

The Resilience of Clusters in the Context of Increasing Globalization: Lessons from the Wind Energy Industry

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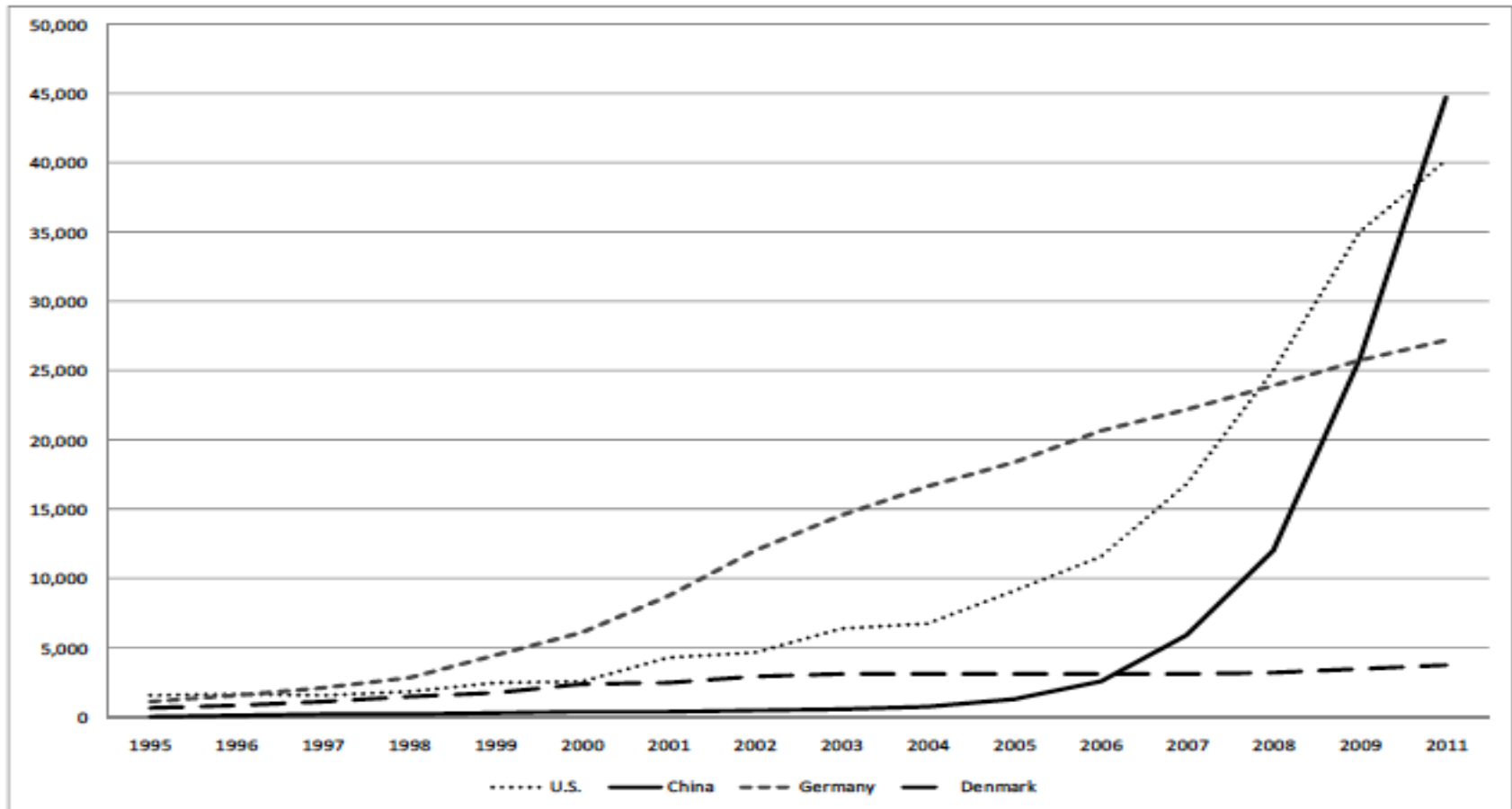
Why is the wind power industry an interesting case?

3 stylized facts

#1. High growing:

in 2012 the world installed capacity was four times that of 2006

Figure 2.2 Cumulative installed wind power capacity, 1995–2011 (MW)



Sources: Earth Policy Institute (2010) and WWEA (2011).

#2. Rapidly globalizing

- **On the demand side**, the market is shifting from Europe (where it is growing slowly) to Asia, mainly to **China** (in 2012 accounting for half of the global market);
- **On the supply side**, European (Danish, German and Spanish) firms are still dominating the global market but they are steadily losing their position as **Chinese and Indian companies are entering the industry**: in 2011 4 Chinese and 1 Indian companies are among the top ten turbine manufacturers.

