INNOVATION AND CRISIS ERA: THE CASE OF COMMERCIAL ARCHAEOLOGY AS A KNOWLEDGE INTENSIVE BUSINESS SERVICE

Eva Parga-dans
Spanish National Research Council
eva.parga-dans@iegps.csic.es

Abstract:
In this article, commercial archaeology is studied as an economic activity with major structural problems that have become more severe due to the effects of the crisis and the paralysis of the construction sector: however, in turn it has major potential for its development and consolidation in the market as a result of being a knowledge intensive business service (KIBS). As a result, these pages present a study on the business activity created around the management of Spanish archaeological heritage, its growth and development in terms of innovation and transfer of knowledge, as driving elements of the sector.
The added value of this research lies in its pioneering nature with regard to the creation of knowledge on business activity associated with the management of archaeological heritage in general terms, and the way in which this type of knowledge can be applied through the analysis of the requirements for innovation and the transfer of knowledge that are being developed.

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ABSTRACT

In this article, commercial archaeology is studied as an economic activity with major structural problems that have become more severe due to the effects of the crisis and the paralysis of the construction sector; however, in turn it has major potential for its development and consolidation in the market as a result of being a knowledge intensive business service (KIBS). As a result, these pages present a study on the business activity created around the management of Spanish archaeological heritage, its growth and development in terms of innovation and transfer of knowledge, as driving elements of the sector.

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1. INTRODUCTION

There is general consensus towards considering innovation processes as a driving force for economic growth through the production, exploitation and diffusion of knowledge (Oslo Manual 2005). A good example of this is the theory of the economist Joseph A. Schumpeter regarding creative destruction as a process of adaptation to change (Schumpeter, 1942). For this reason, periods of crisis have to be understood as new challenges that can be faced up to through process of creative destruction. This perspective is a central theme in the current situation of worldwide financial crisis, which has to be considered in terms of opportunities (Gambardella, 2008).

From 2007, there has been a change in the economic trends of the industrialised nations that has led to a period of recession, with very serious consequences in very different areas. The crisis began in 2007 as a result of a boom in sub-prime mortgages in the United States, which had a major knock-on effect on banks and financial markets throughout the whole world, which worsened dramatically and rapidly during the period from 2008 to 2009 (Aitchison, 2009). The Spanish economy has been particularly vulnerable to these effects, due to the fact that its development over the last decade was
due to a boom in the construction industry on which many other sectors depend, such as the case we analyse here.

In this article, commercial archaeology is studied as an economic activity with major structural problems that have become more severe due to the effects of the crisis and the paralysis of the construction sector; however, in turn it has major potential for its development and consolidation in the market as a result of being a knowledge intensive business service (KIBS).

Commercial activity in relation to the management of archaeological heritage is connected to what is known as the Economy of Culture, or the Economy of Heritage (Greffe 1990), of recent interest due to the growing importance the socio-economic perspective applied to heritage studies, as a type of analysis to discover the impact of this sector in terms of growth, competitiveness, creation of employment, sustainable growth and innovation. For this reason, more and more studies are appearing in this field, and the increasing importance of this phenomenon can be explained by different factors such as the growth of cultural demand, the restructuring of productive structures in developed countries around the service sector, and the appearance of a prosperous and dynamic cultural sector that generates income and employment (Vicente 2007).

The impulse of this novel perspective came about as a result of the recent consideration of the cultural sector as a driving force for economic and social development, as established by the European Commission in the Lisbon Agenda (2000), whose objective for 2010 is that Europe possesses “the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.” In order to achieve this objective, the aim is to invest in economic, social, environmental and cultural factors as basic cornerstones for development, social welfare and quality of life (Samaniego, 2006).

Within this cultural sphere, heritage as a discipline is conceived as a creative sector that is currently in the process of growth, and which is the subject of social and economic studies. Also, this trend is beginning to take effect in the political sphere, where heritage is starting to be considered as a useful instrument for the development and improvement of the welfare and quality of life of citizens (Vicente 2007).

In this study, the heritage sector, and specifically the archaeological sector, is considered as a KIBS, highly qualified and which as a result is a resource capable of promoting technological and productive development with implications in the economic and social sphere. As a result, these pages present a study on the business activity
created around the management of Spanish archaeological heritage, its growth and development in terms of innovation and transfer of knowledge, as driving elements of the sector.

The added value of this research lies in its pioneering nature with regard to the creation of knowledge on business activity associated with the management of archaeological heritage in general terms (mode 1), and the way in which this type of knowledge can be applied through the analysis of the requirements for innovation and the transfer of knowledge that are being developed (mode 2) (Gibbons 1994, 2003).

