



From the Policy of Science; the Endless Frontier to the Policy of Science and Innovation in Iran

* Reza Mahdi 

* Associate Professor, Department of Futures Study, Institute for Social and Cultural Studies (ISCS),
Tehran, Iran. mahdi002@gmail.com

Received: 29.12.2024

Accepted: 28.10.2025

Abstract

The objective of the article is to benchmarking and extract the teachings of the exploration of the document of Science; The Endless Frontier, in order to productive learning from the USA science policy for science and innovation policymaking in Iran in the coming decades. The Science; The Endless Frontier is the USA policy with a special focus on basic sciences, technology, engineering and mathematics (STEM). Given the advances of the USA science institution and innovation ecosystem in the political, economic, social, cultural and national and international technological fields, productive learning from the science policies of the country can be a guide in science policymaking, especially in STEM. The article was conducted using the qualitative content analysis method of the final report of the National Conference on the Study of the document of Science; The Endless Frontier. The conference was held in partnership with the National Academy of Sciences, the Kavli and Sloan Foundations, with the participation of 300 scientific, business and philanthropic leaders and senior managers, with the aim of analyzing the current situation and mapping the future of the science institution with a realistic and holistic approach. Based on the principles and statements of the document of Science; the Endless Frontier of achievements of the USA in the political, economic, social, cultural and technological fields and national and international has been noteworthy in the past eight decades. In the article, fifty useful policy statements have been extracted in Iran's science and innovation policymaking. The science and innovation leaders and policymakers should strive to formulate and apply an appropriate combination of the fifty policy statements presented in the article in order to improve the innovation ecosystem and the comprehensive progress of society, including all people, all regions, and all fields.

Keywords: Higher Education, Science Policy, Science; the Endless Frontier, R&D, Science and Innovation Policymaking.

Corresponding Author: Reza Mahdi- mahdi002@gmail.com



Introduction

Science; The Endless Frontier was the United States' long-term roadmap for national science policy after World War II, centered on "basic science, technology, engineering, and mathematics" (Bush, 1945). For 75 years after World War II, the expansion and development of the U.S. science institution has largely followed the letter and spirit of this document. This document was reviewed in 2020 at a conference with the participation of leaders, experts, and senior executives from the U.S. science institution, foundations, and businesses. Based on the results of this conference, science and technology policies for the next 75 years have been reorganized in a way. In the past eight decades, the higher education and research system in the United States has made remarkable progress, achievements, and impacts in the national and international arenas and in the political, economic, social, cultural, and technological fields. Optimization and generative learning (Khoi, 2021) of the national policies of this country, including science policy; The Infinite Frontier, can be a guide and instructive in the science and innovation policies of other countries, including Iran.

The purpose of the article is to briefly introduce the dimensions and content of the Science; The Infinite Frontier document and present its lessons for the country's macro science and innovation policies in the long term. First, the axes and priorities emphasized in the Science; The Infinite Frontier document are introduced (Bush, 1945). Then, the results and findings of the Science; The Infinite Frontier document analysis conference (Olson, 2020; 2021) are summarized and presented to the country's science and technology policymakers in the form of fifty policy propositions.

Methodology

The research was conducted using the qualitative content analysis method of the final report of the National Conference on the Review and Analysis of the Document of Science; The Endless Frontier (Krippendorff, 1980). The National Academy of Sciences of the United States, in collaboration with the Kavli Foundation and the Sloan Foundation, held a conference in February 2020 in the form of five specialized sessions with the participation of more than 300 scientific, business, and philanthropic leaders and senior managers to examine the current state and outline the future of the institution of science. The main goal and question of this conference was to examine whether the modern research policies and architecture governing the United States need to be rebuilt and revised to face the current and future challenges.

Findings

Based on the results of the conference on analyzing the document of science; the endless frontier, 25 selected policy propositions have been extracted and introduced.

1. Science policymaking goes beyond the mere boundaries of science itself and includes all scientists and researchers, society, the general public, industry, nation, government, country, and the world.
2. Providing the ground for the growth and development of science, scientists, and research ultimately leads to the prosperity and development of society.
3. Successful science policies are essential for successful governance, which ultimately leads to the all-round growth and progress of society.
4. Science should not be focused solely on a practical issue and meeting objective needs that are generally short-term and quick-to-return.
5. The ethical foundation of science has shifted from philanthropy to science and absolute power.
6. Instead of emphasizing absolute science, the presence of people and their needs should be an important part of science policies.
7. There is now a greater need for new ideas emerging from scientific research, as well as for educated young people from all perspectives and specialties, than there was eight decades ago.



