

Communicating Utility Value of Science for Society

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Abstract:- Modern science has a far-reaching influence on the development of society. In the last four to five centuries the scientific progress has been rapid and astounding and yet it is often incomprehensible for people who are impacted by it but left out of the debates surrounding its theories and applications. Scientific progress is often seen as clashing with long held beliefs and values which impedes its application for full realization for the purpose of social goals. In these contexts, scientists and educator have a significant role to play given the fact that they have knowledge, experience and that they themselves are a part of the society that can benefit by scientific endeavors. The paper explores the importance and role of scientific community in sharing the utility value of science for society.

Keywords: Science, Society, Utility Value.

I. INTRODUCTION

The importance of science and scientific community for an evolved, rational and modern society cannot be underscored enough. Science influences every aspect of human life and is constructively responsible for our very existence. Science helps us understand our surroundings and effectively utilize the resources. It is an intellectual process. It helps us think well and promotes reasoning capacity. It is evident in our day-to-day activities. It develops creative and critical thinking. The understanding of various concepts helps us to analyze situations and make decisions wisely.

Modern/ western science has developed mostly with an opposition to religion challenging the dogmatic ideas and with a promise of equality and justice in a society. It comes with a promise of progress, modernity and challenge to traditions which were uniformly judged.

UNESCO considers science as the “greatest collective endeavor” that helps in realizing good health and contributes to the basic human essentials as food, water and shelter.¹ Applied science aids in technological innovations to enrich life and allow suitable choices of living. Society’s realization of science is as old as human civilizations. Society is characterized by group of people who share common interests and develop a distinct culture and institutions.² They live together in an organized way and

¹ Science for Society, UNESCO, en.unesco.org/themes/science-society

² New World Encyclopedia, www.newworldencyclopedia.org/entry/Society

make decisions about sharing work.³ They develop cultures which enrich “lives in countless ways and help(s) build inclusive, innovative and resilient communities”⁴.

Those cultures which explore the use of science for the benefit of society and apply the scientific knowledge to develop tools for convenience contribute to further acceleration of scientific understanding and education may grow into bigger civilizations. Civilization, “is a complex human society that may have certain characteristics of cultural and technological development”⁵. Civilizations are often seen as culturally superior with urban settlements with labour divided for specific jobs.⁶ Ancient world has witnessed the rise of multiple civilizations. Arnold J. Toynbee, British historian deeply interested in the origins of civilizations wrote his best-known, massive twelve volume, monumental, *Study of History* (1934-1961) in which he described the rise and decline of 23 civilizations of the world.⁷ In his work he claimed that civilizations succeed on their ability to deal successfully with challenges and creative leadership and not on racial or environmental factors alone.

The irrigations systems and the first cities of the Sumerians, the tall pyramids of Egypt, the Great Bath and Granary of the Indus Valley civilization, are all material manifestations of the scientific understanding of the ancient people about the natural world around them and perfect mathematical calculations. The growth in societies led to development of polity, administration and legal areas along with growth in natural, social and other human sciences. In this context application of scientific methodology and development of disciplines with a scientific approach was desired for open, liberal and accessible knowledge for society at large and for the growth of related disciplines. In many cases scientific results challenge commonly held beliefs, customs and traditions thus creating a clash and impacting application of scientific knowledge for societal benefits. This brings in the role of researchers, scientists and educators towards the growth of scientific knowledge and

³ Cambridge dictionary, dictionary.cambridge.org/dictionary/english/society

⁴ Culture, Protecting Our Heritage and Fostering Creativity, UNESCO, www.unesco.org/en/culture

⁵ Civilization, National Geographic, education.nationalgeographic.org/resource/civilizations/

⁶ Definition of civilization remains debated among scientists and anthropologists and yet common areas of convergence suggest a more advanced understanding of human existence and way of living.

⁷ Arnold J. Toynbee, (1957), *A Study of History*, Abridgement of Volumes I-VI, Oxford University Press.

the need and various aspects related to sharing domain knowledge with society at large. Largely the discussion to imparting scientific knowledge refers to three levels:

- At Normative level ethical principles of science are set up, discussed and justified.
- At Individual level the ethical principles are translated into responsible actions of individual
- At structural contextual level scientists impart it to social institutions or mechanisms surrounding the scientists.
- One can pose few questions relevant to the discussion. Such as:
- Is it indeed necessary for the scientists to reach out to the society?
- Is that a primary or significant role of a scientist?
- Does it consume more time? Should that be spent?
- Is it important for scientists to think more deeply about their social responsibilities?
- Does science discover reality or creates reality? ⁸
- What is 'March for science'?

