

INNOVATIVE BEHAVIOUR OF INTERNATIONAL ENTERPRISES IN ANDALUSIA. FLOWS AND SYSTEMS

Rosa M^a Jordá Borrell
Francisca Ruiz Rodríguez
University of Seville

Cities today form part of networks in order to become central nodes of the new economy, characterised by the internationalisation of enterprises and the expansion of services and the flow of knowledge. They also compete in the market in a different way to enterprises (creation and implementation of technological innovation), attempting to provide a suitable environment by implementing actions and policies for the development of economic activity underway. Based on these approaches, the service-industrial society becomes the fundamental source of technical change and innovation in cities and the regional economy. The latter two are linked to the density and quality of the organisation of company networks located in the regional and global productive environment.

From the point of view of location, Economic Geography has been studying the interpretation of economic and population concentration processes in metropolitan areas and urban agglomerations for the last few decades. This growing concentration has intensified with the processes of economic globalisation and the internationalisation of enterprises. In Spain, there has been a spectacular transformation in company growth over the last few decades, while medium-sized cities have traditionally been considered as service centres whose functions are aimed at consolidation as market centres. They have, however, recovered their leading role in recent decades as a result of applying territorial development policies (the endowment of equipment, infrastructure and public services) linked to the emergency situation of local/regional industrialisation systems and the internationalisation of enterprises that has led to the boosting of their economic structures.

Spanish and Andalusian enterprises started to adopt the internationalisation strategy based on Latin American privatisation processes in the late 1990's, once the benefits of Spain's entry into the EU (1986) had been consolidated. At the same time, the Regional Government

of Andalusia (Junta de Andalucía in Spanish)¹ started to apply economic development plans that propitiated the implementation of innovation processes in enterprises and the expansion of economic activity. The search for external and nearby economies led to a high concentration of innovative and international enterprises in metropolitan areas and urban agglomerations in Andalusia.

Under these premises, this article analyses:

- 1) The innovative behaviour of international enterprises in Andalusia by territorial fields (rural, medium-sized cities and urban agglomerations). Bearing in mind the characteristics of the urban system in Andalusia, we catalogued towns with less than 10,000 inhabitants as rural, from 10,000 to 100,000 as medium-sized cities and over 100,000 as urban agglomerations or large cities, in accordance with the threshold levels set by the Regional Government of Andalusia (Department of Public Works and Transport, 1999) and the study carried out by Cano García (2002). Based on a sampling of 263 enterprises, we identified 189 companies in different stages of internationalisation. With the information obtained from surveys², we also put together a data base with a broad group of variables corresponding to four topics: innovation (the generation of own technology, technologically innovative activities and the technological results of the enterprise or establishment), internationalisation (criteria of enterprises' internationalisation), general enterprise characteristics (turnover, size and activity sector) and the acquisition of intangible consumables. We mainly treated this information as descriptive statistics using Excel and Access.
- 2) The flow network features that make up the innovation process in Andalusia, in order to discover the magnitude of the diffusion and transfer of knowledge in each territorial field and system in Andalusia. The methodology consisted of an analysis of networks based on a GIS, using Access, Excel and Arc-Gis 9.2, in such a way that:
 - a) each entity the enterprise in the survey relates with has a unique code and a specific location that means they can be shown geographically with the GIS.
 - b) the turnovers of each enterprise expressed in Euros have been grouped into two flow types for each population nucleus. First, immaterial: the acquisition of technology (patents, utility models, design, know-how, software and turnkey plants), contracting advanced services, the acquisition of technology and knowledge from technological partners and other entities and institutions through co-operation. Secondly, material flows: purchasing and sales to customers and from the main suppliers, by the enterprises taking part in the survey. In this way the flows or relations from a city of origin to another that becomes the destination node (the same city when the flow is internal and another different one when it is

1 Andalusia is in the south of Spain, covers a surface area of 87,268 km² and has a population of 8,285,692 (2009).

2 Field work carried out in 2008 for the project entitled «espacio relacional de las empresas innovadoras andaluzas: los procesos de aprendizaje, transferencia y difusión de la innovación» (The relational space of innovative enterprises in Andalusia: learning, transfer and diffusion processes for innovation). Financed by the Ministry of Education and Science, ref. No. SEJ2005-04643/GEOG.

external) are grouped into one sole flow by adding together the data from all of them, material on the one hand and immaterial on the other.

