



Global Value Chain and Innovation Systems: Lessons from the Wind Energy Industry in the Basque Country

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Motivation

- Wind power is an increasingly important source of energy: **in 2010 the total installed capacity was twice that of 2007;**
- Europe is the traditional leader in the wind power industry but demand and supply are rapidly moving to emerging markets, with **China becoming a global player;**
- **Spain** is the fourth country in the world (after China, USA and Germany) in terms of installed capacity;
- Two global players in the wind energy industry are **Gamesa** (a turbine manufacturer) and **Iberdrola** (a utility firms in deployment). They are both located in the **Basque Country**, a dynamic manufacturing region with a strong presence of specialized clusters supported by a very active industrial policy.

Aim of the study

- To investigate the wind energy value chains of the two Basque lead global companies with a focus on their local linkages;
- To investigate their innovative links with a focus on the local innovation system;
- **Research Questions:**
 - How embedded are these two global leaders in the Basque local economic system?
 - How is the globalization of the industry affecting the spatial organization of their value chains?

The changing global context

- **On the demand side**, the market is shifting from Europe to Asia, mainly to **China** (in 2010 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 2010 there are 4 Chinese and 1 Indian companies among the top ten turbine manufacturers.

Table 3.2 Global top ten turbine manufacturers 2003 and 2010 (world market shares)

| 2003 | | | 2010 | | |
|--------|----------------|--------|--------|-------------------------|--------|
| Origin | Firm | Share | Origin | Firm | Share |
| EU | Vestas (DK) | 21.80% | EU | Vestas (DK) | 14.80% |
| US | GE Wind | 18.00% | CN | Sinovel | 11.10% |
| EU | Enercon (DE) | 14.60% | US | GE Wind Energy | 9.60% |
| EU | Gamesa (ES) | 11.50% | CN | Goldwind | 9.50% |
| EU | NEG Micon (DK) | 10.30% | EU | Enercon (DE) | 7.20% |
| EU | Bonus (DK) | 6.60% | IN | Suzlon | 6.90% |
| EU | REpower (DE) | 3.50% | CN | Dongfang Electric | 6.70% |
| EU | Nordex (DE) | 2.90% | EU | Gamesa (ES) | 6.60% |
| EU | Made (ES) | 2.90% | EU | Siemens Wind Power (DK) | 5.90% |
| JP | Mitsubishi | 2.60% | CN | United Power | 4.20% |
| | Others | 5.30% | | Others | 17.5% |

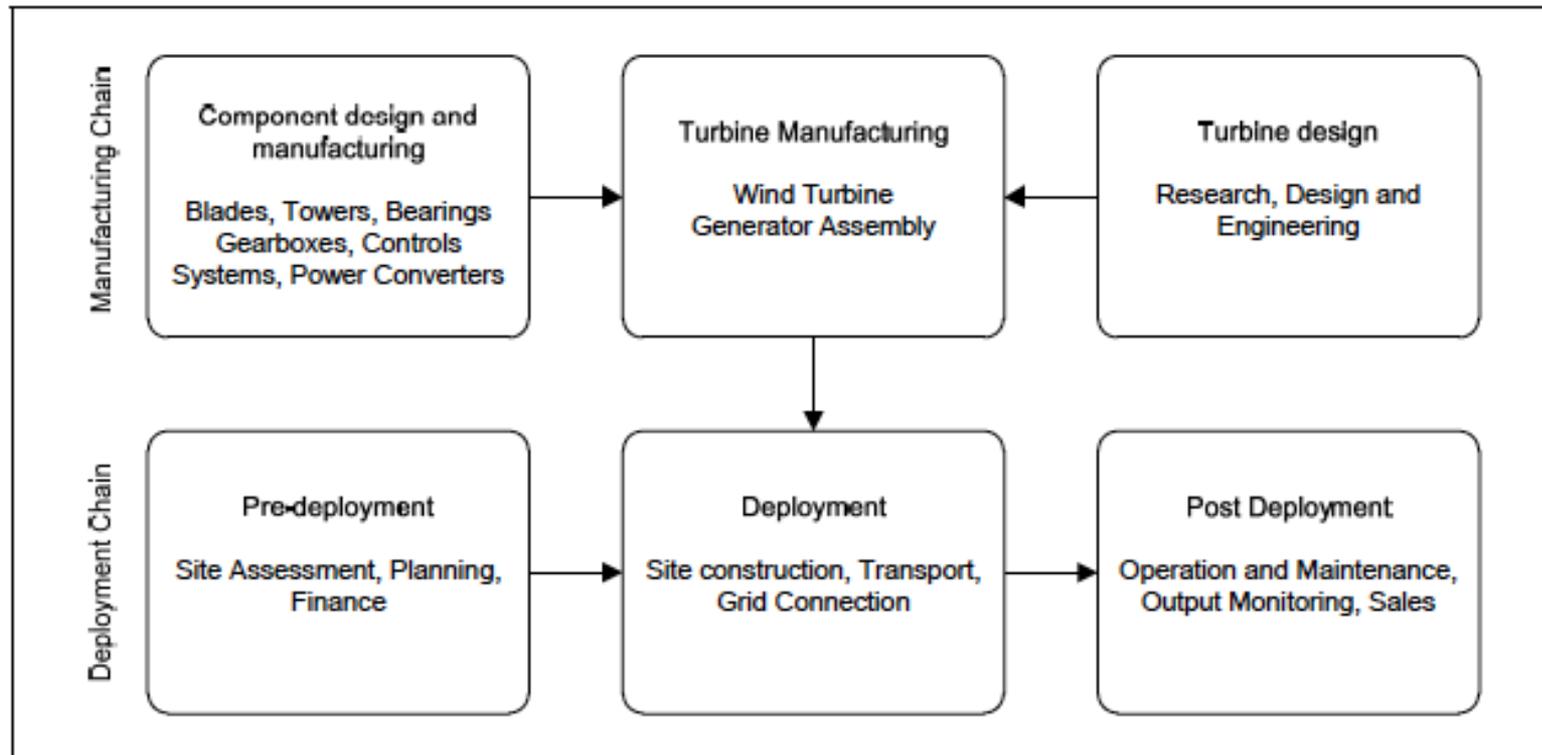
Source: BTM (2004; 2011). The locations of headquarters of European firms are noted in brackets.