➤ *Image of a Scientist:*

A scientist is a curious being. Scientists are objective seekers. They seek truth that is not local and in specific time but universal truth. Scientific knowledge is based on factual findings and scientists reach to their goals by following a tested scientific methodology. Though scientists' continuous research is aimed at finding reality and understanding the core of the problem at hand, they are often perceived as distanced from the society at large and part of a different social milieu that has less to do with functioning world. Scientist are often perceived as genius but quirky. Its own scientific community however has different parameters A professionally trained scientist is expected to have critical thinking, be systematic and diligent in work methods. Much of the focus is on the professional responsibility of scientists to stick to "standards agreed upon by the scientific community".⁹

⁸ Trudy Dehue,, "A more democratic relationship between science and society", TEDxUniversityofGroningen, https://www.google.com/search?q=A+more+democratic+relationship+between+science+and+society+%7C+Trudy+Dehue+%7C+TEDxUniversityofGroningen&biw=1366&bih=657&ei=NTQIZNeFofHX4-EP7JSE8A4&ved=0ahUKEwiX9K__ioP-AhXx6zgGHWwKAe4Q4dUDCA8&uact=5&oq=A+more+democratic+relationship+between+science+and+society+%7C+Trudy+Dehue+%7C+TEDxUniversityofGroningen&gs_lcp=Cgxnd3Mtd2l6LXNlcnAQAzoKCAAQRxDWBBCwA0oECEEYAFDNE1jNE2CdHGgCcAF4AIAB2gGIAAdoBkgEDMi0xmAEAoAEB0AECsAEAyAEIwAEB&sclint=gws-wiz-serp#fpstate=ive&vld=cid:ead89437,vid:Moh5_Mx8oC0

⁹ Elisabeth Pain, 16 February, 2013, "The social responsibilities of Scientist", www.science.org/content/article/social-responsibilities-scientists

➤ *The Significance of Social Responsibility:*

The role of a scientist is to dedicate to scientific research and bring in innovations and discoveries. These may have a tremendous impact on the way societies deal within and with each other. Few questions posed in the earlier part of this paper are worth pondering. Why should scientists commit to social connectivity considering that scientific research demands time, money and energy? It is to the genius of some extraordinary scientists who could invest in research activities and bring life changing (often lifesaving) innovations and discoveries that altered the path of scientific research. This enhances a scientists' role in communicating that knowledge to the society and people who may seem remote and often even disinterested towards the field. Because if the scientists don't explain who else will? Who else can? This is also in the interest of scientific research and scientific community as any challenges from an 'ignorant' society may halt the very process of scientific activity marring its future course of development.

Instead of scientists telling the effects by being on the pedestal it is also to invite people to think along with them and also listen to knowledge of other people. Scientists and researchers are a part of the same society and not outside it. A scientist is influenced by the situations, status and dynamics in a society. He/ she/they are affected and impacted by the same social norms and similar social structures. Breaking through the rigidly held norms requires courage and also scientific and academic honesty. Since scientific knowledge is universal. Science is "communal" community oriented. Hence scientific results and experiments should be shared with everyone.

Regarding how research should be conducted, Mark S. Frankel, the director of the Scientific Responsibility, Human Rights, and Law Program at American Association for the Advancement of Science claimed it as "internal responsibilities and further adds, scientists also have "external" i.e., social responsibilities "toward the larger community".¹⁰ "It is no longer acceptable to focus on internal responsibilities."

Investment of public money is another reason why scientific knowledge cannot be secluded. Education and research are subsidized by society, these are tied with society's expectations on usage of the knowledge in the future and funding for the same. As science depends on public money, affects policy decisions, and offers risks and benefits to society, similarly scientists must accept that the communities in which they live and the communities much distant, are ultimately affected by the work that they do. In exchange of public funding scientists remain committed to

¹⁰ Elisabeth Pain, 16 February, 2013, "The social responsibilities of Scientist", Report on the 2013 AAAS Meeting, www.science.org/content/article/social-responsibilities-scientists www.sciencemag.org/careers/2013/02/social-responsibilities-scientists

finding solutions to the most pressing problems in society today.¹¹

Education and understanding should be imparted from an early age. Young learners should be allowed the “opportunity to explore the values and expectations inherent to their specific fields and to consider whether these are consistent or in conflict with broader social values.”¹²

Science and science study are not restricted in regions but have global dimensions that can and should be able to address global issues and challenges. Thus, it is necessary for learners and scientists to look beyond themselves, and be able to “use their skills to help with global problems.”¹³

These may bring in situations for confrontations where their internal responsibilities and knowledge gained may clash with set norms. It is these confrontations which the scientists must take. Publishing results and continuous social connect is desired outcome of a good scientific activity.

