

Interrelated Diversification and Internationalization: Critical Drives of Global Industries

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Abstract

This paper discusses the influence of two economic trends that arise as a consequence of globalization: the industrial interrelated diversification process through related varieties and the internationalization of both production and innovation. These two trends are evidenced in two industries located in the Basque Country region, the former furniture industry and the wind energy sector. Our study reveals how companies and territories that are in condition to pick up the opportunities derived from the above trends are also the ones that may guarantee their sustainability in the marketplace. In contrast, the firms that respond to these challenges by merely targeting their traditional and/or local markets might be saving their short-run competitiveness while jeopardizing their future prospects.

Keywords: Clusters, related varieties, global innovation networks, wind energy, habitat.

1. Introduction

We are currently witnessing an international economic situation where new emerging economies are challenging the old global equilibria between the formerly leading Western countries and the rest of the world. In order to gain momentum, Western, and particularly European firms, industries, regions and even countries have to find new ways of competing by adding value to their products (i.e. by means of novelties and higher quality standards), by sophisticating their processes, organizational and commercial structures, and by forming coordinated systems of production and innovation at multiple levels (e.g. local and regional, clusters, regional and national innovation systems) (Porter, 1998; Cooke, 2001; Parrilli, 2004; Menzel and Fornhal, 2010; Martin and Sunley, 2011). In this way, some Western economies have to some extent been able to maintain their competitive edge over the past twenty years.

However, global dynamics have not only changed as a result of the threats and challenges associated with the economic power of emerging countries. During these last decades the large Western corporations have also internationalized their operations to such an extent that jeopardizes the resilience¹ of their local supply chains and production systems. Global or multinational companies are increasingly moving their operations to new markets (e.g. emerging economies) in which the hosts have a leading edge (Dunning, 2008; Elola et al., 2012). This means that Western small and medium-sized enterprises (SMEs), their local production systems, and their regional innovation systems need to undergo substantial changes as a means to cope with the challenges derived from these global dynamics. This is true in the case of the clusters that are studied in this paper, but the reflections underneath may also apply to other local production systems, particularly across the EU space (Menzel and Fornhal, 2010; Boschma et al., 2013; Elola et al., 2013).

The main focus of this paper lies in the local production systems and the small and medium-sized enterprises (SMEs) embedded in two clusters located in the Basque Country region: the former furniture industry and the wind energy sector. The goal of the manuscript is to illustrate the impact of two crucial trends affecting local and regional development. On the one hand, the capacity of local firms and systems to

¹ Resilience is taken here as a combination of connectedness across the local social and economic agents and the potential of the latter to diversify their activities as a means to restore the competitiveness of the local/regional production system (see Cooke, 2012:2).

diversify their productions along the ‘related varieties’ angle. On the other, the capacity of local firms to internationalize their operations while keeping their regional innovation system (RIS) active and supportive. This might occur when the RIS is capable of both absorbing knowledge from global innovation networks, and of transferring it to the (regional) firms.

The next section introduces the crucial aspects of innovation that are now integrated in a modern approach to innovation (i.e. interactive and systemic). In section 3, the presentation of the wider landscape in which the two current industrial trends are identified and discussed, i.e. the integration of industrial opportunities along related varieties and the internationalization of production and innovation along global value chains and global innovation networks. Section 4 presents two cases selected from the Basque Country in which the previous two trends are shown: the former furniture industry, now integrating more than manufacture of furniture, and the wind energy cluster. Section 5 links the concepts discussed along the paper with the Smart Specialization Strategies initiative that has in recent years gained considerable attention among European policy makers, in order to provide some policy recommendations as a result of the analysis. A final section of concluding remarks and new research questions closes the paper.

2. The global context and the new challenges

The big push to globalization is driving many firms and industrial sectors to striking changes in their growth prospects. In particular, their own sustainability is at stake since new competitors are coming to the fore with such a strength that allows them gaining important market shares. This presence is in a way shrinking the market available to traditional industries located in Western countries. This is the case of traditional industries such as textiles, clothing, furniture, footwear, tiles, foundries, pulp and paper, plastic and metallic products, machine-tools, etc.

As Table 1 shows, East Asian countries have increased their market share enormously, with exports and imports more than 150 times higher than 20 years ago (inter-annual growth rates of about 14%). Noteworthy are also the growth rates observed in low & middle income and South Asian countries. In contrast, the export/import growth for high income countries is four times higher in the same period (Western economies

account for inter-annual growth rates around 6%). This might depend either on western companies facing growing competition from Asian companies (which implies their market shares could shrink in their traditional western markets), or on Western companies that also have export opportunities in Asian countries, which leads them to rely on the building up of global value chains (GVCs) and global innovation networks (GINs), a topic that will be discussed more in depth in the next sections. On the whole, the direct effect is that market shares of western firms and economies are shrinking significantly.

Table 1: Exports and Imports on a world scale

	Exports (current US\$ billions)			Imports (current US\$ billions)		
	1990	2010	Inter-annual growth (%)	1990	2010	Inter-annual growth (%)
Total	3,473	15,211	7.66	3,551	15,264	7.56
High income	2,903	10,279	6.53	2,992	10,519	6.49
Low & middle income	565	4,929	11.44	547	4,748	11.41
East Asia & Pacific (developing only)	156	2,282	14.36	161	2,046	13.55
Europe & Central Asia (developing only)	...	830	786	...
Latin America & Caribbean (developing only)	141	862	9.48	119	872	10.47
Middle East & North Africa (developing only)	76	353	7.98	77	330	7.55
South Asia	28	271	12.02	39	419	10.61
Sub-Saharan Africa (developing only)	68	333	8.27	58	303	8.62

Source: the World Bank (2013), www.worldbank.org.