Also, it aims to offer solutions to a real problem associated with the current crisis affecting the sector, in which demand is being reduced as a result of the paralysis of the construction sector in Spain, an activity with which this service is connected. As a result, a detailed analysis of the sector is carried out, evaluating its requirements in terms of innovation and transfer of knowledge, as multidimensional, interactive, systemic and dynamic elements (Trigo, 2009).

2. RESEARCH OBJECT AND THEORETICAL APPROACH

This research is carried out with the general aim of providing information on the heritage sector, and more specifically on commercial activity associated with the management of archaeological heritage in Spain, more commonly known as commercial archaeology. For the first time, the aim is to centralise the information on the structure, size and development of this market, as well as to analyse its requirements in terms of innovation and the transfer of knowledge.

Based on this objective, the first empirical analysis is offered on business activity created through the management of Spanish archaeological heritage (commercial archaeology) in general terms, focusing especially on the processes through which this niche in the market appeared and developed, from a systemic perspective, by examining the relations between the agents and institutions that intervene in the archaeological sector, as well as the influence of the processes of innovation in the stimulation of this commercial activity.

With regard to this, the aim of this study and its central theme is presented below as a question, to understand:
How knowledge, agents and institutions involved in the Spanish archaeological sector are intervening in the development of innovation processes of the industrial environment and which factors are influencing these processes?

In order to answer this question, it has been necessary to establish a conceptual and empirical framework making it possible to analyse the archaeological sector, innovative activity developed in a systemic way, and taking territorial links into account. Having defined the analytical tool, the business sector specialising in the management of archaeological heritage is defined and characterised, centralising and systematising the information obtained in order to create a pioneering study in the sector.

As a final objective, the aim is to design strategies and/or recommendations that promote the technological and productive development of this discipline, based on the creation of knowledge and estimating the potential of the social impact of generating this type of activity.

Figure 1 below summarises the proposal of this research. The object of the study is in the centre of the diagram, which is the market developed around the management of archaeological heritage, which forms a part of a sector in which the different areas (academic, geopolitical, administrative and productive) are shaping its structure and function; in turn, this archaeological sector is inserted in an institutional, legal and socio-cultural framework.

The question is to understand how the market created around the management of cultural heritage produces and uses knowledge in relation to the different areas and frameworks within which it is inserted. In this figure we can see the process of innovation and transfer of knowledge that can originate from any agent or area, and affect the other spheres.
The theoretical bases considered throughout this structure form the cornerstones for the construction of an analytical model aimed at understanding the nature and dynamics of the processes of innovation in the Spanish archaeological sector.

In order to understand the specific idiosyncrasy of this sector, it is necessary to focus on a series of questions related to the significance and measurement of innovation. In this case, the definitions included in the Oslo Manual (2005) are very useful, produced by the OECD and the European Commission for the gathering and interpretation of data on innovation. The manual explains that innovation is the introduction of a new or significantly improved product (a good or service), a process, a new method of commercialisation or a new organisational method, in the internal practices of a firm, the organisation of the workplace or external relations. In order for innovation to exist, it is necessary that at least the product, the process, the method of commercialisation or the method of organisation are new (or significantly improved) for the enterprise. This concept includes the products, the processes and the methods that the firms are the first to develop, and those which have been adopted from other firms or organisations.

However, the quantification and measurement of these processes will depend on multiple factors, and as a result it is necessary to create an analytical model adapted to
our object of study. Specifically, the processes of innovation will vary enormously between one sector and another, both in terms of development and in terms of organisational structures and institutional factors (Malerba 2005). For example, in high-tech sectors, R&D plays a priority role in innovation activities, while in other sectors the acquisition of knowledge and technology is more important; the latter is the case in the Spanish archaeological sector.

Also, if we add to this the fact that we are analysing a service sector, we will have to take into account a series of specific factors, such as the distinction between products and processes often being unclear, as production and consumption occur simultaneously; or that the activity of innovation is a continuous process, based on a series of modifications that are progressively introduced in the products and the processes, something that usually makes it difficult to measure innovation.

With these features in mind, an analytical model is proposed to characterise the Spanish archaeological sector in terms of innovation, based on two types of theoretical approaches: innovation systems (Freeman 1987, Lundvall 1992, Nelson 1993 and Edquist 2005, Breschi and Malerba 1997, Malerba 1992 and 2007) and knowledge intensive business services (KIBS) (Miles 1994, Metcalfe and Miles 2000, Gallouj and Sundo 1998, 2002, Trigo 2009, and Vence and Trigo in print), in order to understand the rhythm and direction of the processes of innovation developed in connection with archaeological activity.

