

## **Transformative Science, Technology and Innovation Policy and Transdisciplinary Research**

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Science, technology and innovation (STI) policy has gradually changed and expanded its framework in response to changes in the socio-economic system and international environment of each era, as well as in science and technology itself. At present, the need for transformative innovation oriented towards the transformation of social systems is increasing in response to the accelerated development of emerging technologies and their growing social impact, as well as the growing need for social transformation to achieve a sustainable and resilient society.

The European Union (EU) and European countries are in the process of implementing mission-oriented innovation policies that set specific goals (missions) with defined timelines for achieving long-term societal transformations, such as carbon neutrality, and that promote research and innovation in an integrated manner through various policy measures. The Organization for Economic Cooperation and Development (OECD) is also developing a framework for the governance of emerging technologies such as artificial intelligence (AI), neurotechnology and synthetic biology. It is intended to integrate, from a more upstream stage and in parallel with research and innovation activities, the articulation of values and norms related to such technologies, the formation of specific rules and regulations, and the engagement of civil society and stakeholders and the realization of a reflexive learning process through these activities. In Japan, strategic goals for long-term societal transformation, such as Green Transformation (GX) and Society 5.0, have been set, and in STI policy, the Cabinet Office's Cross-ministerial Strategic Innovation Promotion Program (SIP) has strengthened its inter-ministerial coordination function. In addition, Moonshot R&D programs that aim to develop the technologies needed for the future society of 2050 are required to address ethical, legal, and social issues (ELSI) in an integrated manner with R&D.

This paper presents the situation of STI policy at this turning point and the national and international trends in policy responses. There is a need for a transformation of the governance system of STI policy itself. Such a transformation should include: i) a whole-of-government coordination system that includes not only ministries in charge of research and innovation policy but also those in charge of sectoral policies; ii) the involvement and direction of activities and funds of various stakeholders in society; iii) the creation of communities and innovation ecosystems around local or specific social issues; and iv) the

building of government capacity to enable these. It is expected that research and innovation activities carried out within such a policy framework will inevitably have a more transdisciplinary aspect. Finally, the implications of these policy trends for university research and education are discussed.

**Keywords:** Transformative Innovation, Mission-oriented Innovation Policy, Emerging Technology Governance, Transdisciplinary Research