These new counterparts have acquired an increasing power in global trade, not only by increasing their production facilities and investment agreements, but also in terms of an increasing innovation capacity. This change in world dynamics has implied a major change, with the extension of the G8 group in the wider and inclusive G20, in which a large number of medium-income and low-income countries have been integrated (e.g. China, India, Brazil, Mexico, Indonesia, Turkey, South Africa, etc.).

Notwithstanding such a big transformation, most lead companies try not to lose their market shares by developing new products and processes which they aim at selling in new and emerging markets. They manage this on the basis of two types of strategies. The first one is the strategic effort in research and development (R&D) and innovation activities more in general, which are considered a priority for upgrading the competitiveness of firms (Griliches, 1979; Rothwell, 1984). This first strategy has a major influence on the production systems of these firms (Lundvall, 1992; Pyke and Sengenberger, 1992), which represent their traditional supply chains and help them retain the advantages of flexibility and fast-to-market processes, socially-embedded cooperation, secrecy on process and product innovation, among others. The second strategy is the internationalization of production and trade. This strategy is intended to exploit the width of international markets, which also has a direct influence on the previous types of activities, namely R&D and innovation, production value chains and international trade (Dunning, 1988, 2008).

In the next section we will go through these aspects from a more theoretical perspective, before verifying their application in the specific context of two industries in the Basque Country region (section 4).

3. Innovation, knowledge, learning and related-varieties

On the basis of this challenging global context, the relevance of innovation as a source of dynamism and economic growth is acknowledged. Many of the current theories and approaches on innovation highlight the difficulties firms often face when generating the

technological knowledge required to undertake substantial innovation processes by themselves. Accordingly, firms increasingly need to access external sources of knowledge from other firms or research organizations (e.g. through subcontracting of R&D, technology licensing or bilateral cooperation agreements to name a few).

3.1 Driver I: Innovating through Interrelated Diversification

The relevance of external sources of knowledge as determinants of innovation has been emphasized in the literature from a wide variety of approaches. The innovation systems literature highlights innovation as being the result of dynamic social and economic processes based on learning and interaction among actors (Lundvall, 1992). Network theories (Håkansson, 1987) also maintain that companies rarely innovate individually and that the introduction of new products or processes in the market depends on their ability to cooperate with external agents. Similar arguments have also been posed from strategic management perspectives, which noted that the search for new ideas, new organizational forms, etc. surpassed the boundaries of the organization (March, 1991). Chesbrough (2003) described this phenomenon as the rise of open innovation modes.

One of the key concepts that emerges from the understanding of innovation regarding the internal usability of external knowledge is the ‘absorptive capacity’ (Cohen and Levinthal, 1990). These authors noted that internal R&D plays a dual role. On the one hand, it constitutes an essential source of knowledge for innovation. On the other, it increases the company's ability to identify, assimilate and exploit external knowledge. The empirical studies made in this stream of research illustrate how companies with good levels of absorptive capacity, namely internal R&D capabilities, are more likely to absorb external knowledge through the establishment of cooperation agreements (Vega-Jurado, 2008), what influences the returns these companies get from product and process innovations.

The concept of absorptive capacity however suggests that internal capacities can only be improved in the knowledge bases that are relatively close to those available in the firm. In other words, a company will be able to exploit external knowledge as long as the latter knowledge can be identified and assimilated. This has led some scholars to introduce the concept of ‘related variety’ (Frenken et al., 2007). As Asheim et al. (2011)

discuss, related variety refers to a set of complementary sectors that share capabilities and competences so that it becomes easier to understand and absorb each other's knowledge. The underlying idea is that "a region specializing in a particular composition of complementary sectors will experience higher growth rates than a region specializing in sectors that do not complement each other" (Frenken et al., 2007: 686). Consequently, related variety driven firms, entrepreneurial ventures, territories, etc. reduce the risk of selecting wrong activities since the existing competences are taken as the point of departure in order to broaden the economic base.

The specialization into certain fields tends to increase the risks associated to potential external shocks due to the lack of diversity. In contrast, one may also argue that the larger the sectoral variety, the higher the probability of promoting economic growth. Accordingly, it has to be taken into account that despite these variety driven spillovers can lead to risk reduction, they may also reduce the probability of getting higher profits. This is what is often known as the 'unrelated variety' phenomenon. According to it, when one sector is hit by an economic downturn in a territory with a high degree of unrelated variety, this will not negatively affect the other sectors. Summing up, while unrelated variety safeguards against external shocks, related variety is expected to be beneficial for Jacobs externalities in the form of knowledge spillovers (ibid: 688).

Several studies have been conducted on these two concepts, studying whether territories specialized in certain activities, industries or products (i.e. where related variety is in place) are more conducive to innovation and growth as compared to other locations that count with more diversified industrial structures (i.e. unrelated variety). In this sense, Frenken et al. (2007) found that in the period 1996-2002 Dutch regions with a high degree of related variety showed the highest employment growth rates. Boschma et al. (2011) studied the influence of related variety on regional growth in Spain during the period 1995-2007 with similar results. In fact, their evidence suggests that Spanish provinces with a wide range of related industries tend to show higher economic growth rates. Finally, Saviotti and Frenken (2008) show how related variety in exports is a determinant of GDP per capita and labor productivity growth for OECD countries between 1964 and 2003.

