Examining the Effective Variables of the Scientific and Technological Power and Presenting an Assessment Model of Scientific and Technological Power of Countries

Seyyed Hadi Zarghani
Associate Professor Political Geography, Ferdowsi University of Mashhad, Mashhad, Iran

Hadi Aazami
Associate Professor Political Geography, Ferdowsi University of Mashhad, Mashhad, Iran

Seyyed Javad Mousavi Zare
M.A Political Geography, Ferdowsi University of Mashhad, Mashhad, Iran

Received: 20 November 2016 Accepted: 1 February 2017

Extended Abstract

1. Introduction
Science and technology play a geopolitical role in the global geography of power which is called the power of science and technology. In this regard, statesmen emphasize on science and technology as a key source for the promotion of geopolitical prestige as well as a fundamental tool for improving their people’s standard of living. In other words, science and technology are not only considered as one of the main factors of national power, but also play fundamental role in strengthening other dimensions of national power such as economic, military, territorial, political, cultural power, and so on. Therefore, the study of indicators and variables demonstrating the power of science and technology is very important in terms of evaluating the scientific and technological power of countries and comparing them to each other, as well as analyzing the function and influence of scientific and technological power on other dimensions of national power, such as territorial, military, political, economic, cultural dimension, and so on. This study intends to explore and recognize the most important variables and indicators shaping the scientific and technological power of countries and describe it in a conceptual model.

2. Theoretical Framework
Although power is one of the terms that there is no general consensus about its meaning, it can be defined simply as the dominant ability of the individual, society and government over the opinions and actions of others. However, this phenomenon has the special place in the political geography literature, particularly in geopolitics. The scholars in geopolitics and international relations fields along with the statesmen

1 Corresponding author. Email: h-zarghani@um.ac.ir
have always concerned about the components and factors of national power and actually indicators can accurately reflect the nature of national power. Generally, national power is considered as a combination of the material and spiritual capacities of a country. More precisely, the national power of countries is arisen from the diverse sources such as land and geography space, human resources, military, scientific and cultural capabilities. Meanwhile, science and technology in the opinion of most scholars is one of the main components of national power. In this framework, if science, on its general concept, refers to any kind of consciousness about objects, phenomena and relationships; and technology is defined as the systematic use of scientific information and other systematic consciousness for practical purposes; and also, innovation is considered as the equivalent of putting creative ideas into a new product or service, power of science and technology will be defined as a power of human which is appeared by the ability for knowledge generation, knowledge application, innovation and skilled human resource training. Obviously, variables and indicators of scientific and technological power have a fundamental impact on other dimensions of power such as economic, military, territorial, political, and social power.

3. Methodology
This study has been carried out with the reference to materials of library and fieldworks in descriptive-analytical method. First, in the library step, the most important variables and indicators influencing on scientific and technological power of countries in 102 indicators was gathered referring to reliable sources. In the next step, these indicators were classified in terms of their nature and function in six factors including human resources, financial and economic factors, mediator, information and communication technology (ICT), academic output and performance in strategic sciences. Then, in fieldwork part, the importance of the indicators of each factor, as well as the prioritization of the six factors of the scientific and technological power were determined in fieldwork approach and a questionnaire was prepared by domestic and foreign experts. Accordingly, a researcher-made questionnaire consisted of 108 questions was designed in both Farsi and English based on the Likert scale. Then, regarding the interdisciplinary nature of the research, professors and experts in various fields of political geography, international relations, science and technology policy, economics with an emphasis on economic development, strategic management, management and strategic planning were asked to fill out the questionnaire. Finally, more than 300 questionnaires were provided to internal and external experts and field analysis was based on the filled out questionnaires.

4. Findings and Discussion
The results of this research in two parts of the library and fieldwork show that the phenomenon of the power of science and technology, like national power, has a mixed nature; in other words, since this concept is influenced by the various fields
including human resources, financial resources and information technology, it requires a combination of operational indicators to define itself and consequently, assess the power of science and technology. Accordingly, the combinative model of the power of science and technology is proposed as the result of research in the form of six conceptual factors on the priority importance order (economic factors, human resources, scientific output and innovation, information technology, performance in strategic sciences and mediator) with 44 operating indicators.

**Keywords:** National power, Scientific and technological, Evaluation, Innovation

**References (In Persian)**


References (In English)


