



Original Contribution

Journal scientific and applied research, vol. 4, 2013  
Association Scientific and Applied Research  
International Journal

ISSN 1314-6289

## DELPHIC ORACLE, RAND CORPORATION AND DELPHI METHOD

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**Abstract:** *The point of this article is to show what binds the Delphic oracle, the RAND Corporation and Delphi method. And the connecting link is the long-term forecasting. Since ancient times, people have sought to break into the future to build a rational life in the present. It is mentioned that this was done through the intuitive forecasting. Present offers another starting point for looking into the future that combines scientific intuition plus reliable statistics and mathematics and other models such as the method for long-term forecasting - Delphi method, developed by think tank RAND Corporation - USA. Thanks to its research capacity, the corporation established for decades that a highly effective forecasting method, reflecting the overall theoretical and experimental work in a series of reports. They become a kind of milestones for researchers from around the world to successfully apply it in their scientific and practical activities.*

**Key words:** *Delphic oracle, sanctuary several Apollo, future events, database, credibility, authenticity, divine consultation, intuition, intuitive prediction, scientific prediction, RAND Corporation, military technology, military operations, think tank, experimental space ship, space research, cold war, Science and Technology, Standards Research, strategies, long-term strategies, memorandum, experts, expertise, reports, epistemology, inexact science, analysis of the future, convergence, group forecasts, group process*

The names of the Oracle at Delphi in ancient Greece and Delphi Method are related because of the fact that symbolize look into the future - and the oracle, and method provide long-term outlook for the whole society or sphere of its activities. The link between them is the RAND Corporation - USA.

### **1. Delphic oracle - a look of ancient people to the future**

In the ancient world there are many places that have gained a strong reputation for the development of oracular wisdom. But perhaps the most famous of which is the sanctuary of Apollo at Delphi - Delphic oracle [4], [20] located on the slopes of

Mount Parnassus in Greece, active from 1400 BC.

According to Greek mythology, the temple was built by Apollo itself in honor of his victory over the monster Python. Therefore his priestess called Pythia (python - one of the oldest symbols of Apollo) [4], [33] gods. Pythia function is to reveal the divine purpose of future events. Delphic oracle shares the rise of Greek civilization and has contributed to its prosperity. He learns the Greeks and the other nations long-term oriented actions towards the success of the polis - country [4], [32].

While on the sixth and fifth centuries BC other popular oracles are

Dodona, Didyma, and Ammon, leading to bigger choice in divine consultation [33], [32].

Recorded responses received from Pythia at Delphi are preserved on copper plates are preserved, and modern scientists are divided into categories and recognize them for historical or fiction [4]. Of course, consultation with Pythia were religious in form, but the sanctuary itself acted as an international arbitrator. Delphic oracle shares the rise of Greek civilization and contributed to its prosperity. [33]

Obviously, since ancient times, people have sought to break into the future to build a rational life in the present. This was done through the intuitive forecasting. Modernity offers another starting point for looking into the future that combines scientific intuition plus reliable statistics and mathematics and other models such as the method for long-term forecasting - Delphi method.

## **2. RAND Corporation - Delphic oracle of the modern world, creator of the Delphi Method**

If the Delphic oracle has provided intuitive predictions for future BC, the twentieth-century, in the modern world characterized by intense technological and political changes also appeared a place where not only emerged the future, but also strategies to justify its full course in the interests of human development. This is a project RAND.

The creation, the development, the mission of RAND Corporation are subject to the work of many

authors, but the most detailed it makes Alex Abella [6] in his book "Soldiers of Reason: The RAND Corporation and the Rise of the American Empire ", 2008. The author writes [6, p.8]: "If you look in the mirror, we see that RAND is every one of us."

Its beginning RAND Corporation leads from the Second World War, when a large group of U.S. citizens - mostly scientists and engineers - were mobilized make war on the technological basis [147]. At the end of the war, when the group began to fall apart, the Department of Defense (Ministry of Defense, USA) decided to keep some of the most talented employees to enable them in the coming years to develop military technology, especially to continue their efforts in the study of military operations. For this purpose, Gen X. Arnold, U.S. air present a proposal for an agreement between the Air Force and the airline "Douglas". His proposal was approved, thereby creating a unique Project RAND. He first started operating as a division of the company "Douglas" with contract worth \$ 10 million [6], [10].

In May 1948 RAND began independent existence, when the company separated from Airline "Douglass" and became an independent, private, nonprofit and nonpartisan organization. [10] It is the first organization in the world, which is called "think tank".

First major task of the RAND study is entitled "Preliminary Design of an Experimental World-Circling Spaceship" [36], [37]. Editors of the

report Jack Lipp and Robert Salter, are considered as pioneers of satellite reconnaissance. For their work they take into account the comments of another 195 scientists. The report noted that "taken prudent and realistic engineering assessment of the possibility to build a spacecraft that will circle the earth as a companion. The forecast is based on the current state of technological progress and it does not include features such as the future development of nuclear energy." [36, p.10]. However the fact that at this stage the satellite is mostly science fiction, in its report in 1946, is a detailed assessment of the prospects for scientific satellites and space research prepared by 50 scientists. When in mid-1957 was declared the expected date of launch of the first satellite proved that prediction error is only two weeks.

