritative individuals or participants who are in the position to dictate opinions. It also allows the participants to revise in a better way their opinions, hidden behind the anonymity.

THERE are researches supporting the strong sides of DELPHI – they belong to L. Albertson and T. Culter [2], P. Clifford [3], O. Helmer [11], M. Turoff and S. R. Hiltz [25], Ch. Colton and T. Hatcher [27]. These researches show that overall this method is useful at the research of specific problems of the social reality. The support for its use in complex, multi-modeling is smaller. In this case it is assumed that the data received through the DELPHI Method acquire significance when supported by the data, gathered through other sources.

THE advantages of the method are linked to a greater extent with the anonymity of the evaluations. The adherence to the anonymity principle removes the negative psychological effect, borne by the stifling influence of the authorities or the direct imposture of own ideas. Apart from that the controlled feedback allows the experts to take into consideration some circumstances that have been out of their consideration so far.

BUT the strongest side of the method is the participation of well-read specialists-experts, which guarantees the high scientific character and reliability of the forecasts. The method enables to get the best of the knowledge and experience of the most qualified experts in an easy and fast way.

AT the same time *the weak sides of the DELPHI Method* cannot be saved.

ACCORDING to Rowe and Wright [18], [19], the DELPHI Method serves as a "last resort" and it can be used only when there are no other techniques and methods, suitable or accessible for discussion and evaluation of a problem. A. Green and Graefe [8] consider that the main problems, arising at its application include: bad internal concordance and reliability of the final solutions between the experts and consequently the reproductivity of the forecasts on the basis of the achieved results.

B. SMITH [22] warns on the ambiguity that appears sometimes in the questionnaires, used for data collection; difficulties in the final evaluation of the expertise offered by the participating experts.

ONE of the main problems pointed out in researches in the field of implementation and application of DELPHI's researches is the tendency for over-simplification of the asked specific questions or for viewing them as an isolated event. This is very important in the case of forecasting, when the experts tend to think of linear, consecutive events, rather than the application of a full approach, which includes complex chains and associations. This leads to the development of other techniques and multiplication effects, connected with scenarios, pointed out by the participating experts. [1]

THERE are a lot of cases when the method yields poor results. Some authors explain this with weaknesses in the application of the method, rather than with weaknesses in the method itself. Also, it must be clear that the degree of uncertainty in areas such as science and technologies is so big that the precise and true forecasts are impossible, and this field presupposes a high degree for error.

ANOTHER peculiar weakness of the DELPHI Method is that the future development is not always forecast correctly with a consensus of experts. Sometimes unusual thinking may fall under the influence of the expert thought of the majority.

FOR the needs of education the DELPHI METHOD is being realized with university lecturers and students of the Social Works Department. The author of this article is also

part of the realization of Delphi Method. The basis of the school-simulated method is to forecast *which risk groups will prevail in the Bulgarian society in the future and in what way they will define the state of our national security.*

CHARACTERICS OF THE REALIZED METHOD:

1. TEAMS FOR REALIZATION – 2

1.1. WORK TEAM – two academic lecturers and a student.

1.2. EXPERT TEAM – five experts from different social institutions, with longtime experience and contribution to the social works system.

2. TYPE OF COMMUNICATION BETWEEN THE TEAMS – sending the information electronically.

3. TIMING – 7 days, of which 2 days for preparation and selection of the techniques, 3 days for the rounds and 2 days for the final summarizing and analyzing of the results.

4. WORK CARD – *Question for discussion by the experts:* Which will be the risk groups in the next 5-10 years, which will be a threat for the national security of the Bulgarian society?

Possible responses /closed-ended questions in the work card/: long-term unemployed; unemployed young people; disabled and chronically ill people; elderly people/ pensioners; closed ethnic groups; large families; incomplete families; chronic poverty; individuals with antisocial behavior and criminal records; children at risk.

5. TIMING – THREE ROUNDS

FIRST ROUND – sending of the work card and receiving the primary responses within 24 hours. The work team found out that the responses of the experts were consolidated around the following risk groups /the responses are shown in numbers /:

1. elderly people / pensioners – 5
2. closed ethnic groups – 5
3. long-term unemployed – 5
4. chronic poverty – 3
5. individuals with antisocial behavior and criminal records – 3
6. unemployed young people – 2
7. children at risk – 2
8. incomplete families -1
9. large families – 1.