Why GVC analysis is a useful conceptual framework in this study?

- Unpacking the value chain and considering how the role played by the different stakeholders changes, it allows to investigate how **power relationships are evolving** because of:
 - **chain-internal reasons**: suppliers can gain capabilities;
 - **chain-external reasons**: the geography of global market can change over time.

There are two value chains

Figure 2.1 Basic wind industry value chain

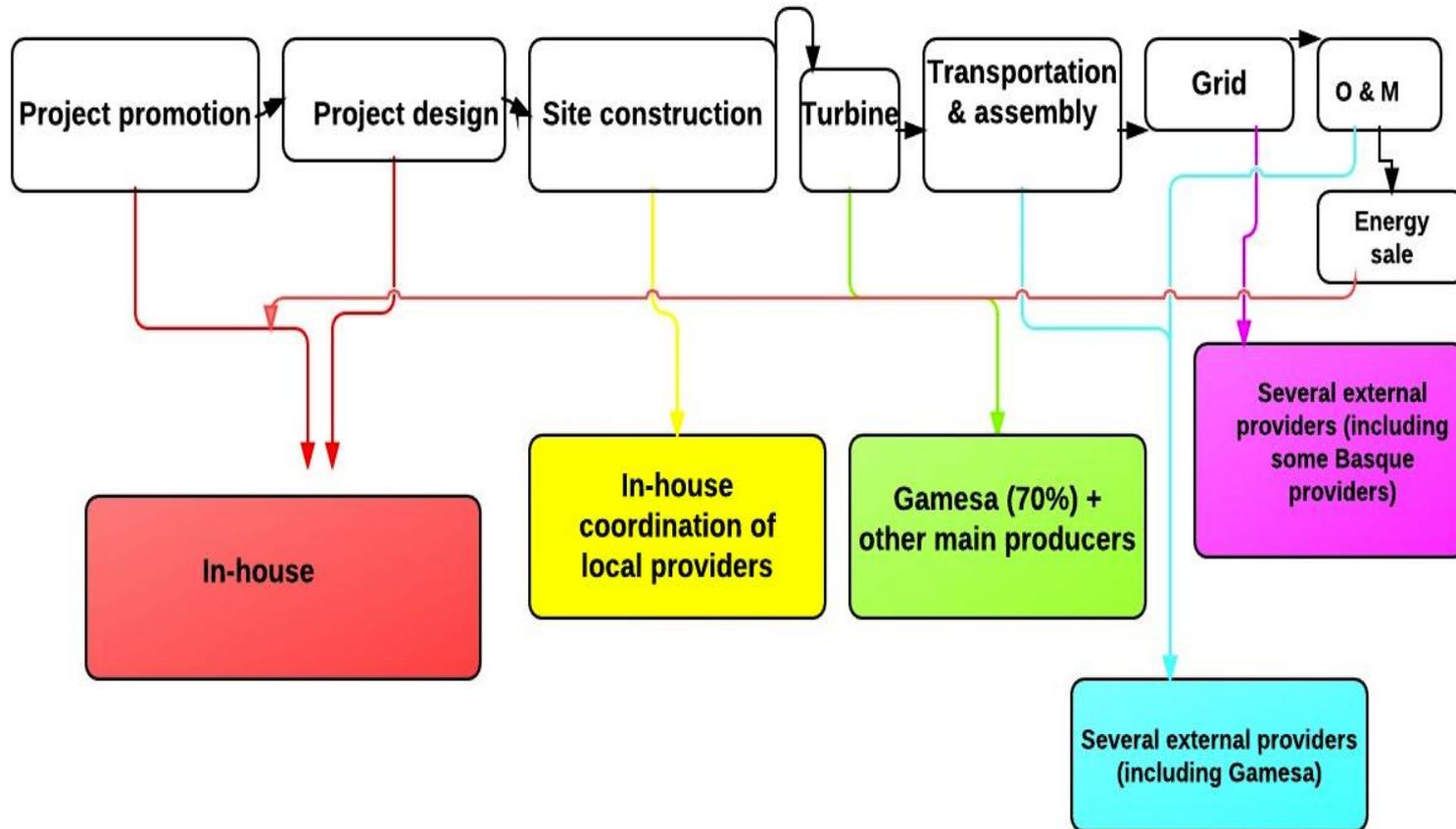


Sources: Drawing on Frost and Sullivan (2010); EWEA (2007); EAI (n.d.); CCB International (2011). Arrows indicate flows of goods and services between functions in the chain.

Main determinants of GVC organization

- **Immobility** of the production of some parts of wind turbines such as nacelles, blades and towers and of wind park organization;
- **Onshore wind farms**: the technology is rather standardized and competition is mainly on **costs in emerging market** and **on productivity and reliability in the European market**;
- **Offshore wind farms**: the technology is still in its infancy and technological collaborations with suppliers are a key competitive driver in this segment of market.