In the Cold War, one of the first developments of RAND is the effective resistance of the Soviet Union, and conducted a series of studies in 1948 focused on economic and military potential of the Soviet Union - RAND became the first American institution, which began to develop the theory of so-called "Cold War" using methods that involve intensive study of a potential enemy from a distance [41]. Another development RAND is titled "The Soviet military doctrine", authored by R. Gartof [22] and in the work by M. Mead considered the Soviet national character "Soviet attitudes toward authority" [35]. Polarization between the two world powers, the U.S. and the USSR [324] dictates the

establishment in 1983 in the Rand Center for The Study Soviet international behavior, RAND-University of California, Los Angeles [7].

Links of RAND with NASA lead to participation in measuring the effectiveness of its space program. Even back in 1968 a catalog of scientific goals in the space, which contains more than 1,000 items in five main areas of research: Earth and Environmental, life on other planets, solar system, universe, cosmos as a scientific laboratory. RAND also assess the effectiveness of the program Space Shuttle .

With the expansion of RAND to its creators, it is clear that the experiment was successful. By way of its development to the 60s of the XX century, RAND turns to the domestic politics of the United States and introduces a model of empirical research focused on the independent analysis in the study of real social and economic problems in the country [6], [40].

In 2001, RAND formulate the agenda of the then presidential administration in the field of science and technology. The corporation has its own importance and the current presidential administration. In 2009-2010, was carried in the RAND analysis of the proposal of President B. Obama's health care reform in the United States was based on a specific micro-simulation model [34]. In special survey among voters for U.S. Presidential Elections - 2012 RAND points out the difference between B.

Obama and M. Romney - 50.3% against 43.7% in favor of Obama.

*By 2011, over 30 Nobel laureates, especially in economics and physics associated with RAND at some point in his career.*

The article is not able to display the entire list of Nobel Prize winners, but the most popular of them are: Peter Diamond, Willard Lewis Alvarez, Murray Gell-Mann, Kenneth Arrow, Henry Kisinddzhari, James Tobin, Harry Markowitz, Gary Becker, Robert Lampert Oliver Williamson and others.

Other notable members of RAND are: Paul Baran - developing ARPANET and later the Internet; Barry Boam - inventor of COCOMO; Bernard Brody - Military strategist and nuclear architect; Francis Fukuyama - futurologist, Margaret Mead - social anthropologist; Allen Newell - expert AI; Condoleezza Rice - ex U.S. Secretary of State; Donald Rumsfeld - ex Minister of Defense; Norman Shapiro - a mathematician, co-author of the Rice-Shapiro theorem and others. [40]

One of the most significant events of Rand's justification and development of the method for long-term forecasting Delphi, by which the corporation professes in futurology.

### **3. Delphi method**

The first reported use of Delphi method is done by its creators N. Dolgi and O. Helmer [13] in 1962 in Memorandum RM-727-PR "Experimental application of the Delphi method to the use of experts." Presenting it they write [13, p.1-2],

"RAND Project Memorandum is shortened and revised version of the Memorandum of the RAND with the same number titled "Use of experts for assessment of requirements for bombs" (14 November 1951), which has recently been declassified ... This paper gives an indication of an experiment in the use of so-called Delphi method, that is designed to get the most reliable opinion and as a result of the consensus of a panel of experts by subjecting them to a series of questionnaires mixed with controlled opinion and feedback."

The name of the Delphi Method to correlate with the Oracle of Delphi in ancient Greece. This name was deliberately given by A. Kaplan [42, s.132], philosopher, professor at the University of California at Los Angeles, working as a researcher at the RAND Corporation.

J. Fowles [21] also points out that the word Delphi refers to the most revered oracle in ancient Greece when it is demanded by future forecasts and advice from gods. And the B. Brown writes [9, p.7] "Delphi method is a name applied to a technique used to elicit opinions and receive answers from a panel of experts. Delphi replaces direct confrontation and debate with carefully planned and structured program of sequential individual surveys are usually conducted through questionnaires."

The method is described by T. Gordon and O. Helmer [23] in 1964 "Report on a Long Range Forecasting Study" of the corporation. For the last time the list of predictable processes

using the Delphi method has significantly expanded, but by far the greater use he has in the field of scientific and technical progress [1], [3].

The creators of the Delphi method experts from RAND Corporation: Olaf Helmer - philosopher and logician; Norman Dalkey - mathematician, Nicholas Rescher - Philosophy (philosophy of science), what they do with the kind assistance of: Bernice Brown - mathematician, Samuel Cochran - psychologist; T. Gordon - futurologist, an expert in the field of high technology, planning and policy analysis.

To develop methods and other contributing scientists like): A. Delbek, A. Van de Ven and D. Gustafson, S. Enzer, G. Landeta, D. Passig, M. Turof, B. Ludwig [365] G. Martino, G. Skalmoski, F. Hartman and J. Collapse, P. Tapio, M. Adler and E. Ziglio, M. Bolonini and others.