The theories of innovation systems provide a series of key elements for understanding innovation in a systemic, interactive manner, and in a specific geographical context. These theories are very useful for this study, due to the fact that they focus on all of the agents and spheres connected with a sector and in a specific spatial context. In particular, the approach regarding sectorial innovation systems has been especially useful for this study, which defines the object of study in connection with a specific sector, which is identified through three dimensions: a specific type of knowledge, actors and institutions (Malerba 2007), which in turn may have dimensions at local, regional, national or global level, and which coexist between them; however, the analytical centre is based on the sector, which in this case is the Spanish archaeological sector.

In summary, the theoretical bases regarding innovation systems provide a series of tools that allow us to define the analytical context of innovation. Through the geographical frontiers and the characterisation of the archaeological sector, the study of innovation processes is established as understanding the dynamics of the three main dimensions:
learning processes and the creation of knowledge, exchanges and interaction between
the actors associated with the sector, and the sphere created by the institutions (Malerba,
2007).

Having defined the frontiers and dimensions of the object of study, the sector is
analysed as a KIBS (Miles 1994, Metcalfe and Miles 2000, Gallouj y Sundo 1998, 2002;
Trigo 2009, Vence and Trigo in print). These theoretical approaches have been very
useful for characterising the commercial activity developed in relation to heritage
management as an offer of KIBS. This kind of services are formed by companies who
offer knowledge-dependent services or professional experience in a specific discipline
or technique, and which come from knowledge-based products and services
(Escaurinaza, Tintoré and Torres 2001); also, they are characterised by being highly
concentrated in metropolitan regions (Coffey 2000), usually in the capital cities of
countries (Daniels 1995, Vence and González 2005, 2008, 2009). This territorial link
makes space highly important in the configuration of this type of markets, characterised
by being of reduced size, but highly concentrated (Vence and González 2009). The
geographical location of these activities is explained by a series of factors that converge
in the concentration of these services in large metropolitan areas, such as the need to
generate a minimum demand of these activities, their strategic situation in locations
where the headquarters of the main organisations and institutions and the most
important markets are located, and the facilities for direct and personalised relations,
amongst others.

Also, in order to develop knowledge intensive business activities, specialised know-how
is required, whose application calls for highly qualified human resources, specifically
with university training and subsequent specialisation (Vence and González 2009). This
is because they are services that depend on the knowledge and/or professional
experience of a specific, technical discipline.

Knowledge intensive business services (KIBS) are characterised by carrying out
activities that are heavily reliant on new technologies (Miles 1995), especially ICT,
which in turn form a part of the process of elaborating these services (Vence and
González 2009) and as a result of being important creators and diffusers of significant
innovation processes; therefore, these activities have a strategic importance and in turn
are vital for other sectors of the economy (Windrum & Thomlinson 1998).
In order to characterise commercial archaeology as a KIBS, we will analyse if it complies with all of these characteristics through the formulation of the following working hypothesis:

**Hypothesis 1:** The commercial activity carried out in relation to the management of archaeological heritage is configured as an offer of knowledge intensive business services.

Having characterised the sector, we will continue to establish an analytical tool in order to analyse the requirements in terms of innovation. Based on these theoretical approaches, it may be affirmed that the innovation processes developed by this type of services are very heterogeneous and are based on very different patterns, although several authors have written articles on certain common elements in these processes (Metcalfe & Miles 2000, Gallouj & Sundbo 1998, Gallouj 2002, Trigo 2009, Vence & Trigo in print), which are described below:

The innovation processes in the KIBS are characterised by being scarcely systemic and formalised, as a result of being based on an interactive character, i.e. through the exchange of knowledge between the different agents involved in the sector, and due to their intangible nature, as a result of being developed as small incremental innovations based on the implementation of knowledge. Therefore, the innovation of KIBS is usually difficult to quantify, as it does not always refer to technological innovations or R&D activities as generators of knowledge (Vence & Trigo, in print).

With reference to the characterisation of innovation in KIBS, a series of studies have pinpointed the main difficulties affecting the development of these processes, especially legal and bureaucratic obstacles and financial restrictions (Escaurinaza, Tintoré & Torres 2001, Pilat 2000).