From our point of view, these findings seem to reveal that while that related variety determines growth in the short run, unrelated variety becomes a determinant of growth in longer time horizons. Making an analogy, in a dry soil a farmer would plant as many

different seeds as possible. However, if the same farmer has a fertile soil, he/she might probably plant similar seeds to those that have already grown. The efficiency in both situations would also be a matter of discussion. In the first case the farmer would get a low efficiency, as his main goal is to be effective in turning the dry soil into a fertile one. In the second situation though, the goal of the farmer would be to be as efficient as possible, as he/she is already aware of the type of plants that may grow under those conditions. We consider more light needs to be shed on the debate between related and unrelated varieties and their positive or negative impact on employment and economic growth. Applying the related varieties rationale to the product and technology life cycles, one may wonder to what extent employment growth could be observed if the dominant industrial sectors in a territory are in a decline process. In the case of old industrial regions then, what would be the most effective strategy, to rely on related varieties gaining knowledge from sectors with a similar knowledge base, or trying to diversify as much as possible in an unrelated manner? We will try to address these questions in the concluding section in this article.

As we will see in the case of the HABIC cluster (section 4.1), the regional specialization observed in the furniture industry in the Basque Country, together with the extra-regional linkages local firms have, has induced interactive learning and innovation in local firms within this sector. As a result, local actors have been able to apply their knowledge pool in both related and unrelated industries, identifying those opportunities that may be relevant for them, and thus obtaining a diversified but still related variety of products.

3.2 Driver II: Internationalization of production and global innovation strategies and networks

The second strategic driver of the past few years has been the globalization of innovation. The globalization of production has become a relevant field of study since the second half of the 1980s with the transfer of significant phases of production abroad or even the full assembly process. This form of internationalization developed across a set of industries that did not require advanced manufacturing competences, such as textiles and footwear (to Asia and Central America), the furniture industry (in Eastern Europe), and electronics appliances (again to Asia), among others (Baldwin, 2005). In

these sectors and markets, lead companies have internationalized their production as a means to respond to the limitations of their traditional production and commercialization sites (e.g. cost of personnel, tight regulation, and tax regime), which could no more guarantee their sustainable growth. These firms have mostly become internationalized either by breaking their production system into small distinct steps and spreading the physical location of these steps around the world, or by moving the whole production process to different countries (Gourevitch et al., 2000: 302). That way, firms developed a consistent strategy of foreign direct investments, production and sale overseas such as in Asian and Latin American markets (Dunning, 1988; 2008; Gereffi and Korzeniewicz, 1994; Kokko and Blomstrom, 2000; Gereffi et al., 2005). The analysis of this phenomenon and the related value distribution across agents and countries has led a number of development scholars to elaborate the concept of ‘global commodity chains’ (GCC), which has later been upgraded to the more comprehensive concept of ‘global value chains’ –GVC- (Gereffi et al., 2005). The GVC concept focuses on any production that is developed through different phases and activities that are performed by separate firms in various countries. It analyses the value each production phase adds to the final product and the market power delivered to the different companies, industries and countries involved in such exchange. In this sense, it takes quite a linear perspective, which helps identifying the governance/power arrangement and dynamics across the different agents that also determine their market power in the whole value chain (Parrilli et al., 2013).

From a different perspective, the concept of global production networks (GPNs) has been developed and applied to the analysis of global production dynamics (Ernst and Kim, 2002; Henderson et al., 2002; Coe et al., 2008; Yeung, 2009). It is a concept developed within the economic geography approximation to globalization, emphasizing the changing integration of new areas, regions and companies in the complex dynamics that involve the most globalized industries such as electronics and ICTs, automotive, biotech or pharmaceuticals (Yeung, 2009; Yang, 2012). This approach takes a much less linear approach than the global value chains’; for this reason, these scholars replace the concept ‘chain’ with ‘network’, which best represents this changing scenario of globalized production. It also focuses on a wider set of competitive drivers (i.e. institutional, cultural, social and political) and mechanisms (e.g. labor and environmental regulations) that also help explain constraints, bottlenecks, potentials and

opportunities (Coe et al., 2008; Parrilli et al., 2013). In addition, as discussed by Coe et al. (2008: 272), although the core of all three conceptualizations (GCC, GPN and GVC) is similar (i.e. the nexus of interconnected functions, operations and transactions) there are two crucial differences, between GCCs and GVCs on the one hand and these two as compared to GPNs on the other. First, GCCs and GVCs are essentially linear, while GPNs go beyond such linearity and incorporate all kinds of network configurations. In turn, GCCs/GVCs focus on the governance of inter-firm transactions while GPNs attempt to encompass all relevant sets of actors and relationships.

Although the previous theoretical approaches focus on different aspects of globalization, all of them stress the importance acquired by the strategies and practices of production internationalization devised by the large corporations over the past decades. These frameworks have a variety of possible positive and negative impacts on local production systems (Gourevitch et al., 2000). However, to give a fuller account of their impact, these frameworks need to be discussed in combination with a new one that focuses on the innovation capacities and strategies of both the lead corporations and their local production systems and supply chains.

The innovation systems literature recognizes the role played by local skills, institutions, localized learning processes, and the relevance of common social and cultural values, among others (Cooke et al., 1997; Cooke et al., 2004; Uyarra and Flanagan, 2010). Acknowledging that the characteristics of the local environment are a crucial element in this stream of research, we also need to recognize that the competitive forces associated to an increasingly globalized economy drive companies to create strong internal links and pipelines to global knowledge sources in order to strengthen their core competences (Howells et al., 2003; Caloghirou, 2004; Sotarauta and Pulkkinen, 2011). On these bases, a theoretical framework relying on the concept of global innovation networks (GINs) has been recently developed and applied to globalization processes (Ernst, 2009; Cooke, 2012; Parrilli et al., 2013).

