

Innovations, Institutional Linkages and Knowledge Production: A Case of Solar Energy Sector in India

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The study is motivated by the need to accelerate the supply of renewable energy with special focus on solar energy with a vision of affordable and reliable clean energy because it addresses the issue of climate change and fostering sustainable development in India. Energy is an important sector for economic growth of a nation like India. The country's economy is one of the fastest growing economies in the world. Due to the rapid growing population and growing economy, the consumption in energy sector has increased rapidly in the country. There is a wide gap between the country's energy production and the energy consumption (Krishna, C., Sagar, A.D. and Spratt, S., 2015). According to Ministry of New and Renewable Energy, solar energy promotes the ecologically sustainable growth and also addresses the country's energy security challenge among the various forms of renewable energy. It is also one of the promising sectors which discourse the issues of climate change under National Action Plan on Climate Change. Recently the government of India launched "National Solar Mission" which target the country as one of the global leader in terms of solar energy production, promoting R&D and developed trained human resource for solar industry. Knowledge production refers here the research outcomes such as patents and research publications from the various R&D institutions, university, firms etc. Linkage means the interaction or collaboration between various actors and institutions who shape the solar energy sector in the country. And innovation stands here the ability to absorb, adapt and transform a given technology into specific operational, managerial skills that accelerates an innovative organizational culture, characteristics of internal promoting activities and capabilities of communication facilities of firms to others in both market or non-market relations.

The main objectives are to explore the knowledge production and its transformation or functioning in the sector, to study the dynamics of innovation in the domain of solar energy and to assess the role of public policies on solar in support of R&D. The sectoral system of innovation framework is adopted for this study. For understanding the knowledge production we use bibliometric exploration from Scopus online database and for the analysis of patents we are mapping with the help of USPTO (United States Patent and Trademark Office) and IPO (Indian Patent Office). The study highlights the number of research publications and patents has been increased in the country and there is a significant presence of productive R&D organization, academia and supportive policy initiatives. The country ranks among the top ten country in terms of knowledge production pertaining to the field of solar energy and particularly having the maximum publications in the area of poly-crystalline, thin film and dye-sensitized technologies. However, the country is far behind others in terms of investment in solar R&D. This paper also addresses the research trust area in various emerging solar technologies in the country and explores the ways in which various actors, agencies and policies shape the solar sector from the different perspectives on innovation literature.