Another especially relevant dimension for understanding the nature of the innovation developed in a sector is the analysis of the institutions. The actions and interactions of the agents are influenced by the institutions; these include regulations, routines, habits, established practices, guidelines, laws and standards. There are institutions of a national, regional or local nature, while others are specific to a sector. Through the configuration of the different institutions and their relations, it is possible to study the possible effects that are being developed in the structuring of the sector.
The role played by the public sector is intimately linked with the institutional sphere, and how this affects the established dynamics in a sector. One of the main objectives of the public sector is to create a dynamic industrial sector in which the markets can develop, as a result of which the public sector implements different types of mechanisms such as policies, laws, investment levels, standards, financial support, infrastructures, R&D, training, subsidies, taxes and subventions (Gregersen 1992).

Through the legislative and management models, the direction and rhythm of innovation is defined, economic growth is encouraged or inhibited, and the quality levels and sizes of the markets are established (Gregersen 1992).

For the case of the Spanish archaeological market, the aim is to analyse the role of the administrative departments responsible for the management of archaeological and cultural heritage, and the regulatory and management models that affect the structure and development of commercial activity. Special emphasis will be placed on studying the public sector as a central agent in the creation, maintenance and stimulation of innovation. As a result, the second working hypothesis is the following:

**Hypothesis 2: The legal and administrative environment is configured as an agent that is mitigating the driving force for commercial archaeological activity**

### 3. METHODOLOGICAL APPROACH

In order to describe and analyse commercial archaeological activity in Spain and its requirements in terms of innovation and the transfer of knowledge, this study will focus on the offer in the sector: more specifically, the analysis will focus on archaeological companies. To do so, a research strategy must be defined that focuses on gathering information directly on the processes of innovation in Spanish archaeology companies.

However, in this case an important hurdle is the fact that there are not official sources in Spain that offer systematised data on the archaeological sector, and even less so on the activity created in relation to commercial archaeology. For this reason, the main difficulty facing the study lies in the large amount of resources and efforts required to obtain the primary data.

To start with, the first database on Spanish archaeology companies has been created. The companies were identified using the national economic activity code. As a result, a database was created with 273 entries. Next, a questionnaire was produced and sent to
companies dedicated to heritage management in Spain. Thanks to this questionnaire it was possible to compile information on the structure, size and activities carried out by these companies, and for the first time to systematise data on this business sector and be able to evaluate its requirements in terms of innovation and the transfer of knowledge.

In designing the questionnaire, the directives of the Oslo Manual (2005) were taken into account for gathering and interpreting data on innovation; this is the most relevant methodological document in the international literature on the measurement of innovation (March Chordà 2004). The structure and organisation of the questionnaire was based on the Questionnaire on Technological Innovation in Enterprises developed by the National Institute of Statistics, and the Community Innovation Survey (CIS) of the European Union.

However, due to the reasoning behind this study, it was necessary to design the questionnaire from a qualitative perspective, in order to obtain information similar to the examples mentioned above in a service sector. Information was gathered for the following areas: the general characteristics of the company, economic activity, legislation and management of archaeological heritage, innovative activity, training and diffusion, relations with other agents in the sector, and impacts caused by the crisis.

This activity was complemented by a series of semi-open interviews aimed at the administrative departments responsible for the management of archaeological heritage in Spain’s seventeen regions. As a result, information was obtained on aspects referring to regulations affecting cultural and archaeological heritage; the structure, size and type of activities carried out by the heritage departments responsible for the management of archaeological heritage in the regions, as well as obtaining information on the labour market associated with this activity.

As a result of these activities, it has been possible to analyse the type of relations and structures that exist with reference to the productive and commercial environment, focusing especially on the importance of the legal and administrative environment for their development, by analysing the functioning and development of companies dedicated to archaeological services, as well as the influence of the structures responsible for managing archaeological heritage in the structural definition of this market. This analysis will make it possible to analyse the innovation processes that are being developed in this sector, as well as the optimum conditions for the creation of knowledge, and to answer the hypotheses put forward.
4. SOME RESULTS: THE MARKET ASSOCIATED WITH ARCHAEOLOGICAL HERITAGE MANAGEMENT

The market associated with the management of archaeological heritage, more commonly known as commercial archaeology, is defined as business activity created “when suitable management of the same requires the performance of specific actions that generally take place through a contract, and in any event providing a specific type of service and charging for it. As is generally known, this field is mainly occupied by small companies and archaeological consultancy firms” (Criado 1996).

As a result, the activity carried out in relation to commercial activity consists of the buying and selling, the supply and demand, of a series of services associated with the management of archaeological heritage. This offer of services took shape in the 1990s, as a result of the implementation of the Spanish Historical Heritage Law (1985), and the diversification of responsibilities for the management of heritage elements amongst the seventeen Spanish regions. This law establishes a national framework of action, although apart from this regulation, a series of different laws were implemented at regional level, establishing a regulatory framework that led to the creation of an institutional structure for the management of heritage, through which commercial archaeology developed.