- c) territory is classified by importance or the weight of the nodes or population nucleus, places where enterprise exchange accumulates. The capacity of the nucleus is measured by i) the value of sales or purchases of material or immaterial products in Euros made by each population nucleus, ii) the amount of flows that leave or arrive at the node. We have shown flows on different maps (separate maps for material and immaterial) in order to discover their behaviour in rural areas, medium-sized cities and large cities (6 maps altogether), in order to see if the flows make up a system or network.

The results of the investigation show us that external and agglomeration economies (territorial component) are a conditioning factor in sectorial specialisation and other structural characteristics (size, capital, etc.) in each area, and consequently in the innovative behaviour of the enterprises located therein. Intensive knowledge sectors (industry and scientific services) require more external agents than enterprises in sectors where suppliers and large-scale production prevail. It should be pointed out that business innovation in rural area enterprises is marked by their geographical isolation. Limitations on equipment and services of all kinds characterise the profile of the medium and large enterprise, industrial, with domestic capital, making little effort in co-operative R&D innovation activities – they have the capacity to patent, but very little capacity to launch new products in a foreign market.

There are external and agglomeration economies in medium-sized cities, promoted by the public authorities; the implementation of multinational enterprises plays a significant role in these actions, influencing the innovation processes of enterprises in the area by demanding greater quality and innovation levels, although bearing in mind that they are in search of the advantages of lower salary costs in these cities. The innovation process is focused on tasks of technological development, adaptation and applied research in co-operation (relations with the local, regional and provincial surroundings are important) and design and engineering. They purchase very little disembodied technology and use advanced medium added value consulting services relatively little. Even though these enterprises make a great effort to generate technology, especially in their processes, their results are low from a technological point of view (standard and updated products), and they have less capacity than rural enterprises to find a position in the rest of the world. This is because there is a high proportion of large-scale production enterprises (food, clothing and automobile), of a medium or low technological intensity, supplying large markets (domestic and European), or they are subcontracted by multinationals located in the region, whose strategy consists of reducing costs through salaries.

In urban agglomerations where there is a high number of external economies, there is a concentration of enterprises in capital and knowledge-intensive sectors (importance of advanced services, accumulation of highly qualified human resources, greater investment in innovation, etc). They develop an innovative process of a greater complexity and level of externalisation in their innovative activities. These innovative activities are carried out internally, but the R&D is executed through co-operation mechanisms with public institutions, with lower rates

than rural and medium-sized cities, and more recourse to purchasing external knowledge of both advanced services together with technological partners and buying technology (patents, equipment assets...). However, the innovative behaviour of the technologically less intense sectors (large-scale production) does not show great differences in comparison to that adopted by other territorial fields, as in Andalusia they require less specific resources valued today as strategic and more economies related to the practice of cost strategy (use of less qualified labour and natural resources).

Innovation activities and the degree of externalisation of the innovative process of the enterprises under study, their results in terms of markets and technology and the capacity to access and diffuse knowledge at different territorial scales is all therefore related to four factors: 1) the systematic and iterative nature of the innovative process, 2) the location patterns of innovative and international enterprises, 3) the organisation and innovation competencies (Jordá and Ruiz, 2009) reached by these enterprises, which enables them to take on an innovation process with a spatial dimension linked more to territorial scales than to local ones, and 4) the territorial policy applied in Andalusia until the mid-1990's, which consisted of making the city system rest almost exclusively on capital agglomerations, thereby weakening intraprovincial articulation without improving it on an interprovincial one (Rodríguez Martínez, 2008).