SECOND ROUND – the received and ranged responses from the first round were sent to the experts for drawing the opinions closer and a request for the defining of the three risk groups, which would be prevailing in the Bulgarian society in the future. Within 24 hours the following responses were received / the responses are shown in numbers/:

1. elderly people / pensioners – 5
2. closed ethnic groups – 5
3. long-term unemployed – 5
4. individuals with antisocial behavior and criminal records – 3
5. chronic poverty – 3
6. children at risk – 2
7. unemployed young people – 0
8. incomplete families – 0
9. large families – 0.

THIRD ROUND – the processed and ranged responses were sent again to the experts for drawing the opinions closer and a request for the defining of the three risk groups, which according to them would be prevailing in the Bulgarian society in the future. Three risk groups, which received 0 points by the experts dropped from the work card – unemployed young people, incomplete families and large families. Again within 24 hours the responses, finally drawn closer, were received /the responses are shown in numbers/:

1. closed ethnic groups – 5
2. elderly people / pensioners – 5
3. individuals with antisocial behavior and criminal records – 5

The remaining risk groups pointed out in the work card receive 0 points.

6. ANALYSIS AND SUMMARY OF THE RESULTS.

THE experimental conducting of DELPHI METHOD allows the clarification of the following conclusions as regards to the risk groups that may threaten the national security of Republic of Bulgaria in the next 15 years:

THE opinion of the experts in the realization of the forecast accentuates on *three risk groups, which will be prevailing in the next 10-15 years in the Bulgarian society: closed ethnic groups, elderly people, individuals with antisocial behavior and criminal records.* They appear to be a serious threat for the future of the national security;

- **AS** regards to what was presented as risky, in the future, *ethnic groups*, the members of the work group gathered around the statement that on the basis of this is poverty and the isolation they are in, and if these are not overcome the share of the social services pointed towards these groups will be increased. In the absence of adequate state policy, the Roma population is the group that could cause future heavy social problems in the country, and hence gaps in its national security;

- **THE** work group consolidated around the opinion that the *elderly people / pensioners* are among the three risk groups pointed out by the experts, because of the material and immaterial problems connected with their existence – the poor solvency of the elderly people not only excludes them from a wide range of publicly available services for recreation, rest and vacation, but also quite often deprives them from the possibility to care about their own health. On the other hand the immaterial problems come from their impossibility to spend money for cultural life, as well as from their highly restricted social contacts. As regards to the sharp decline of the birthrate the group of the elderly people in Bulgaria will grow more, and as a result more social services will be directed to them, at economic support of the state.

- **IN** order to restrict the growth of the third risk group in the near future - *individuals with antisocial behavior and criminal records*, the work group considers that the application of efficient forms for individual and group psychological work should start, which to provoke their potentials for development and change in their position in life. Otherwise these individuals would seriously undermine the national security of the society.