GINs can be defined as “globally organized networks of interconnected and integrated functions and operations by firms and non-firm organizations engaged in the development or diffusion of innovations” (Chaminade et al., 2010: 3). Such framework focuses on the specific innovation dynamics that take place within specific industries and that favor changes in market dynamics. Both Ernst (2009) and Cooke (2012) applied it to the electronics industry in Asia, where important investments and

upgrading in R&D and innovation activities occur and where such changes affect the competitiveness of leading companies (e.g. the hard disk drive –HDD- electronics industry moving from Singapore to China and other Asian countries, see Cooke, 2012). Elola et al. (2013) studied these innovation dynamics in the global wind energy industry and showed how these can be driven by both the need to develop new value-added products and to get access to new potential markets. In all these cases, the study of production dynamics is complemented by the study of innovation dynamics as these represent the new building block of competitiveness and the necessary (possibly also sufficient) step to modify own competitive position in globalized markets (Parrilli et al., 2013).

The crucial factors identified in the rising GIN literature (i.e. innovation strategies and networks) refer to the strategic assets that have been developed and valued over the past few years and that seem to matter when considering the future growth prospects of industries and local production systems. The dynamic innovation strategies developed by lead firms are key aspects of their renewed competitiveness. It is the case of innovating business models in case of the aircraft industry towards the low-cost segment, or innovating the commercialization practice in the publishing industry as done by Amazon with their sale online business model. Fiat's takeover of Chrysler or Tata takeover of Jaguar and Land Rover are other of these (innovation and) market strategies adopted as a means to gain free access to new meaningful markets (the US in the first case, and UK-Europe in the second) for further growth prospects of the business group. This aspect of global innovation strategies merge with that of global innovation networks as the latter is strategic in that innovation does not take place through internal R&D activities only, but more and more through cooperation and joint R&D and innovation activities with other agents. As a matter of fact, multinationals have for some years now spread their R&D centres in different countries, doing complementary R&D activities among them. At present times, most large corporations are building up very powerful global networks of agents (usually other corporations and international university centers) in order to develop new product, process and architectural innovations. This strategy helps them controlling the most important phase of production, and protecting themselves from a large and undifferentiated set of global competitors and producers that aim at gaining further market shares.

The more consolidated regional, sector and national innovation systems respond to this challenge as several agents partner in order to pull together higher capabilities, specializations and resources to develop new products, processes, market and organizational novelties and arrangements that increase the competitiveness of the participating groups of firms (and territories). It is the case of the Basque Country itself that enjoys the benefits of a strong RIS or of Germany, where a powerful and coordinated national innovation system is at work in order to promote the formation of new capabilities and competitive strengths (Navarro et al., 2009; Koschatzsky and Stahlecker, 2010).

However, it is also true that such RIS are under pressure by the above-mentioned new trend of large corporations to form their own GINs, which are replacing the former dense relationships between the large corporations and their own local/regional production and innovation repository (system). A tension is there that needs to be analyzed in depth as the effect on SMEs, which constitute the typical basis of local production systems, can be extremely powerful and jeopardize their own resilience (Elola et al., 2013). The policy-makers themselves are part of this tension as they would like to promote the absorption of knowledge through global pipelines, but simultaneously have to avoid favoring knowledge spillovers from policy-funded initiatives to competing business systems and networks.

As we will see (section 4.2), in the wind energy industry in the Basque Country, institutional constraints together with a thriving growth in developing countries have led many of the leading companies to internationalize their operations both by exporting windmills and by investing in new production plants. These production plants and the R&D activities associated to them have also headed some local first tier suppliers to follow the same path, so despite the industry has become much more globalized, it has also become more fragmented, as some of the local firms have been excluded from those networks.

The next section will put special attention to such drivers in the analysis of two of the most internationalized industries of the Basque Country region.

4. Interrelated Diversification and Internationalization via GINs in two industries in the Basque Country

In this section we provide evidence of the trends discussed in the conceptual part (see Sections 2 and 3), and which can be synthesized in: (i) the trend to industrial diversification through related varieties, and (ii) the trend to internationalization of both production and innovation. In this section we will provide an illustration of two industries that exemplify these trends, the former furniture industry and the wind energy sector.

Companies and territories that are in condition to pick up these new opportunities linked to lateral moves and to globalize their operations in both production and investments are also the ones that guarantee their future in the current environment. In contrast, the firms that respond to the new challenges by closing themselves in their local markets might be saving their short-run competitiveness, although might jeopardize their future prospects as market growth might move elsewhere through rapid shifts that jump inadvertently from a local production system to another (the risk satellite platforms face, see Markusen, 1996).

4.1. Empirical evidence on related varieties: the HABIC Cluster

The furniture cluster is based in Azpeitia and Azkoitia. These two towns are located fifty kilometers in between Bilbao and San Sebastian. For many years it was the base of a relevant number of medium and small-sized firms devoted to the production of all kinds of furniture, especially wooden ones. In fact, about 13 core production firms (mostly medium-sized companies) totaled about 900 employees, 24 small ancillary enterprises totaled about 500 workers and another 24 ancillary enterprises plus three companies devoted to produce machinery for furniture production totaled about 200 employees (Parrilli et al., 2010). The specialized training institution LANBIDE HEZIKETA was part of the cluster together with the industry association ENBOR and the technology centre CIDEMCO². The critical mass of actors was guaranteed by such numbers that ensured the localization of furniture production in this cluster for decades.

² CIDEMCO is part of the set of powerful technology centres corporation (Tecnalia) that focus their activities on applied R&D in benefit of the regional private sector. They are private foundations created in the early 1990s and financed simultaneously by the regional government together with competitive funding sources and private contracts with firms.