These companies, and in consequence the territories where they are located, play an important role in the diffusion and transfer of knowledge through the relations and networks set up with other agents in the system of innovation, making it clear that:

- 1) International and innovative enterprises located in urban agglomerations have more interaction (immaterial flow) with knowledge centres in countries with an advanced economy and within the actual agglomerations. On a regional scale, a radial network is set up, with Seville in the centre, in which the provincial capitals integrate medium-sized cities via co-operation relations. These cities supply research, R&D assessment, design, marketing etc. to companies located in the medium-sized cities. The existence of local innovation systems in the latter based on R&D and the economies generated on the network can turn them into knowledge diffusion centres. But these local innovation systems still only have few connections with other local and regional nodes, thereby limiting the transfer of innovation in a structured way in Andalusia. These results corroborate the theory that positive local externalities, the local distribution of growing performance, the effects of synergies and «spilling» tend to lessen the more capacity there is to use places farther away for the supply of immaterial assets. There is consequently a need for public institutions to invest more in technical infrastructures and in general, in external economies in medium-sized cities and industrialised rural areas so that the former can play a more significant role in the innovation system in Andalusia (maps 1, 2 and 3).
- 2) Knowledge exchange via market relations (purchasing-sales) is established on a regional scale: a – via suppliers (40% of the total) more than through customer relations (25% of the total). b – through complementary intangible consumables (knowledge) from purchasing or sales (mutual visits by work groups, carrying out joint technical tests, setting up new organisational and productive routines and the

homogenisation of technological and innovative competencies). The diffusion of innovation mainly takes place within the urban agglomerations (62% via suppliers and 40% via customers) and among large cities, given that the former concentrate 74.5% of sales and 60.5% of supplies in Andalusia. We should add that enterprises in urban agglomerations devote the most resources to R&D (an average of 6.08% of the turnover) and many of them have an established technological strategy (Jordá Borrell and González Relaño, 2009). Enterprises in agglomerations are also being supplied from and selling abroad more and more (60% and 75% respectively). They are therefore the main centres of connection to the European and worldwide system, but their local production systems are starting to lose their key role in territorial development from a market relation point of view, because they are more involved with the global economy than the regional one.

It is urban agglomerations that integrate medium-sized cities into Andalusian system via suppliers (31.3% of total purchases in Andalusia), but they are supplied mainly from their own local systems (58% of total purchases in Andalusia). The reason for this is that the technological level of companies in urban agglomerations is higher than that of enterprises in the local systems of medium-sized cities. They spend 3.4% of their sales revenue on R&D and the strategy implemented is based on innovation and not technology (Jordá Borrell and González Relaño, 2009). Therefore, supplies from urban agglomerations have a better technological level than those produced in local medium-sized city systems, despite the fact that the technology parks in Málaga, Seville and Granada play a very reduced integrating role with medium-sized cities and rural towns, even more so bearing in mind that the enterprises studied are innovative and international. Rural enterprise supplies come from Andalusia (30%), and within this percentage 50.8% comes from their respective provinces and from Seville (21.5%). A large part of the flow in these nuclei goes abroad, and it is here that the disembodied technology and high added value components come from (maps 4, 5 and 6).

In short, there is a series of innovative enterprises in Andalusia that are very competitive internationally and use the external economies of large urban agglomerations (research and training centres, advanced services, industrial enterprises) to develop their innovation process. These large cities connect the regional system with Europe and the rest of the world, and constitute the main regional network nodes. Knowledge is transferred from these cities to medium-sized cities and rural nuclei. This transfer is carried out in immaterial flows more than in material ones. Furthermore, local systems are created both in urban agglomerations and in medium-sized cities and rural nuclei. Even though the latter have great potential they are still hardly connected with their local and provincial surroundings.