REFERENCES

1. **ADLER, M., ERIO ZIGLIO, E. 1966:** (EDS.) GAZING INTO THE ORACLE: THE DELPHI METHOD AND ITS APPLICATION TO SOCIAL POLICY AND PUBLIC HEALTH, LONDON: KINGSLEY PUBLISHERS
2. **ALBERTSON, L., CULTER, T. 1976:** DELPHI // FUTURES, VOL.8 - №5, P.397-404
3. **CLIFFORD, P. 2008:** ED. RAND AND THE CITY: PART ONE, SANTA MONICA MIRROR, OCTOBER 27, 1999 – NOVEMBER 2, 1999. FIVE-PART SERIES INCLUDES: 1; 2; 3; 4; & 5. ACCESSED 15 APRIL
4. **BOLOGNINI, M. 2001:** DEMOCRAZIA ELETTRONICA. METODO DELPHI E POLITICHE PUBBLICHE (ELECTRONIC DEMOCRACY. DELPHI METHOD AND PUBLIC POLICY-MAKING), ROME: CAROCCI EDITORE
5. **BROWN, T. 1972:** AN EXPERIMENT IN PROBABILISTIC FORECASTING, R-944-ARPA, THE FIRST RAND PAPER
6. **BROWN, B.B. 1968:** DELPHI PROCESS: A METHODOLOGY USED FOR THE ELICITATION OF OPINIONS OF EXPERTS : AN EARLIER PAPER PUBLISHED BY RAND - DOCUMENT NO: P-3925, 15 PAGES
7. **DALKEY, N. 1968:** PREDICTING THE FUTURE, RAND CORPORATION, USA
8. **GREEN, A., AND GRAEFE 2007:** METHODS TO ELICIT FORECASTS FROM GROUPS: DELPHI AND PREDICTION MARKETS COMPARED. FORTHCOMING IN FORESIGHT: THE INTERNATIONAL JOURNAL OF APPLIED FORECASTING
9. **FOWLES, J., 1978:** HANDBOOK OF FUTURES RESEARCH, GREENWOOD PRESS: CONNECTICUT
10. **HELMER, O. 1962:** AN EXPERIMENTAL APPLICATION OF THE DELPHI METHOD TO THE USE OF EXPERTS, RAND CORPORATION, USA
11. **HELMER, O. 1967:** ANALYSIS OF THE FUTURE: THE DELPHI METHOD - RAND CORPORATION, USA
12. **HELMER, O. 1966:** THE USE OF THE DELPHI TECHNIQUE IN PROBLEMS OF EDUCATIONAL INNOVATIONS, RAND CORPORATION, USA
13. **HILBERT, M., MILES, I. AND OTHMER, J. 2009:** FORESIGHT TOOLS FOR PARTICIPATIVE POLICY-MAKING IN INTER-GOVERNMENTAL PROCESSES IN DEVELOPING COUNTRIES: LESSONS LEARNED FROM THE ELAC POLICY PRIORITIES DELPHI, TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE, VOLUME 76, ISSUE 7, SEPTEMBER
14. **HILTZ, S.R., TUROFF M. 1978:** THE NETWORK NATION: HUMAN COMMUNICATION, VIA COMPUTER, ADDISON-WESLEY
15. **LINSTONE, H., TUROFF, M. 1975, 2002:** THE DELPHI METHOD, TECHNIQUES AND APPLICATIONS READING, MASSACHUSETTS: ADISON-WESLEY
16. **VON DER GRACHT, H. A., DARKOW, I.L. 2010:** SCENARIOS FOR THE LOGISTICS SERVICE INDUSTRY: A DELPHI-BASED ANALYSIS FOR 2025. IN: INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS, VOL. 127, NO. 1, 46-59
17. **WISSEMA, J.G., 1982:** TRENDS IN TECHNOLOGY FORECASTING. R & D MANAGEMENT, 12 (1), PP. 27-36
18. **ROWE AND WRIGHT 1999:** THE DELPHI TECHNIQUE AS A FORECASTING TOOL: ISSUES AND ANALYSIS, INTERNATIONAL JOURNAL OF FORECASTING, VOL. 15, OCTOBER
19. **ROWE AND WRIGHT 2001:** EXPERT OPINIONS IN FORECASTING. ROLE OF THE DELPHI TECHNIQUE. IN: ARMSTRONG (ED.): PRINCIPLES OF FORECASTING: A HANDBOOK OF RESEARCHERS AND PRACTITIONERS, BOSTON: KLUWER ACADEMIC PUBLISHERS
20. **RESCHER, P. 1998:** PREDICTING THE FUTURE, ALBANY, NY: STATE UNIVERSITY OF NEW YORK PRESS
21. **SACKMAN, H. 1974:** DELPHI ASSESSMENT: EXPERT OPINION, FORECASTING AND GROUP PROCESS, R-1283-PR, APRIL
22. **SMITH, BRUCE L.R. 1966:** THE RAND CORPORATION: CASE STUDY OF A NONPROFIT ADVISORY CORPORATION, HARVARD UNIVERSITY PRESS
23. **TAPIO, P. 2003:** DISAGGREGATIVE POLICY DELPHI: USING CLUSTER ANALYSIS AS A TOOL FOR SYSTEMATIC SCENARIO FORMATION, TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 70(1): 83-101

24. **TUROFF, M. 1970:** THE DESIGN OF A POLICY DELPHI, TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 2
25. **TUROFF, M., HILTZ, S.R. 1980:** COMPUTER-BASED DELPHI PROCESSES, IN MICHAEL ADLER, ERIO ZIGLIO (EDS.), GAZING INTO THE ORACLE, OP. CIT.
26. **TAPIO, P. 2003:** DISAGGREGATIVE POLICY DELPHI: USING CLUSTER ANALYSIS AS A TOOL FOR SYSTEMATIC SCENARIO FORMATION, TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 70(1): 83-101
27. **COLTON, CH., HATCHER 2004:** T., THE WEB-BASED DELPHI RESEARCH TECHNIQUE AS A METHOD FOR CONTENT VALIDATION IN HRD AND ADULT EDUCATION RESEARCH, 2004
28. **COLTON, CH., HATCHER 2006:** USING THE INTERNET TO IMPROVE HRD RESEARCH: THE CASE OF THE WEB-BASED DELPHI RESEARCH TECHNIQUE TO ACHIEVE CONTENT VALIDITY OF AN HRD-ORIENTED MEASUREMENT

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