8. A significant increase in national and state investment in research is a vital necessity.
9. The need to educate a new generation of scientists and citizens who are prepared for the very different world ahead is acute and serious.
10. The concentration of wealth, health, education, and opportunity in a relatively small segment of society threatens to collapse the support system for innovation that, if properly implemented, can have widespread benefits for all.
11. The university institution should reflect the racial, ethnic, socio-economic, and intellectual diversity of the entire community, including students and faculty.
12. The modern research institution is and will become much larger, more collaborative, more multidisciplinary, more global, and more international than it was a few decades ago.
13. Today's research is increasingly integrating and integrating the knowledge and tools of life sciences, physics, engineering, and other disciplines in a "convergence of the sciences."
14. Today's researchers must be flexible learners who are able to collaborate and share their knowledge and expertise across disciplinary and national boundaries.
15. Research communities need to be much more diverse in order to attract a wider range and number of people in the field and to dramatically increase scientific creativity.
16. Today's researchers must be proficient in communicating with other researchers and laypeople.
17. Demystifying science through better scientific communication with lay audiences can help increase support for research while creating a more informed elite.
18. Government-university collaboration has achieved great things, but changing this relationship can bring even greater success.
19. Today's demand on science is to help solve new and long-standing problems such as global pandemics, chronic diseases, social inequalities, systematic racism, cybersecurity, social polarization due to climate change, and mass migration, some of which have been created with the help of scientific achievements.
20. A country that depends on others for basic scientific knowledge will face slow industrial progress and a weakened competitive position.
21. Basic research should not be a priority alongside other national priorities; basic research is the driving force behind progress and the foundation for other priorities.
22. Intense global competition has begun, especially in important advanced technologies.
23. The emergence of the digital economy (and the digital transformation in general) has created and will create a profound disruption in the workforce.
24. The world is under tremendous pressure to understand, anticipate, mitigate, and adapt to climate change.
25. Rapid progress is needed in human capital education and to educate as many people as possible who are underrepresented in STEM education.

Conclusion

The Science Document: The Endless Frontier emphasizes the need for a transformation in science and technology policymaking to achieve long-term progress and enhance the innovation ecosystem. The most important lessons of the document are: 1. Science must go beyond short-term needs to address social issues such as climate change, inequality, and public health; 2. Extensive investment in basic and fundamental research is essential and underpins national progress; 3. Diversity in the scientific community, international partnerships, and interdisciplinary collaboration must be strengthened; 4. Effective communication with the public and transparency of science increase public trust; 5. The higher education system must move towards training responsible, creative, and communicative scientists; 6. The role of the government in sustainable support of research and innovation is vital and irreplaceable; 7.



Talent migration and the use of global knowledge contribute to the country's scientific progress.

In general, the document of Science; The Endless Frontier calls for a holistic, long-term, and community-oriented view of science and technology in order to respond to complex global challenges. The final suggestion is that science and technology policymakers should strive to formulate and implement an appropriate and effective combination of the fifty policy propositions presented in this article in order to strengthen the country's innovation ecosystem and the all-round growth and progress of society, including all people, all regions, and all fields and territories. It seems that consciously and wisely laying the groundwork for the application of all fifty policy propositions with a realistic, holistic, and participatory approach in the long term is a comprehensive strategy. Today, ethical and humanitarian science and technology are the sure path to the prosperity and salvation of all nations, therefore, the prosperity of the great and cultural nation of Iran requires sufficient time and effective and comprehensive policies, programs, and practical measures (Mahdi, 2015).

References

1. Bush, V. (1945). Science the Endless Frontier, A Report to the President by V. Bush, Director of the Office of Scientific Research and Development, United States Government Printing Office, Washington.
2. Khoi, Le Thanh (1999). Education: Cultures and Societies, translated by M. Yemenidozi Sorkhabi, Tehran, Shahid Beheshti University Pub.
3. Krippendorff, K. (1980). Content Analysis: An Introduction to its Methodology. Beverly Hills: Sage Pub.
4. Mahdi, R. (2015). Evaluation of National Science and Technology Policies in Iran, Elsevier, Procedia - Social and Behavioral Sciences, 195, pp. 210-219.
5. Olson, S. (2020). The Endless Frontier, the next 75 Years in Science, the National Academy of Sciences Pub.
6. Olson, S. (2021). Science; the Endless Frontier, translated by A. Matin, Institute for Cultural and Social Studies Pub.