It was a spontaneously-grown type of cluster, perhaps based on the rich endowment of raw material (wood), and the existence of a traditional pool of wooden craftwork developed on the basis of a local demand of furniture (Aranguren et al., 2007).

Over the past few years, this cluster has suffered a significant competitive pressure from other producers based in other countries and, sometimes, from multinational companies that based their commercial offices in the region (e.g. Ikea, Natuzzi). As a result, it has been losing ground as the following table shows.

Table 2: Employment and Industry GDP in the furniture sector in the Basque Country

	2008	2009	2010
Employment (people)	7.434	6.398	5.916
Industry GDP (million Euro)	269.507	233.613	250.374

Source: EUSTAT, 2012.

In collaboration with the Basque government policy of cluster promotion, and following new trends developed in other EU regions (e.g. Catalonia and French West and Alps), some of the local lead companies decided to move a step beyond crossing the landmark of the former ‘mono-sectoral’ basis to transform into a multi-sectoral cluster. A larger and more heterogeneous diversity of firms came together in the brand-new cluster association (HABIC, created in 2011), which involves not only furniture producers, but also producers of plastic toys and structures for kindergartens and playgrounds, companies focused on related components such as coatings systems, floors, ceilings and roofs, illumination and acclimatization systems, domotic and security systems, and companies focused on architectural services, among others.³ The cluster association is further enriched by the participation of client companies such as schools, hotels, public administrations, gymnasiums, hospitals, etc.

³ ‘The firms of the cluster association Habic sell 1050 million euros’, *El Economista*, July 9, 2012.

Figure 1: Complexity of production in the furniture/HABIC cluster in the BC



Source: own elaboration on the basis of the association website.

This process has been in part promoted by the Basque government policy to support the formation of a broad type of furniture cluster. In addition to the institutional support delivered for the creation of a cluster association (e.g. financing a small management structure that promote joint initiatives among firms), it boosted a relatively tiny catalytic procurement programme called ‘Renove Muebles’ (‘Renovating Furniture’) through which any consumer and firm would receive a small subsidy of between € 300 and 1,000 worth of furniture per household.⁴ In this program, the Basque government received 50,000 requests that totaled a cost of about € 22 million of subsidies⁵.

In addition to the government efforts, the private sector itself has been very active in the renewal of this industry. Among others, the private sector developed a set of cooperative actions, such as the creation of the NORA Group (six local firms including Sellex, Treku, Codis, Ondarreta Contract, Ezarri and Group B-Lux) that targets

⁴ <http://www.elmundo.es/elmundo/2009/09/30/paisvasco/1254303095.html> accessed on April 3, 2013.

⁵ <http://www.noticiasdegipuzkoa.com/2010/01/30/sociedad/euskadi/el-gobierno-vasco-ha-pagado-dos-tercios-de-las-facturas-del-renove-del-mueble> accessed on April 3, 2013.

renovation projects for international hotel chains (e.g. Marmari Kos Hotel in Greece, DanHostel in Copenhagen). This particular group includes firms involved in illumination systems, glass mosaics, bathroom furniture, and home furniture in general, among others. Another group of local companies (fifteen) also developed a relevant joint action: they invited about seventy German architects in a Basque artistic venue in order to present the special production features and skills of their firms as well as proposing specific joint projects. Additionally, in collaboration with the cluster association HABIC, a system of competitive intelligence has been developed and made available to the member firms as a means to anticipate changes in market demand and in supply technologies.⁶

This set of initiatives helped the local firms participating in the cluster to fight against the crisis that affected very strongly the Basque economy in 2012. Overall, they were able to generate an increase in sales of about 12% over the former 1,050 million euro generated in 2011.⁷ The cluster association and its members are also quite active in participating in international specialized fairs and in focusing on the export market. For this purpose, they are forming a consortium that helps them supply furniture and other related goods and services in the global market for hospitals. Simultaneously, they are actively participating in international projects such as Woodtech, which is an EU-Interreg project with other Spanish, Portuguese and French partners who are oriented to develop and commercialize new products as well as to train future entrepreneurs in the creation of new related ventures⁸.

The new complexity of the former furniture cluster is displayed by the identification of new market and development prospects within this industry, i.e. sustainable construction/buildings, bio-products and biomass processing. Once again, this shows how the increasing complexity of this sector is going beyond its traditional production boundaries to integrate a much broader range of industries and services. This conscious effort pursued by the Basque firms associated in 'Habic' is in line with the aforementioned trend of extending one's own knowledge and production capacities across

⁶ <http://www.clusterhabic.com/> accessed on August 28, 2012.

⁷ <http://www.finanzas.com/noticias/economia/20121220/cluster-habic-aumenta-ventas-1660391.html>, accessed on April 3, 2013.

⁸ <http://asistemas.ctfc.es/woodtech/WOODTECH-%20ESPA%C3%91OL/woodtech-ESPA%C3%91OL-IMPRESA.pdf> accessed on April 3, 2013.

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related and unrelated varieties⁹, which seems to pay in terms of increasing current competitiveness while also strengthening the future sustainability of the local production system (for example vis-à-vis other more traditional industries that did not take such a new complex profile, e.g. the pulp and paper cluster in the same region).