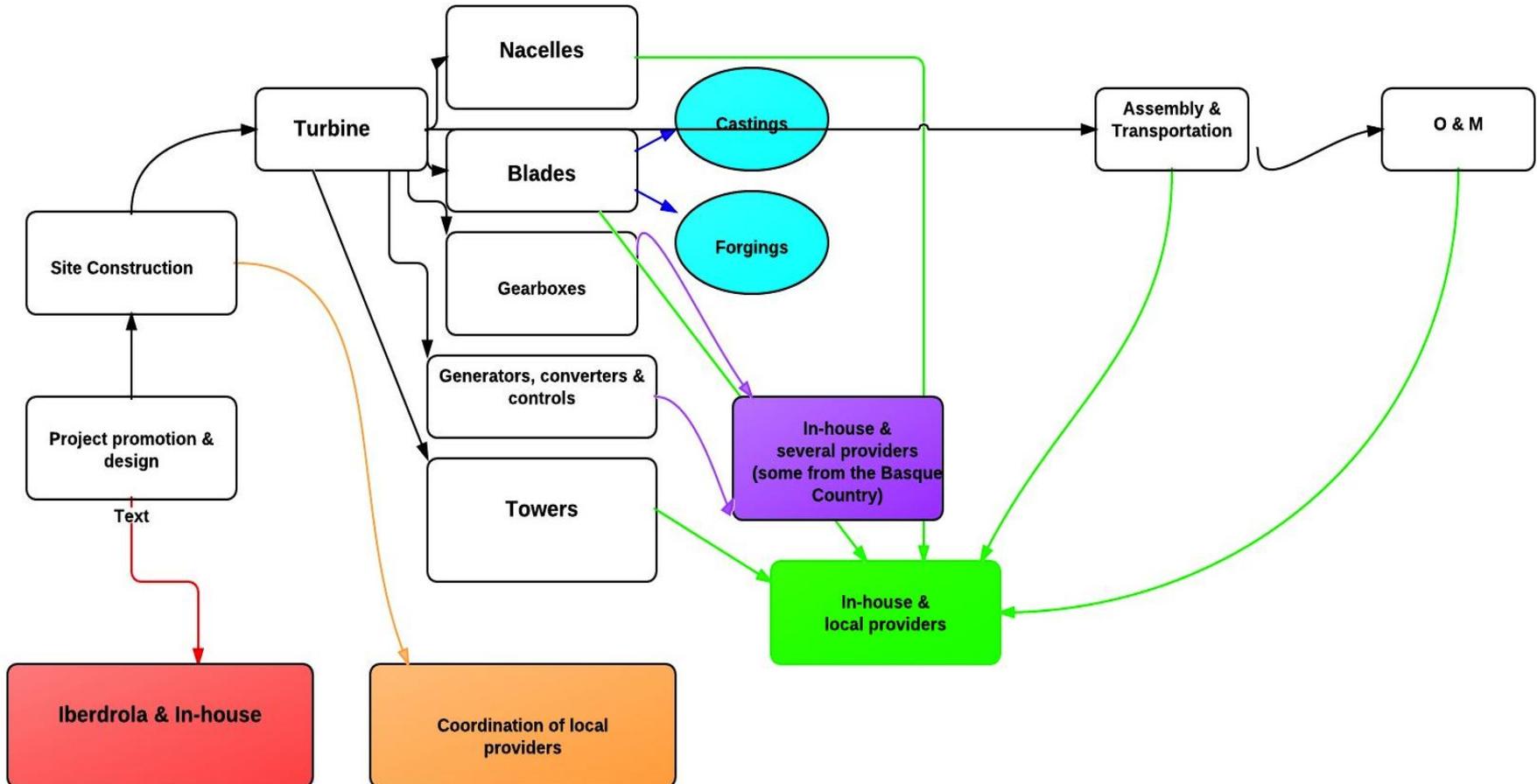
Iberdrola value chain



Iberdrola Value Chain

- Iberdrola is the world top park operator in terms of installed capacity;
- It is highly globalized with a presence in more 20 countries in Europe, in the US and in Latin America;
- It undertakes in-house the pre-deployment and deployment stages of the chain and the sales, which are high value added activities;
- It outsources the turbine manufacturing and the O&M to external suppliers such as Gamesa (70% of turbines);
- With suppliers, Iberdrola mainly maintains **modular** relationships when operating in **onshore** wind farms;
- When it operates in **offshore** wind farms it mainly has **relational** linkages with suppliers because services such as transportation and O&M are key and complementary knowledge and skills are needed in this new area.

Gamesa Value Chain



Gamesa Value Chain

- **High degree of vertical integration** with many components produced in-house to control productivity and reliability;
- **Relational** linkages with a small number of first-tier suppliers (many of them from the Basque country) **due to customization of components for each individual project in onshore wind farms and complexity of technology in offshore wind farms** ;
- With the globalization of the company (e.g. 6 plants in China):
 - **Less vertical integrated**;
 - **Modular** relations with component suppliers (cost-driven and mature technology);
 - Some of the European (and Basque) suppliers have followed Gamesa;
 - Host country component producers are increasingly involved in the chain;
- In the Basque Country, there are also a large number of second and third tier suppliers, which are suffering from the shift of the market outside Spain and Europe.

The Innovation Networks

- In Europe, the technological leadership is in Denmark and Germany where the main R&D research centers as well as test centers, certification organizations and other related KIBS are located ;
