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I. Our understanding of the status quo of S&T (Science & Technology) in Japan

1. S&T as a source of national competitiveness

In the face of intensifying global competition, the accelerating ageing of society, global warming and increasingly severe environmental issues, our country faces many challenging issues. The accelerating growth of the new economies increasingly threatens our country, not only in terms of the rate of economic growth, but also in innovation and its base, S&T.

Our capability in S&T will inevitably decline in relative terms over the long run if we take no action, together with our national competitiveness. There is no doubt that S&T forms the foundation to create new knowledge to shape a brighter future. S&T is also expected to play a significant role in achieving national policy initiatives. For example, S&T is critical in achieving a resilient economy and industry, based upon a series of innovations. Through S&T, both a sustainable society and economic development can be attained. It is technological breakthroughs through the advancement of S&T that will help sustainable economic growth and resolve issues related to global warming.

In order to meet these expectations, we need to maintain and further strengthen our S&T capabilities. Our task starts with the thorough investigation of our country's S&T capabilities to allow us to identify our areas of strength. We need to create, protect and apply knowledge assets and implement R&D management systems, in line with the national policy initiatives. In this way, we can ensure that the policies are effective and efficient.

2. Development and retention of excellent human capital; foundation of S&T

It is indispensable to develop and retain people equipped with a high level of scientific

knowledge and capability. These people include researchers and engineers of high caliber. It is critical that we create a “virtuous cycle” of highly competent people with science & technology backgrounds who can compete and collaborate in the global arena. To do so, universities and graduate schools are required to continue their efforts in developing high caliber people AND providing excellent development opportunities for such people to prosper.

Looking at the situation in Japan, however, we conclude that there is much room to make improvements to the quality of the human capital that is currently available. Fundamental and underlying issues include the absence of attractive career paths for scientists and engineers. The dwindling interest among younger students in science and technology and the increasing lack of understanding among adults about science seem to be at the root of the problem. We need to take immediate and comprehensive action to develop people of high caliber, as it is human capital after all that forms the foundation of a science & technology-based country. Without such people, the country cannot prosper.

3. S&T policy well-supported by the public

S&T policy can only achieve the expected results of national policy initiatives when the public and society at large understand and support it. Thus, we need to design a mechanism through which the policy initiatives are planned, implemented, checked and acted upon based upon results. With this mechanism in place, a process starting with the creation of new knowledge will end with the most effective outcome. We need to ensure that S&T can bring about tangible social benefits. People should be able to feel the real value of S&T discoveries.

For people’s desires such as “building a safe and secure society” and “living a healthy and safe life” to be realized, we need to take the “customer” and “public” perspective and aggressively apply new findings in S&T.

II. Programs to strengthen the foundations of S&T

1. Development and implementation of strategy to create “revolutionary/epoch-making technology”

It is indispensable for Japan as a country to continue creating and developing revolutionary and epoch-making technologies in order to realize sustainable economic growth. CSTP will collaborate with the Council for Economic and Fiscal Policy (CEFP) to promote technologies that will encourage national growth to make this happen. Our efforts will focus on various initiatives to strengthen the technologies in which Japan

now leads the world. A new strategic initiative entitled “Creation of Revolutionary Technology” will be developed and implemented together with the CEFPP.

CSTP will closely examine the following items.

- a. Promote revolutionary and epoch-making basic research and sources of future economic growth

CSTP will invest heavily to create a series of (i.e. not one-shot) breakthrough technologies with huge spillover effects. It will develop specific programs to identify basic research seeds and to allocate resources efficiently and effectively to ensure continuous advancement. One typical example of this is IPS research which is expected to have tremendous spillover effects. For this type of research, a long-term perspective as well as practical approach to commercial application is needed.

This kind of organizational arrangement, which goes beyond one discipline or institution, is needed so that the knowledge and wisdom of diverse fields can be applied at the optimal level. In addition, management of the total process starting from basic research, application and commercialization is critical. For these arrangements and processes, CSTP will make sure that leading infrastructure and centers of excellence in research are built immediately.

- b. Enhance support to create and continue innovation

CSTP will enhance support mechanisms to further strengthen leading technologies in the private sector, and to commercialize the outcome from public R&D. Specifically, we will take proactive measures to build infrastructure to create and continue innovation. These include new tax policies to promote R&D and regulatory reform. Various mechanisms to give incentives to R&D efforts in the private sector will be examined, including open use of national research institutions and facilities.