4.2. Empirical evidence on internationalization and GINs: the Wind Energy Industry

The large energy industry based in the Basque Country includes more than 300 firms in the different segments of oil, gas, solar and photovoltaic, wind and biomass, among others. However, the development of a significant number of these segments is quite recent. For example, the wind energy industry has developed over the past fifteen years from scratch (i.e. it was from an investment of the lead Danish company Vestas, which acquired the local aircraft company ‘Aernnova’, later transformed into the independent company Gamesa). The same applies to the solar and photovoltaic industry, whereas the tide and wave-based industry is in its infancy and it is expected to become economically viable in the next twenty years or so. This ongoing evolution shows on the one hand the relevance of the related varieties framework in the case of the energy cluster in the Basque Country. In fact, twenty years ago there were only the oil industry and some thermoelectric plants, which however created the basis for a group of industries to grow and develop. It is the case of Ormazabal, Artech, Ingeteam, Oasa, Incoesa or Cegasa, which are specialized in electrical components and systems that could later be transferred and specialized in other segments, predominantly the wind energy and the photovoltaic. A similar industrial extension and expansion applies to a number of other Basque companies that, by and large, operate in energy industries and related business services (e.g. logistics and transportation, operation and maintenance of electric plants, etc.).

The development of this wide energy sector by means of an extension across related varieties has been simultaneously promoted by the Basque government and the private

⁹ Curiously, in this case we observe both, related and unrelated varieties at work. Particularly, the recent inclusion of illumination and acclimatization industries together with domotic and security businesses seem to extend this traditional furniture cluster even beyond the ‘related varieties’ knowledge and industry dynamic into a wider ‘unrelated varieties’ industry framework. More discussion is needed on this relevant aspect.

sector. The former stimulated the creation of an energy cluster association, in order to promote joint business initiatives for innovation and commercialization, among others. Recently, the energy cluster association developed a project with the shipbuilding cluster association to identify and boost the opportunities to involve a wide group of local firms in the offshore wind energy production. Simultaneously, the private sector has caught this and other opportunities to expand its activities within new product/energy markets. It is the case of Ingeteam, which has moved from the wind energy market into the photovoltaic industry, Hine that moved from the hydroelectric industry into the wind energy sector, and Aernnova that expanded in the aircraft industry and transplanted its capacities into the wind energy industry giving the boost to the development of this cluster about fifteen years ago (Parrilli et al., 2012).

In particular, the specific segment of the wind energy industry has acquired a special importance over the past ten years. Two multinational companies based in the Basque Country (Iberdrola and Gamesa) contributed to the development of one of the world-class clusters, which currently integrates about one hundred companies in different specialized compartments such as foundry companies producing towers, blades and nacelles, electrical companies producing generators, inverters and transformers, other specialized companies producing components such as cylinders and hydraulic systems, pitch-drives, gearboxes, electronic remote controls; companies specialized in meaningful services such as logistics and transportation, operation and maintenance; and firms (usually the lead company) centred on the sale and distribution of energy to the electric network (Elola et al., 2013).

Since 2007, the national market, which promoted the growth of the wind energy cluster, became saturated and restrained by a legislation that did not maintain the subsidization of the previous years. Simultaneously, a boom in demand has been arising in emerging countries, first of all in China, then followed by India and Brazil, before others. This demand has pushed leading companies such as Vestas, Siemens, GE and Gamesa to internationalize their operations both by exporting windmills (parts and components) and by investing in new production plants abroad (Elola et al., 2013). On these bases, in the last two years Gamesa installed all its windmill production in foreign markets. Internationalization has become the tool that guarantees the sustainability of this company. As a consequence, a set of other first-tier suppliers, such as Ingeteam, Ormazabal, and second tier suppliers such as Hine and Glual invested abroad by setting

up new production facilities there (mainly China, but also USA, Brazil, Argentina and India among others). However, another group of local companies may become redundant in this international business. These are the producers of foundry and other metallic parts (e.g. towers, blades and nacelles) and also service providers (e.g. logistics and transportation, operation and maintenance). In this way, the cluster itself may break up in two segments, one which is connected to global value chains, whereas the other is excluded (Ibid.).

Within this context, the growth of global innovation strategies and networks headed by the afore-mentioned lead companies becomes crucial, as well as the discussion of its implications for local development processes. Each individual lead company organizes its own strategy and global innovation network by partnering with leading organizations on R&D activities on water-resistant light materials, electronic controls, deep offshore installations, etc. The lead companies tend to partner with organizations that manage very specialized knowledge that they do not control yet. This is why lead Basque companies in energy distribution connect and work with lead Dutch firms in the construction of offshore windfarms, and also why lead Basque companies in windmill manufacturing and installation partner with a German group specialized in gearbox production. The intention here is to partner on advanced R&D activities in order to increase the competitive edge over global competitors. In addition, these companies try to form implicit consortia to access international markets with a leading edge over other groups of producers. This is the case of the Danish company Vestas that set up a huge R&D facility in China, and it is also the case of Gamesa that set up R&D facilities around a new 'corporate university' with bases in Europe as well as in China, India and the USA. In general terms, this is the case of companies such as Gamesa and Iberdrola, which connect with universities and companies from the Netherlands, the US or Singapore. The results of these strategies are visible in the impressive reorientation of production towards these global markets that accounted for 100% of windmill installation over the past few years.

The issue here is the risk that such process, combined with the growing focus on international markets, can lead to disanchoring production from the Basque Country. In this context, the discussion of the role of the RIS matters as this may offer the capacities and incentives to the local firms to start a dynamic of investment in innovation activities and to conquer a more competitive position within the GVC. This means that the

various organizations (e.g. technology centres, universities, research centers of excellence, training institutes) should work together with cluster firms and their representative bodies (i.e. business and cluster associations, chambers of commerce), for example by mapping out competences and skills and promoting joint local and international projects that cross-fertilize the cluster firms and help them acquire stronger R&D and innovation capacities that make them more essential to the lead companies. This is likely to be a strategic solution to keep the cluster cohesive and working together in competitive global value chains.

