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Understanding sustainability innovation as a social process of knowledge transformation

ABSTRACT. Sustainability concerns long-term constraints on resources including energy and water. It is crucial that diverse types of knowledge be integrated effectively for encouraging innovation for sustainability. To understand the mechanisms of sustainability innovation, the social process of production, diffusion, and utilization of various types of knowledge needs to be analysed. The cases of photovoltaics and water treatment technologies suggest that gaps and inconsistencies in the knowledge circulation system could pose serious challenges to the pursuit of sustainability innovation. The development of photovoltaics illustrates a significant transition in the knowledge system from one based on R&D projects supported by the public sector for basic scientific knowledge to another based on investments in production facilities by private funds for societal diffusion. The pattern of innovation through university–industry collaboration, which has functioned relatively well for creating scientific knowledge in the past, may not be working in utilizing financial knowledge. For sustainable water management, various types of knowledge are required, including demand prediction, water treatment technologies, water management systems, infrastructure, and laws and regulations. The traditional innovation system focusing on specific technological development may not function effectively. Various types of knowledge need to be integrated and utilized effectively for water management systems through strategic collaboration between the public and private sectors. In addition to the approach of innovation systems with a particular focus on their structure, it would be useful to identify in a dynamic framework the relevant functions of innovation systems and to establish linkages between these various functions through a process of knowledge transformation in society.

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