

and the creation of a virtuous cycle between R&D, market growth and price reduction: The case of photovoltaic power generation (PV) development in Japan.

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Industrial dynamism and the creation of a "virtuous cycle" between R&D, market growth and price reduction: The case of photovoltaic power generation (PV) development in Japan

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Abstract

In light of the global environmental consequences of CO₂ emissions resulting from energy use, systems options for the rational use of energy, particularly of energy efficiency improvement and renewable energy technology, have become crucial. Despite its leading efforts in developing extensive renewable energy, Japan has not necessarily achieved comparative advantage in this field owing to inherent resource constraints for renewable energy. One of the exceptions is photovoltaic power generation (PV).

PV is considered to be a "footloose" renewable energy which is expected to overcome Japan's own geographical disadvantages as a technology breakthrough. MITI

...the Japan's own geographical advantages as a technology, creating a virtuous cycle (Japan's Ministry of International Trade and Industry) initiated PV development under its Sunshine Project (R&D Program on New Energy) aiming at maximizing these advantages by: (1) encouraging the broad involvement of cross-sectoral industry, (2) stimulating inter-technology stimulation and cross-sectoral technology spillover, and (3) inducing vigorous industry investment in PV R&D, leading to an increase in industry's PV technology knowledge stock. An increase in this technology knowledge stock contributed to a dramatic increase in solar cell production. These increases led to a dramatic decrease in solar cell production price, and this decrease induced a further increase in solar cell production. An increase in solar cell production induced further PV R&D, thus creating a "virtuous cycle" between R&D, market growth and price reduction.

This paper, on the basis of an empirical analysis of Japan's PV development, demonstrates the industrial dynamism of this "virtuous cycle" as a policy initiative.