‘Science agenda – Framework for Action’ is a document endorsed at the International Council for Science (ICSU) and UNESCO’s ‘World Conference on Science’ in 1999 recommends that “basic ethical principles and responsibilities of science” be an integral part of the education and training of all scientists and engineers.¹⁴

➤ *India’s Scientific Policy Resolutions:*

India’s scientific policy resolution (SPR) published on March 13, 1958 was placed before both Houses of Parliament. The policy document was drafted with keen interest and inputs from the then Prime Minister Jawaharlal Nehru. SPR 1958 laid the foundation of “scientific enterprise and scientific temper” in India. Its aims were “to promote, foster, cultivate and sustain science and scientific research” in all its aspects; accord recognition to the work of scientists and “to secure for the people of the country all the benefits that can accrue from the acquisition and application of scientific knowledge”.¹⁵ Four major policies have been implemented since independence namely, Scientific Policy Resolution (SPR 1958), Technology Policy Statement 1983, Science and technology Policy 2003 (STP 2003) and Science and Technology Innovation Policy 2013 (STIP 2013).

¹¹ Ibid.

¹² Mark S. Frankel’s address at the 2013 AAAS meeting, Pain Elisabeth, 16 February, 2013, “The social responsibilities of Scientist”, Report on the 2013 AAAS Meeting, www.science.org/content/article/social-responsibilities-scientists
www.sciencemag.org/careers/2013/02/social-responsibilities-scientists

¹³ Ibid.

¹⁴ Science agenda – Framework for Action, unesdoc.unesco.org/ark:/48223/pf0000121035

¹⁵ Information of Scientific Policy resolution 1958 www.india.gov.in/information-scientific-policy-resolution-1958-department-science-and-technology

➤ *March for Science:*

Coinciding with the Earth Day on 22nd April, 2017, a series of rallies and marches were held in Washington, D.C., and more than 600 other cities across the world. Large number of people participated sustaining faith in scientific activity and its relevance. This became “non-partisan movement” to celebrate science and the role it plays in everyday lives. The goals of the marches and rallies were “to emphasize that science upholds the common good and to call for evidence-based policy in the public’s best interest”.¹⁶ A major source of inspiration behind the planning of the march was the 2017 Women’s March of January 21, 2017. Among other aims and objectives, the march aims at the following:¹⁷

- ❖ Encourage the public “to value and invest in science” and “appreciate and engage with science.”
- ❖ Encourage scientists to “reach out to their communities” and share their research and its impact.
- ❖ Encourage scientists to “listen to communities” and consider their research from the perspective of the people they serve.
 - Affirm science as a “vital feature of a working democracy.”
 - Show science to be “first and foremost a human process” that is “conducted, applied, and supported by a diverse body of people.”
 - Support research “that gives us insight into the world” and “upholds the common good.”
 - Encourage people to “support and safeguard the scientific community.”

Four months after the international community held its march, ‘India March for Science’, happened on 9th August 2017 and had drawn researchers, journalists and activists. The demand for annihilation of religious bigotry, propagation of non-scientific ideas and demand for development of scientific temper, human values and spirit of inquiry in conformance with Article 51 A of the Indian constitution remain constant demands apart from demands for increased government spending on scientific research and education system that imparts ideas based on scientific evidence.

II. CONCLUSION

Scientific research has social impact. As rapid changes happen in the arena of science and new vistas open up for scientific inquiry and new solutions are desired for newer challenges, the role of scientific community remains relevant to address the various concerns and debates and reach out to the community at large. Societal dogmas and conservative ideas contribute to bias, exploitation and authoritarianism. While pure scientific research is time

¹⁶ Ed Yong, “What Exactly Are People Marching for When They March for Science?”, *The Atlantic*, www.theatlantic.com/science/archive/2017/03/what-exactly-are-people-marching-for-when-they-march-for-science/518763/

¹⁷ Ibid.

consuming and involves public funding the gains of technology are easily accessible and rarely challenged. While communicating science and knowledge is a role of experts, a just movement towards science and scientific approach and scientific temper is desirable for a modern, egalitarian society.

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