This phenomenon can in fact be observed in the case of the leader firm in the wind energy market, the Danish company Vestas (Pedersen, 2009), which is simultaneously creating new global alliances (it just set up the biggest R&D facility in China with over 600 local and international PhDs and engineers at work) while simultaneously strengthens its local/national innovation system. Back in Denmark Vestas created a national/sectoral innovation system by integrating firms, universities and public institutes (e.g. the advanced research lab RISØ), as well as by attracting R&D facilities of global competitors such as Siemens, Suzlon and Envision Energy. This is a challenge that the Danish wind energy system led by Vestas seems in condition to face, whereas the Basque still struggles with it. In fact, Gamesa did not find a proper balance between the creation of its own GIN and an ongoing effective relationship with regional innovation agents; it worked strongly with them until 2007, and then started focusing on international partners while reducing its local commitment with technology centres and universities.

5. Policy recommendations

This section aims to link the concepts of related variety and smart specialization, which has gained a lot of attention from the policy-making sphere in Europe. Taking into account the contributions in the field of innovation systems and incorporating the advances proposed by the management literature in terms of learning modes and absorptive capacity, the European Commission (2010) has recently introduced the concept of Smart Specialization Strategies (Foray et al., 2009; Navarro-Arancegui et al., 2012). As defined by the European Commission (2010: 7), “smart specialisation

involves businesses, research centres and universities working together to identify a region's most promising areas of specialisation, but also the weaknesses that hamper innovation". The concept of smart specialisation emerges as a response to the replication and imitation found in regional policies, which often neglect the diversity of their contexts (Navarro-Arancegui et al., 2012). Smart specialization aims to help regions concentrate resources on key priorities rather than spreading investments across areas and business sectors.

In a sense, the concept of smart specialization strategies is not new, as it shares the rationale of another policy instrument promoted by the European Commission in the mid-1990s, the "Regional Innovation Strategies". This instrument aimed at "offering regional stakeholders a common platform to promote, design, implement, manage and evaluate the region's R&D and innovation policy" (Zabala-Iturriagoitia et al., 2008: 1146). The Regional Innovation Strategies initiative was introduced in 1994 as an instrument to promote STI policy implementation at the regional level aiming at "stimulating the development of clusters... that combine industrial, technological and geographical advantages... [which] requires the active involvement of all the actors concerned... [and in which] the main emphasis should be on a horizontal, trans-sectoral and multidisciplinary approach" (European Commission, 1993: 65).

The goal of smart specialization strategies lies in the creation of diversity among regions instead of promoting regional science, technology and innovation strategies developed in an imitative manner, in order to avoid duplication and hence contribute to increase the potential for complementarities across the European knowledge base (Foray et al., 2009: 20). The promoters of this specialization strategy acknowledge that public bodies can play an important role not only as decision bodies (i.e. priority setting) but also in assisting to the establishment (or reinforcement) of connections among regional stakeholders to accelerate the whole process (ibid).

As the reader may note, the smart specialization and related variety approaches share some common features, as long as they intend to support the economic development of firms/territories in those areas that may be more closely related to their core competences. As Navarro et al. (2012: 4) discuss, smart specialisation is not only interpreted as the impulse towards a pure specialisation that exploits the economics of localisation, but as 'a specialised diversification that exploits the economies derived from related variety' (McCann and Ortega-Argilés, 2011).

Despite it is hard to assess whether the concept of related variety is at the origin of the smart specialisation policy concept, the overlaps between the two seem reasonable. Hence, according to the rationale of smart specialization policies, (relational) structural changes in those key industries regarded as strategic for a certain territory should be promoted by means of (public) policy support. However, one question that may rise from here is whether related variety emerges because of policy is pushing for it, or because industries evolve ‘naturally’, as these related paths constitute an effective strategy? As we have seen in the two cases illustrated in the previous section, the ‘spontaneous’ industrial dynamics coexist with public policy support. Accordingly, if the smart specialization approach is to gain momentum in Europe, we consider it should try to include both sides. Accordingly, it should acknowledge and deepen in the individual strategies followed by firms, as well as create consensus-building scenarios required to leapfrog from firm strategies to territorial strategies.

Our arguments are in line with Leppälä and Desrochers (2010), who claim that regional specialization, and hence its re-structuring, should not be viewed as the ultimate goal for policy makers due to the heterogeneity among individuals in terms of skills and expectations. Leppälä and Desrochers suggest that a policy driven “regional specialization would only deliver the optimal outcome when every individual within the region possesses the same comparative advantage” (p. 145). It can thus be concluded that individual and regional competitive advantages are two processes that necessarily need to go hand in hand, as both feedback each other.

From our point of view, related variety should be understood as the search for an interrelated diversification of the existing knowledge bases, in case we are referring to firms, or the search for interrelated diversification of the existing industrial structure in the case of a territory, as a means to stop imitation from other spaces or industries and build up new competitive edges over new competitors (e.g. from new emerging economies). We consider that the underlying rationales behind smart specialization and related variety diverge to a great extent. First, related variety is a theoretical construct while smart specialization is being used as a policy concept. Second, while related variety highlights that regional growth should be driven by diversifying the existing knowledge bases into different (but related sectors), the smart specialization underlines the need for equilibrium between the competitive advantage of regions and the overlaps across sectors. That is, it advocates an equilibrium between related and unrelated

varieties. It has to be noted that the possible paths to achieve this smart specialization are multiple and include the retooling, extending, emerging and cross-sectoral, whereas the ways to achieve the related variety are to date not that clear. In line with Navarro et al. (2012), too much specialisation can also hinder diversification and expose the region to the risks of market condition changes or other unpredictable external events. Accordingly, it is not that clear cut which of the two avenues could be more beneficial, not only in the short term, but also for the economic sustainability of European regions.