- In the Basque Country there are non specialised technological centers (e.g. Tecnalia, IK4) involved in wind related R&D projects together with the lead companies and some suppliers;
- **Iberdrola** maintain strong domestic (and local) innovation linkages with various partners (suppliers, universities, technological centers and business associations);
- **Gamesa** has a very global R&D strategy with technology centers in Germany and Denmark to be close where the standards are set and to gain access to these specialized innovations system;
- As a whole, the lead companies and some of their local suppliers have strong **in-house technological capabilities at the firm level** but the local (and national) innovation system is rather weak if compared with the European competitors.

Lessons for LAC

- In the next future, thanks to the increasing presence of China, wind energy is likely to become less expensive and more competitive with traditional sources, opening up **opportunities of investments in LAC**;
- For developing a market, public support programs are key and the **incentive structure** influences how the value chain is organized (Europe vs. China);
- There is space for collaboration with European lead companies that may be interested in **trading technology for market access in LAC** (e.g. Gamesa in Brazil). This strategy is already undertaken by China (joint design and R&D collaboration, overseas R&D units);
- There are important parts of the chain which are rather immobile and this means that there is **space for creating domestic capacity and employment bound to the local areas of investments**;
- There is a key role for policy to establish **favorable framework conditions** (e.g. standard settings; R&D investments, favourable investment framework).



Thank you

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