

Promotion of science & technology with culture as its foundation

Hiroyuki ABÉ

Professor Emeritus at Tohoku University / Former Executive Member of the Council for Science and Technology Policy

Preface

The quest for scientific facts and value recognition for creativity are both artifacts of their underlying culture, as pointed out by Max Weber (the sociologist/economist), Silvano Arieti (the psychiatrist) and many other predecessors. In this article, I would like to describe their contemporary meanings.

The science and technology competitions of today's world have been steadily intensifying. They have been driven by the widely disseminated understating that science and technology are at the core of each nation's international competitiveness including its economic power and the sustainable prosperity of human society. As is well known, each national government has been competing to increase budgets for science and technology as well as placing emphasis on relevant institutional reforms and human resource development. There is no doubt that each government's ambition and policies, as well as their continuation, will greatly affect its nation's future development. However, in my opinion, national culture, especially spiritual culture, is equally or perhaps more essential. To put it plainly, culture related to value judgments on science and technology as well as atmosphere with eagerness to foster such culture would be at least equally essential.

About creativity in particular

As mentioned in the Budapest Declaration adopted by the World Conference on Science (1999), "the fostering of creativity" is a fundamental issue for both science and society. This point must be repeatedly underscored.

There are many Nobel Laureates in the US, with those in the three scientific fields (physics, chemistry and physiology or medicine) accounting for over 43% of the world's total. Meanwhile, in terms of the percentage of the national population, the US falls behind not only Switzerland, who tops the list, but also several other European countries. In this regard, the US is not necessarily so successful. However, since World War II, more than half of the Nobel Laureates have come from the US. In addition to a great number of these award winners, the number of world-class researchers in various fields, including those not covered by the Nobel Prize, has been increasing, such researchers mutually competing in dozens of American universities and research institutions. In this sense, the US certainly dominates other nations. Such dominance has seemingly resulted from the nation's background where culture has been fostered in a way as to place high value on creativity. This is the reason why leading-edge scientists around the world are most interested in research trends and evaluations in the US.

As a matter of fact, creative scientific and technological research works as represented by the Nobel Prize have been almost entirely monopolized by Western countries.*¹ If there is an exception, that would be Japan as it now stands. Japanese people

seem to have been endowed with a suitable socio-cultural environment for their creativity. Needless to say, this environment is still insufficient, and would be on the decline if we kept our arms folded.

The following are socio-cultural factors required especially for Japan with regard to creativity.

- (a) The fostering of future-oriented culture
 - Emphasis on creative career
 - Education to foster creative minds and entrance examination reform to this end*²
- (b) Acceptance of diversity and different cultures, and resulting inspiration
- (c) Other points of concern
 - Attention should be paid to both selection & concentration of support for mega science and a continuous & diverse sense of value of science funded by small-scale research budgets.
 - Supremacy of efficiency is not appropriate for excellent academic research and education.

The above factors are compiled by this author, but over half of them coincide with the insights of Arieti*³ and other intellectuals. According to Arieti, inspiration from different cultures is the reason why there are so many Nobel Laureates in Switzerland.

Toward creation of a future society

*¹ : Many reasons have been considered. As one of the most distinguished reasons, there is a detailed analysis which describes the major role of Protestantism (*Social Theory and Social Structure: Toward the Codification of Theory and Research*, Robert King Merton, Free Press, 1949). However, there are quite a number of exceptions. In addition, if such religious confinement is set up, youths might get a wrong prevision about their future. This author highly appreciates the historical role of Protestantism but believes that such confinement should not be endorsed.

*² : If three key words for education to foster creative minds are cited, maybe they are creation, ethics and cultural backgrounds. Due to limitations of space, please refer to Chapter 5 of the book mentioned in footnote 7. In order to emphasize these three, various ways have been devised in Western countries. Looking at the current situation in Japan, its direction can be said to be antithetical (i.e. centering on knowledge as information) as a result of past experiences and developments over the years. Countermeasures are fundamentally required, and for this purpose such insights as Kiyoshi Miki's criticism against entrance examinations and Masao Maruyama's whole concept of university education serve as reference, to name a few. In addition, it is worth taking a look at John H. Newman's assertion about compatibility between so-called vocational education and "intellectual training" or superiority of the latter ("Toki no Nagare wo Koete—J. H. Newman wo Manabu—" (Beyond Passage of Time: Learning from J. H. Newman), written and edited by Nihon Newman Kyokai (the Japan Newman Association), Kyoyusha, 2006).

*³ : *Creativity: The Magic Synthesis*, Silvano Arieti, Basic Books, 1976.

Human beings are now struggling over how to create a 21st-century society, while tackling various conundrums related to the global environment, food, population, disparities, and infectious diseases, etc. From a historical point of view, human beings seem to become wiser little by little. However, it is also true that they are haunted by various new dangers, including those with a likelihood of large-scale downfalls such as mass murder.

In such circumstances, I wonder what kind of nation or society Japan intends to build.^{*4} The role of science and technology is surely significant. When conducting scientific research and developing technology, or during the process of innovation, qualitative selection of science and technology is required together with creation.^{*5} During the process of such selection, transnational persuasive power and understanding of regional societies are essential. Furthermore, we need to clarify and convey how attractive the Japanese socio-cultural environment is, and it remains to be seen how much understanding and trust we can gain.

Value and success or failure of science and technology, from the new seed, cultivation, fruition through to social demand, largely depend on cultural backgrounds, a sense of ethics, a sense of civilization, as well as the creativity of those involved. The same applies to the argument about what kind of capitalist society should be aimed at.

^{*4} : Japanese citizens often request the Prime Minister as the chief executive to present the nation's future vision, which is their utmost concern. However, it has been as if they seek something that they can't receive, because preconditions have hardly been met. To put it plainly, it is essential that academics and intellectuals should provide various draft proposals and arguments as preconditions, which have been unfortunately scarce so far.

^{*5} : The argument about "dual use", which has been highlighted by The National Academies (US) and others, is part of this movement. In addition, so-called "fraud prevention" will become subject to severer scrutiny. Furthermore, "ethics" should not simply focus on a self-discipline aspect as in "fraud prevention." Also, we need to discuss "what ethics ought to be" from a more forward-looking point of view toward the future of human society.

As for Japan, its spiritual culture has been denied from its very foundation, or at least disregarded especially since the end of World War II due to reflection on its past conduct. Such denial or disregard surely had significance to some degree, but the subsequent construction of a new ethos^{*6} has been neglected. It is largely because Japan has been in some sort of privileged environment where people can work toward economic development just by catching up to and improving foreign science and technology such as that from the US.

Japan in the 21st century needs to become a society which creates and realizes its unique wisdom. With this in mind, we can say that there would be no future without seriously considering the role of spiritual culture. In this regard, however, we should not build our spiritual culture with haste, since multidimensional thoughts and discussions are essential. Clues for this purpose seem to be found in the wisdom of our predecessors.^{*7}

^{*6} : Moral custom / atmosphere which prevails in an ethnic group or society (Kojien).

^{*7} : "Kagaku Gijyutsu to Chi no Seishin Bunka—Atarashii Kagaku Gijyutsu Bunmei no Kouchiku ni Mukete" (Science & Technology and Ethos of Knowledge: Toward Construction of a New Civilization of Science & Technology), edited by JST Research Institute of Science and Technology for Society, Maruzen Planet, 2009. This author and others position the above-mentioned book as the argument-starter for this article.

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E-mail: ronsetsu@chemistry.or.jp

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