

INNOVATION AND NEW PATH CREATION IN THE MODERN WIND-POWER INDUSTRY: AN INTERNATIONAL COMPARISON

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Introduction

- ▶ The research is part of a pilot project on ‘Regional Clusters of Innovation in Clean Energy Technologies’ led by Oxford Brookes University.
 - ▶ Why this topic?
 - ▶ The paper presents the findings from **empirical research** based on interviews with inventors in the wind–power industry operating in three different countries: **Germany, Great Britain and Italy.**
 - ▶ Why empirical research?
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Theoretical background

- ▶ Evolutionary economics / Path dependency theory – David (1985) and Arthur (1989)
 - ▶ Four phases of technological development: Martin and Simmie (2008) and Simmie et al. (2008)
 - ▶ Focus on path creation – drivers and barriers identified by the literature
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Main research questions

- ▶ Which are the factors that favour the generation and the development of new or improved technological paths in the wind–power industry? Are there major differences in the presence of these factors in the different OECD countries under analysis?
 - ▶ What is the nature of innovation in the wind–power industry? Are innovations in this industry more likely to be radical or incremental?
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Research Methodology

- ▶ Brief overview:
 - ✓ Population– ESPACENET patent Database
 - ✓ Letters to inventors
 - ✓ Telephone interviews with a self–selected sample
 - ✓ Sample reached – GB: 12/100; D: 13/200; I: 16/143
 - ✓ Data analysis

 - ▶ Limits of the approach:
 - ✓ Reliability and completeness of ESPACENET Database
 - ✓ Self selected sample
 - ✓ Difficult to approach firms in Germany and Italy – loss of commercial information
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Empirical analysis: an international comparison

- ▶ Outcomes from the interviews with inventors/patent applicants in Germany, Great Britain and Italy...

1st R.Q. Niche environments

		Germany	Great Britain	Italy
DRIVERS BARRIERS of INNOVATION	Physical/geographical environment	✓	✓	✓
	Culture	✓	✓	✗
	Political will and support	✓	✓	✓
	Complementary industries/technologies	✓	✓	✓
	R&D	✓	✓	✗
	Lobbies	✓	✓	✗
	Competing industries and vested economic interests	✓	✗	✗
	Availability of finance	✗	✗	✗

- ▶ Different levels of development in the wind power industry in the 3 countries that could be explained by the dissimilar presence of “drivers” and “barriers”.

 - ▶ The countries can be placed on a scale with different levels of innovation:
 - ✓ **Germany** at the upper end
 - ✓ **Italy** at the lower end
 - ✓ **GB** in-between

 - ▶ **Niches** considered as necessary environments for innovation to occur and they were mainly regarded as “places” where the main **drivers** are in place
 - main innovations from large companies in Northern European countries
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2nd R.Q. Types of innovation

- ▶ The wind–power industry has been characterized by **incremental innovations** rather than radical/breakthrough innovations:
 - ✓ Continual improvement, development and modernisation of old technologies.
 - ✓ Transfer of knowledge from other industries.
- ▶ This evidence reinforces the argument that the existence of other industries producing similar or complementary technologies is a favourable pre–condition for the creation of new technological paths in the wind–power sector.

Additional evidence emerging

- ▶ Diffusion of innovation :
- ✓ **Venture capital investment** is the most frequently cited together with marketing and informal networks related to **large companies**.

- ▶ Possibility of wind power replacing other forms of energy generation:
 - ✓ It could not alone entirely replace other forms of energy.
 - ✓ Use wind energy in combination with other renewable energies.
 - ✓ It will eventually be exploited more, especially if traditional forms of energy come to an end (market demand).

- ▶ The role of **institutions and policies** in providing incentives and financing will be crucial for the wind energy industry to further expand and develop.

Summary and conclusions

- ▶ **Pilot project** : the findings rely only on the information obtained through the interviews with inventors, thus further evidence needs to be acquired by investigating policies at both national and regional levels.
- ▶ **Niche environments** are necessary sets of conditions for **innovation** to occur.
 - ✓ Empirical evidence shows that innovations mainly took place where a favourable physical/geographical environment, cultural predisposition, political will, the existence of particular industries and R&D were present.
 - ✓ Theoretical foundation in the arguments related to the pre-formation and path creation phases of path dependency theory.
- ▶ The wind-power industry has experienced **gradual** and **incremental innovations** rather than radical innovations.

Thank you for your attention

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