

Strategy for Science and Technology Innovations – Expectations for Solid State Devices and Materials –

Kazuo Kyuma

Council for Science, Technology and Innovation, Cabinet Office
1-6-1 Nagata-cho, Chiyoda-ku, Tokyo 100-8914, Japan.
Phone: +81-3-5253-2111

1. Sustainable Economic Growth

Strategic creation of innovations is necessary for achieving both sustainable economic growth and fulfilling life quality.

Innovation is a driving force to change society and/or industry by means of developing new technologies and products based on invention and discovery. Innovations could be categorized into two types as shown in Fig.1. One is a sustainable innovation, which makes continuous improvement of product values. The other is a disruptive innovation, which leads to a paradigm shift.

In either case, the innovative talents are essential to generate sprouts of innovations and to fructify innovations as businesses.

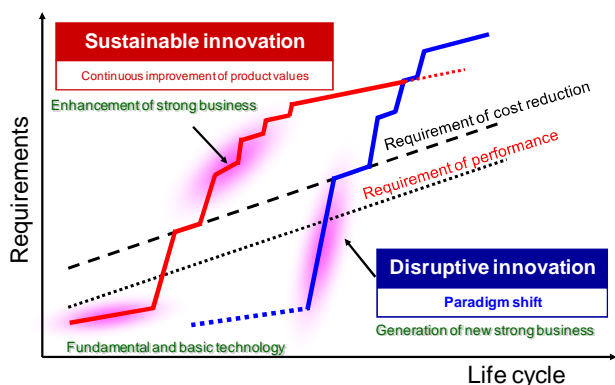


Fig.1. Sustainable innovation and disruptive innovation.

2. Promoting Science and Technology Innovations

Today, Japan is promoting “Three Arrows” policy which consists of aggressive monetary policy, flexible fiscal policy and new growth strategy to achieve both economic revitalization and sustainable economic growth. Science and technology innovations are addressed as one of the most important driving forces of the growth strategy. The Council for Science, Technology and Innovation (CSTI) takes the bird’s eye view of all Japanese science and technology, and formulates comprehensive policies for the creation of innovations. In the comprehensive policies, CSTI promotes to address the five grand challenges for realizing ideal society in 2030 as follows:

- (1) Realization of clean and economical energy system
- (2) Realization of healthy and active aging society
- (3) Development of next generation infrastructures
- (4) Regional revitalization taking advantage of the regional resources
- (5) Recovery and revitalization from the Great East Japan Earthquake

Semiconductor devices, nano-electronics, material science, information and communication technologies, environmental technologies are included as common fundamental technologies in cross-sectional way.

To solve the five grand challenges, CSTI has defined “Action Plan” and set the priorities on important actions to be taken for science and technology, and established two programs as follows:

- (1) Cross-ministerial Strategic Innovation promotion Program (SIP)
- (2) Impulsing Paradigm Change through disruptive Technologies program (ImPACT)

SIPs are managed by well versed Program Directors (PDs) in project management, aiming to create science and technology innovation by doing basic research to commercialization through cross-ministerial cooperative program. The ten subjects, including next generation power electronics, innovative structural materials and others, were chosen as SIP. On the other hand, ImPACT programs are managed by producers to whom all the significant authority over planning, acting and managing the project is given, aiming to create innovations which possibly revolutionize industries and/or society through high-risk/ high-impact R&D(s). The twelve issues, including ultra low power consumption spintronics, highly sensitive sensors, robotics and others, were selected as ImPACT programs.

3. Construction of new business model

The perspective of the balance between needs oriented R&D and seeds oriented R&D is required to create innovations. Too much emphasis on needs oriented approach could make fundamental and basic technologies weakened. On the other hand, overemphasis on seeds oriented approach may not be able to achieve the trinity of performance, quality and cost for winning in business, nevertheless revolutionized technologies are created.

The integration of inimitable soft-wares into innovative hard-wares is necessary to create novel values. The importance is a creation of new business model which provides solutions to customers by means of the integrated module with both inimitable soft-wares and innovative hard-wares keeping the trinity. To provide the solutions, it is also necessary to collaborate with engineers/ scientists of diverse fields beyond the wall, from material to application/ system, as well as the correct recognition of customer needs in respective country and region.

The SSDM has produced outstanding results in the diverse fields, such as semiconductor devices, nano-electronics, material science, information and communication technologies, environmental technologies. I expect that the SSDM will lead the creation of science and technology innovation which will realize both of sustainable economic growth and fulfilling human life.