- c. Promote projects to bring about tangible benefit to the public

CSTP will promote the Social Benefit Acceleration Project from Innovation25. The purpose of the program is to ensure that the public feels tangible benefits from the discovery and outcome of S&T. Above all, we will investigate specific programs to introduce ubiquitous technology and robotics to households and the workplace to make life easier and more comfortable for the elderly and handicapped.

- d. Develop and implement IPR strategy to improve competitiveness

In today's global competition for innovation, it is indispensable to include R&D

activities at universities and research institutes within a “Knowledge Creation Cycle” in which intellectual assets can be created, protected and applied. We will examine R&D activities by focusing on the “output”, such as Intellectual Property Rights and International Standards. The objective is to conduct R&D activities more strategically and effectively.

2. Development of plan to further advance environment and energy-related technologies

CSTP is developing a plan to further advance “Environment and Energy Technology”, capitalizing on the timing of Japan’s hosting of the G8 summit. These technologies are expected to resolve global issues, such as energy and global warming, in unconventional ways. Under the plan, CSTP will try to ensure that our country maintains a leading position in energy efficiency and environment-related technologies.

III. Strategic initiatives for high priority issues

1. Promotion of science and technology as a foreign diplomacy policy

CSTP will coordinate S&T policy and foreign policy so that synergistic effects from science as foreign policy can be achieved. For example, CSTP proposes that the Japanese government takes leadership in resolving global issues by managing the agenda setting and discussions at the G8 science advisor meetings and on other such occasions.

2. Development and promotion of comprehensive area-based S&T strategy

In order to mark a clear departure from the traditional centrally-controlled S&T policy, a comprehensive area-based S&T strategy will be developed and promoted. This is the only way regions can be revitalized, as it allows business, academia and the local public sectors to collaborate fully in rejuvenating economic growth in the area. CSTP will ensure that the locus of decision and responsibility shifts to the regions, while the central government and administration supports local initiatives and eliminates the obstacles for local autonomy.

3. Development of researchers and engineers of high caliber

It is indispensable to identify and develop people equipped with world-class capabilities at universities and graduate schools, with the increasingly globalized competition for S&T. CSTP proposes the improvement of curriculum and coursework to be on a par with the global standard. CSTP will examine how we can assess the quality of people with advanced degrees.

We consider it imperative to achieve diversity - whether in terms of gender, nationality, or background - at Japanese universities and research institutions. CSTP will take specific action to increase Japan's ratio of women and international researchers, for example, which is extremely low compared to other advanced economies.

Investment should be increased for the next generation of researchers to shape the future. Competitive funding, specifically targeting young researchers and those in doctoral programs, will be increased.

It is devastating to find that children's interest in science and technology in Japan is ranked at No. 56 among 57 countries. CSTP will examine specific policies and programs to improve the quality of teachers and other means to stimulate interest in S&T among children. Ways of increasing the awareness and interest in S&T of adults will also be examined.

4. Research infrastructure and regulatory reform

CSTP will examine how to align relatively large-scale infrastructure for research (facilities, information etc.), with national priorities in S&T. This will be examined as a part of the resource allocation of the national S&T budget.

5. Reform of R&D management

CSTP will ensure a smooth and speedy PDCA (Plan-Do-Check-Act) cycle in S&T, in order to ensure policy initiatives are implemented. The PDCA cycle in this case proceeds with the following steps:

- 1) R&D target-setting in line with S&T policy targets
- 2) Implementation of R&D activities
- 3) Assessment of the outcome
- 4) Feedback loop and action based upon the outcome

The most effective and efficient R&D management process is likely to differ depending on the type of R&D, organizational structure, and the objective of the assessment.

Comprehensive guidelines for R&D assessment will be revisited and examined to improve current assessment practice.

6. Safety and security of the public

CSTP will ensure that the most advanced S&T, such as clinical research in the field of regenerative medicine and GMOs (Genetically Modified Organisms), can be translated into tangible value and benefits for society. When doing so, the safety and security of the

public becomes one of the highest priorities.

With these six issues as high priority issues, CSTP will examine and analyze the status quo and develop policy directions. The results of our review will be reflected in the fund allocation for 2009.