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EAJ Urgent Proposal 2019
"To Stop the Fall of Japan's Level of Engineering and Technological Sciences"
(Summary)

Science and Technology level of Japan shows a serious decline in international competitiveness according to such indexes as the number and quality of academic papers published and world university rankings. No reforms or political measures have proven effective to stop this trend, which implies tremendous negative impact on Japan's future competitiveness including that of industry.

Hereupon, a serious reflection is being made that our science and technology policies and university reforms have been so inward-looking to get out of step with the other developed countries. The Engineering Academy of Japan (EAJ) once made an urgent proposal in this regard in May 2017. Taking an opportunity for the government to draw up the next Basic Plan for Science and Technology, we would like to remind of this pressing issue following up our proposal 2017.

[1] Strengthening of university research

Having a group of excellent universities is extremely important for a country because it is regarded as the fundamental strength of the country. Through raising of public understanding and support of this important issue, the level of basic research should be further enhanced to fulfill the primary role of universities.

Providing more stable and ample public funding is inevitable to encourage universities to tackle reforms and improvements in longer-range perspective. Continued efforts should be made toward increased small-scale funding opportunities as well as focused funding for the most promising researches. A better environment to concentrate on research and education should be facilitated easing administrative burdens on universities and professors from frequent policy changes. On top of that, undertaking a policy of forming a group of diversity-oriented leading universities besides encouraging competition among top-ranking universities is essential.

[2] Deepening of collaboration between industry and university

The missions of a university are, through on-target education, to produce human resources who can play a leading role in society and the world of academia in the next generations and to create seeds of innovation in the academic research. Universities are responsible for developing the knowledge base, and industry is responsible for creating socio-economic values. Both should co-create and co-operate with each other fulfilling their respective roles. In this regard, with the all-out cooperation and support of industry, an optimum funding system should be explored and developed among industry-university joint research funds from private sources, allocated basic expenses and competitive research funds from the government.

Universities should strive for autonomy as the originally required form of management. The top executives of universities must reconfirm their responsibility of developing and implementing the university visions and strategies. They should also work harder to boost incomes for the universities.

The government, on the other hand, must accelerate institutional reforms to expand funding opportunities from private sources to universities and make them available more

flexibly.

[3] Strengthening of young human-resource development and facilitating of the mobility of human resources

In order to nurture young researchers, securing of support funds for students in the doctoral course, possibly from out of the external funds that universities and professors would receive, is essential, and such an institutional reform of graduate schools should be push forward. In order to facilitate young researchers to go abroad, overseas working experience should be more valued in recruitment of research staffs at universities, public research institutes and private companies. Universities and the government should provide brilliant young researchers with more opportunities for forming diverse human networks at home and abroad.

The mobility increase of human resources in society as a whole is another key to stimulating the mobility of research personnel. Linkages and cooperation among industry, university and the government are imperative. Radical increase in the number of foreign professors at university is also required. Active transfer of human resources among universities and public research institutes at home and abroad should be accelerated, for example, through introduction of the annual salary system on a full-fledged basis.

[4] Venturing into new disciplines

A serious concern is expressed that research in Japan is increasingly conservative and getting out of step with the global trend. In other words, evolved-type researches in the disciplines that have substantial results in the past are increasing and researches that would open up new disciplines are decreasing. Inviting widely from the world those who have an excellent insight both in academic and technological areas and are able to evaluate researches from world-level perspective is needed.

Universities should play the primary role in basic research that would generate new disciplines and contribute to society. While universities are required to encourage researchers to aggressively enter into new disciplines, the government should facilitate a system like competitive research funds that would proactively support the above-mentioned efforts at universities. Younger researchers are especially expected to discover high-impact themes from around the unexplored virgin areas, tackle them and achieve outcomes.

Mathematical science, such as mathematics and statistics, and informatics are increasingly gaining recognition as the basis of scientific research and industry. Enhancing of mathematical science and informatics and producing excellent human resources who will be required and play a leading role in society are essential.

[5] Conducting of a comprehensive review of key reforms and policies

Based on a comprehensive and international review of the reforms and policies during the first twenty years of this century in comparison with other countries, a framework for future policy development should be established.

In university, the president's duty is improving of the research and educational environment. Universities should make every effort to aspire to becoming a world-class model on the basis of comparative review of the developed countries, while at the same time the government should endeavor to provide more internationally comparable data in statistics on universities.

As the efforts toward the realization of the above, gaining the broad support of the people and society is absolutely essential. Sparking of wider discussions is what we want.

The EAJ will continue discussions on the innovative R&D system unique to Japan and make proposals in a timely manner. Any comments from interested parties will be most welcome.