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Keywords

PV; Virtuous cycle; Technology spillover; Learning exercise; Technology stock

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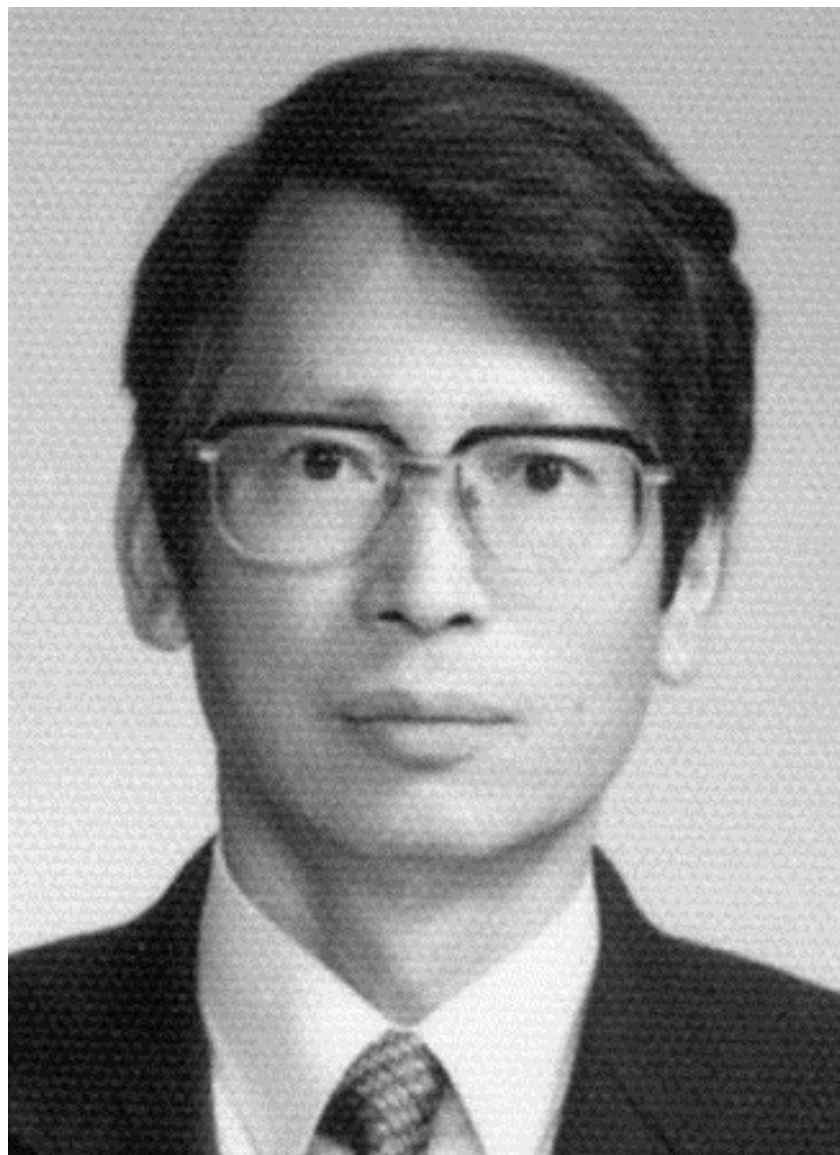
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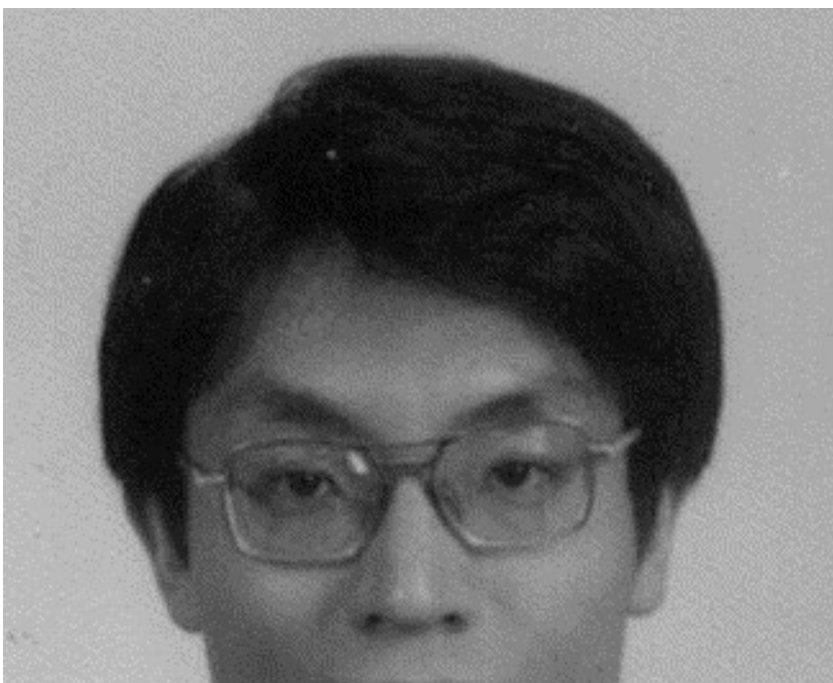
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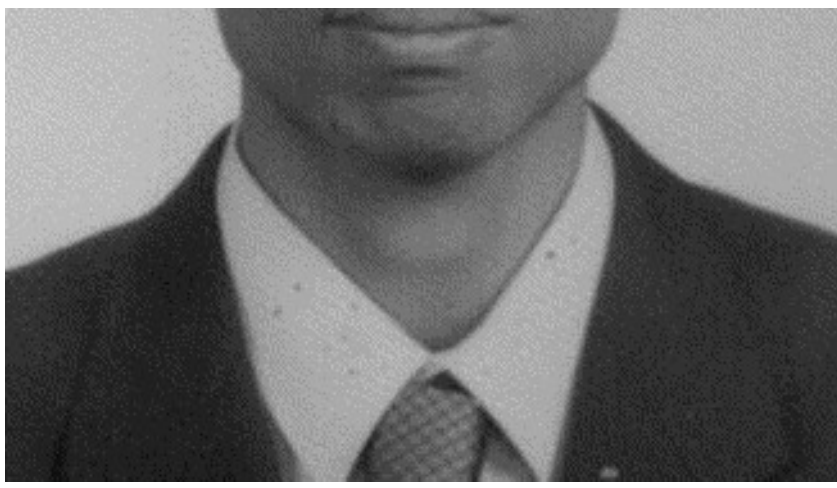




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