Justification of the Delphi method is not a single act but a continuous process whose development is reflected in a series of reports. They are part of a research Memorandum of RAND Corporation from 1948 to 1973 The most important of them are [1], [3]:

- RAND P-1513, 1958 - „*On the Epistemology of the Inexact Sciences*”, by **Helmer, O., Rescher** [28].
- RAND RM-727-PR, 1962 - „*An Experimental Application of the Delphi Method to the Use of Experts*” by **Dalkey, N.C, Helmer, O.** [13].

- RAND P-2795, 1963 - „*The Systematic Use of Expert Judgment in Operations Research*” of **Helmer, O.** [30].
- RAND, P-2973, September 1964 - „*Convergence of Expert Consensus Through Feedback*” by **Helmer, O** [27].
- RAND, P-2986, September 1964 - „*Improving the Reliability of Estimates Obtained from a Consensus of Experts*” by **Helmer, O., B. Brown** [26].
- RAND, P-3499, December 1966 - „*The Use of the Delphi Technique in Problems of Educational Innovations*” by **O. Helmer** [31].
- P-3558, 1967 г. - „*Analysis of the Future: The Delphi Method, in Technological Forecasting for Industry and Government*” by **O. Helmer** [25].
- RAND, P-3704, 1967 г., „*Delphi*” of **Dalkey, N.C.** [16].
- RAND P-3721, November 1967 - „*Systematic Use of Expert Opinions*” by **O. Helmer** [29].
- RAND, P-3925, September 1968 - „*DELPHI Process: A Methodology Used for the Elicitation of Opinions of Experts*” by **Brown, B.** [9].
- RAND P-3820, March 1968 - „*Experiments in Group Prediction*” - by **Dalkey, N.C.** [12].
- RAND, P-3948, 1968 - „*Predicting the Future*” by **Dalkey, N.C.** [17].
- RAND P-4182, 1969 - „*Delphi and Values*” by **Rescher, N.**[38].
- RAND, RM-5888-PR, June 1969 - „*The Delphi Method An Experimental*

*Study of Group Opinion*” - by **Dalkey, N.C.** [19].

- RM-5957-PR, 1969 - „*The Delphi Method, II: Structure of Experiments*” by **Brown, B., Cochran, S.W., Dalkey, N.C.** [8].

- RM-6115-PR от 1969 г. - „*The Delphi Method, III: Use Of Self Ratings To Improve Group Estimates*”)by **Dalkey, N.C., Brown, B., Cochran, S.**[14].

- RM-6118-PR, 1970 - „*The Delphi Method, IV: Effect of Percentile Feedback and Feed-In of Relevant Facts*” by **Dalkey, N.C, Brown, B., Cochran, S.**[11].

- R-0612-ARPA, 1971 - „*Experimental Assessment of Delphi Procedures With Group Value Judgments*” by **Dalkey, N.C., Rourke, D.L** [18].

- R-0678-ARPA, 1971 - „*Comparison of Group Judgment Techniques with Short-Range Predictions and Almanac Questions*”by **Dalkey, N.C., Brown, B.**[15].

- R-1283-PR1, 1974 - „*Delphi Assessment: Expert Opinion, Forecasting, and Group Process*” by **Sackman, H.** [39].

RAND Corporation reports are strictly justified scientific practice that marked the path of development of the Delphi method, which began to be applied globally. Even after 1970, following these benchmarks. Japan soon after the United States began practicing national Delphi, and then it begins to "branches" also in other countries.

From the made statement can be drawn the following conclusions and findings:

1. The expert team of RAND Corporation, including high-ranking experts, including Nobel laureates is a reliable source of comprehensive knowledge and innovation skills, whose capacity for rational scientific judgment are the basis for justifying the creation of Delphi method as a method for long-term forecasting.

2. Historically, the structure of the research organization RAND is strongly influenced by the external environment and its fast changing characteristics - started its operations with tasks related to the Cold War and in following years to the development of policies aimed at the development of national and global society in the world without confrontation between the two political systems.

3. The scientific process of creating Delphi method is through rigorous research, recorded in a Memorandum of reports. Realizing verification through controlled experiments, scientists have recorded measurable data related observations analyzed the logged information to construct theoretical explanations of the studied experimental method.

4. The“child" of RAND - Delphi method is based on empirical and measurable evidence, specific principles of reasoning, systematic observation, measurement and experimentation, testing and modified hypotheses.

5. Delphi as a scientific method requires you to be verified. Therefore, all the information about the method

was published in a series of documents - RAND reports. Such verification is realized by implementing a series of experiments and measurement of results.

6. To create Delphi Method RAND Corporation scientists have trusted their inspiration and insight - intuition, a combination of empirical data and detailed observations and

enhanced ability to pass through solid surface of the assumptions by logical-mathematical methods.

7. By creating a method Delphi the team of RAND Corporation shows the world that science is not just a collection of facts, concepts and useful ideas about reality, but is also a method for detection of reliable knowledge with plan for the future.

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