Table 1. Global top ten turbine manufacturers: 2003 and 2011. (World market shares %)

2003		2011	
Vestas (DK)	21.80	Vestas (DK)	12.70
GE Wind (US)	18.00	Sinovel (CN)	9.0
Enercon (DE)	14.60	Goldwind (CN)	8.7
Gamesa (ES)	11.50	Gamesa (ES)	8.0
NEG Micon (DK)	10.30	Enercon (DE)	7.8
Bonus (DK)	6.60	GE Energy (US)	7.7
Repower (DE)	3.50	Suzlon (IN)	7.6
Nordex (DE)	2.90	Guodian United Power (CN)	7.4
Made (ES)	2.90	Siemens Wind Power (DK)	6.3
Mitsubishi (JP)	2.60	Ming Yang (CN)	3.6
Others	5.30	Others	21.2

Source: BTM (2004) and IHS Emerging Energy Research (2012).

#3. Medium technology intensity

- **Onshore technology:** rather standardized. Due to different incentive structures:
 - In Europe, competition on productivity and reliability:
 - High degree of vertical integration of turbine manufacturers;
 - Stable network of suppliers producing customized parts and components (**strong relational links**).
 - In Asia, competition is on costs :
 - De-verticalization of global turbine manufacturers;
 - Local providers and global suppliers of standardized components (**modular relationships**).
- **Offshore technology** is the new frontier: European lead firms maintain the leadership collaborating with a small number of suppliers.

A tale of two wind clusters

The Basque cluster

- Two large leading companies: Gamesa and Iberdrola;
- First-tier key providers of components with **relational linkages**, based on collaboration;
- Second and third-tier suppliers of standardized components with **market relationships**;
- **Weak local availability of specialised BDS, test centres, research and technology centres**;
- R&D mainly at the firm level.

The Danish cluster

- Large leading companies: Vestas + several MNCs;
- **Highly diversified cluster** with more than 50% of employment in specialized Knowledge Intensive Business Services (KIBS – technology, design, licensing services);
- **Very strong local availability of specialised KIBS, test centres, research and technology centres**;
- R&D bottom up strategy based on close interactions between users and producers.

The impact of globalization

The Basque cluster

- Gamesa has become a globally oriented company (in 2011 92% of total turnover comes from exports; manufacturing plants and R&D facilities in Denmark, USA, UK, China, India, Singapore, and Brazil);
- A small group of local companies have followed Gamesa in its strategy of internationalization;
- The vast majority of local suppliers producing standardized parts and components are out-competed on costs by Asian suppliers.

The Danish cluster

- Vestas is a highly globalized company with the largest manufacturing facility and R&D centre in China (trading technology for market access);
- Danish KIBS and component suppliers are also increasingly collaborating with Chinese turbine manufacturers (upgrading their technological capability);
- R&D investments by German, Spanish, Chinese and Indian companies are attracted into the cluster.

Evidence of impact

The Basque cluster

- (+) Creation of new multinational companies taking advantage of new market opportunities;
- (-) Loss of local jobs;
- (-) Loss of local knowledge and technological capability (Gamesa has moved most of its R&D outside the cluster).

The Danish cluster

- (+) Creation of skilled green jobs in a sector of great growth potential;
- (+) Attraction of technology intensive FDI;
- (+) High involvement of local actors in R&D international collaboration project;
- (+) Maintenance of the technological leadership.

What has worked in the Danish cluster?

A balanced public-private approach

- Strong and continuous political commitment with **consistent policy mechanisms that do not change unexpectedly over time**;
- **Key public funding of R&D through taxes**: very effective in financing public research and spreading the costs through all electricity consumers;
- **Strong public support and coordination**: R&D centres (RISØ), test sites, collective R&D projects bringing together key stakeholders, technology institutes, universities and companies;
- **Public involvement in the internationalization of the cluster**: government-to-government R&D programs (China National Renewable Energy Centre established by the Sino-Danish Renewable Energy Development Program) facilitating the internationalization of smaller companies.

Implications for RED

Are the Basque and Danish wind cases a validation of the LED approach?

Productive integration (Clusters & GVC) + Universities, R&D and Test Centres, etc. (IS missing element?)

- **Clusters:**
 - In the Basque cluster: weak local linkages with a stand alone global leader;
 - In the Danish cluster: highly diversified and strongly integrated cluster with close local R&D interactions aimed at incremental learning through practical experience.
- **Global Value Chains:**
 - In the Basque cluster only leading companies take advantage of external opportunities. Leaders act as external stars;
 - In Denmark the whole cluster integrate into GVCs with some public sustain. Locally, there is an upgrading towards high value added research and design activities.
- **Innovation Systems:**
 - In the Basque cluster: weak innovation system and limited specific public intervention;
 - In the Danish cluster: strong innovation system attracting global leaders, supported by public R&D and key role of policy in establishing a favorable industry framework (e.g. standard settings; R&D investments, investment framework).

Thank you

Elola A., Parrilli M.D, Rabelloiti R., 2013, “The resilience of clusters in the context of globalisation: The basque wind value chain”, forthcoming in *European Planning Studies*

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