In line with the second focus of this article, GINs, the policy thoughts suggest the importance of complementing the simultaneous working of these global networks with the regional innovation agents. This is theoretically purported by Bathelt et al. (2004) who talk about the importance of combining the rich flow of codified knowledge from global knowledge pipelines with the dense interactive local buzz. In part, it has also been taken into account in the formulation of transnational innovation programmes, such as the FP7 and a good part of its associated sub-programmes of networks of research excellence (e.g. Marie Curie), and networks of practitioners and policy agents around best practices and successes (e.g. inter-reg programmes).

Notwithstanding this clarity of intentions, the combination of global knowledge pipelines with local buzz (and knowledge) networks is a new issue in local and regional production systems traditionally close to powerful RIS agents, but quite distant yet from global knowledge sources. Such local systems cannot yet find their way across this issue and the negative impact of the lead companies' strategies to rely more and more on their new GINs and GPNs. Here too, the role of policy-making needs to be reframed, trying to generate the policy spaces (Uyarra and Flanagan, 2010) that lead to a sustainable equilibrium between the further strengthening of the RIS and its growing dependence on GINs, rather than adopting policy decisions that may not count with a strong support of regional stakeholders (Elola et al., 2013).

The Danish wind energy industry seems to find its way across this issue by investing in both (GIN and RIS/SIS), but this needs a thorough thinking and appropriate strategies and resources. For example, maps of competences and joint innovation projects may help these industries and companies to build up further and coordinated competences and competitive strengths, which might help these firms (particularly the local SMEs) to combine the two approaches fruitfully. Of course, the commitment of the lead industrial companies (e.g. Iberdrola and Gamesa in this case) with the regional development

process remains essential to the success of this strategy in the current competitive and globalized economy.

6. Conclusions, discussion and further research

This qualitative paper touches upon novel issues (e.g. related variety and global innovation networks) which have not been extensively addressed in the innovation studies literature to date. Hence it opens the scope for other contributions that could be based on conceptual insights and empirical findings included here. In particular, our analysis reveals the importance of territorial options and strategies focused on diversifying by extending one's own territorial knowledge to related varieties that are also knowledge-intensive and value added generating. In spite of the significant evidence (see also Asheim et al., 2011; Boschma et al., 2013) about the growth of new industries along this global trend, there might arise a more meaningful debate on policy options. In fact, the current slogan of smart specialization might not necessarily be based upon the related varieties platform, but on a sensible attention to coordination of specialization across the EU space, which might lead to neglecting the real options of extending one's own opportunities by following the related variety approach. A serious assessment needs to take place to verify whether these two approaches complement each other or create contrasts and contradictions.

In this work, we also exhibit a second trend of large corporations to develop global innovation networks that help them acquire strategic knowledge assets even at the cost of their relationship with the regional innovation system. In this context, a challenge is open on how to combine the new GINs developed by lead corporations with the former RIS/NIS approach to local and regional development. A solution to this challenge would help the regional system to combine the absorption of inputs and opportunities offered by global knowledge pipelines with the advantages of cooperating within the local buzz and, in this way, to keep small and medium-sized suppliers integrated in global value chains and international markets. In this sense, a more systematic analysis needs to be thoroughly structured and organized (e.g. in a EU project) in order to verify under what conditions the GIN and the RIS can work together to strengthen the resilience of clusters and local production systems vis-à-vis cases in which this does not

happen and, in contrast, such local systems disintegrate and disappear with their repositories of knowledge and competences.

We also consider that the differences and influence of related and unrelated varieties, as well as the plausibility and ease of implementation of smart specialization strategies need to be addressed more in detail. As we noted, the evidence suggests that related variety has a positive impact on innovation and employment growth as compared to the unrelated variety approach, which leads to a more diversified industrial structure. Despite we recognize the relevance of the related variety concept, we do not want to disregard the potential contribution that may be also derived from the analysis of unrelated varieties. From our point of view the conclusions provided by the literature need more depth, since the influence of related variety has to date been studied in periods of economic growth, not in declining economies or industries. Hence, it might be the case that when an economy (sector, region) is facing a declining trajectory, being “unrelated” may provide higher chances to face the risks associated to these economic downturns. As we reflected in the analogy made in section 3.1, it is a matter of finding the balance between effectiveness and efficiency. Accordingly, research needs to dig into the economic impact of these two concepts not only in the short term, but also for the economic sustainability of the territories (i.e. medium to long run). In a similar vein, we still lack knowledge on the degree of operationalization of the smart specialization approach. Can all European regions apply this concept to the same extent? As McCann and Ortega-Argilés (2011: 12) indicate, “the regions which appear to be the most conducive and favourable for the operation of smart specialisation-type processes are the buoyant core regions”. Accordingly, the size and diversity in the economic activities carried out in EU regions needs also to be addressed.

In addition, we may highlight other related research lines that could be opened from here and that would deserve a more careful attention. These are somehow tangentially linked to those mentioned in the conceptual parts of the paper, which is why they have not been studied here in order to provide a message as concise, clear and direct as possible: A) Labor mobility: how has it changed due to the related variety and the global innovation networks? What type of labor mobility can we observe for example in the Basque Country or elsewhere in Europe? In which industries is this phenomenon more observable? Has it had more impact on certain industries over others?; B) Conflict between the policy intervention (aiming at increasing diversity, and new firm and

employment creation) and the action of large corporations (aimed at increasing their own market shares and reducing competitors). From our point of view these research areas may not only allow to make relevant contributions to the academic community, but could also assist in the setting up more effective policy initiatives and adopting more solid policy making decisions.

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