This meant that the different Spanish regions began to develop their own models, creating seventeen regional authorities with their own Heritage Departments, who began to publish regulations aimed at controlling archaeological activities in their respective territories.

These regulations led to the appearance of a demand for services in relation to heritage management that could not be dealt with by the public sector, due to an absence of resources. As a result, a new need was created based on the buying and selling of archaeological services, creating a labour market in the field of commercial archaeology that led to the appearance of cooperatives, firms and self-employed specialists who structured this new business area, which developed over the foundations of regional directives on the protection and management of heritage elements, the environment and territorial organisation. From 1985 to the present day, this activity has grown progressively, acquiring experience and diversifying its knowledge.

Therefore, a type of commercial activity developed that is linked to the legal and administrative environment, characterised by having a heterogeneous structure
According to the different Spanish regions, as a result of the different management models. This fact has different consequences in the development of the commercial archaeology by regions.

The commercial archaeological activity came about as a result of the publication of the Spanish Historical Heritage Law of 1985, and the establishment of a series of requisites for the protection and control of heritage, which led to the privatization of this activity. Subsequently the Spanish regions published laws that influenced commercial development in these areas.

The following graphic shows the number of archaeology companies in relation to the year and region in which they were created. During the period from 1980-1985, prior to the publication of the Spanish Historical Heritage Law (1985), this market did not exist; only two archaeology companies were working in the Community of Madrid.

From 1985, and over the next five years, a number of archaeological companies timidly began to appear in the regions of Galicia, Castile-León, Aragón, Andalusia and the Basque Country. To put this into perspective, during this period only 4% of the total number of companies that currently exist were operating; at this time, the market was at an incipient stage.

In 1990, the autonomous regions began to publish regulations affecting heritage elements; Andalusia and Castile-La Mancha were the pioneers, with legislation from the same year; in 1993, regulations were published in Catalonia, and in 1995 in Galicia during this period more companies began to appear, with a certain density beginning to take shape in the cities of Barcelona and Valladolid. Around 16% of the companies who answered the questionnaire were already working in this period.

This process of creation continued to increase during the period between 1995 and 2000, during which time regulations were published in the vast majority of Spain’s regions (the Community of Valencia, Madrid, Cantabria, the Balearic Islands, Aragón, the Canary Islands and Extremadura). During this period there was a high density of companies in the city of Zaragoza, and in the regions of Catalonia, the Community of Valencia, Madrid, Castile-León and Andalusia. 23% of the companies who answered the questionnaire were constituted during these years.

Surprisingly, the major boom in archaeological companies occurred during the period from 2000-2005: years of economic prosperity and the development of the construction sector, with important clients demanding archaeological services, as will be explained later on in this article. During this period a large number of companies were created in
Spain’s largest cities, more than 40% of those who answered the questionnaire, and legislation in relation to heritage elements was published in Asturias, Castile-León, La Rioja and Navarra. The highest densities in terms of the number of companies were located in Madrid, Barcelona, Valencia, Seville, Zaragoza, Alicante, A Coruña and Córdoba.

Finally, the period from 2005-2010 was analysed, years in which there was a dramatic decrease in the number of companies created, which could be as a result of the economic crisis, due to the close relations between the archaeological sector and the construction sector, which was paralysed from 2008 onwards. In 2006, the creation of companies stood at around 5%, and despite the fact that this grew to 8% in 2007, in 2008 it decreased to 4%, a possible effect of the economic crisis.

Despite the decrease in the number of archaeology companies, the concentration of companies increased around the cities of Madrid, Seville, Zaragoza and A Coruña. In these cities, the density of archaeology companies increased; however, it decreased in the Community of Valencia, where Valencia and Alicante were previously cities with high concentrations of archaeology companies. This may also be a result of the decrease in construction work in these areas, and therefore a result of the current economic crisis.
On analysing the data referring to municipal districts, it may be seen that the highest densities are in the cities of Madrid and Barcelona, as well as in the municipal districts around these cities. In these cases, it may be seen that the high density includes other provinces that are close to these centres. For example, in the case of Barcelona, the area of concentration includes the province of Tarragona and Lleida. In the case of Madrid, it
includes the area belonging to the provinces of Ávila, Segovia, Valladolid and Toledo. However, the further away from the metropolitan area, the lower the density of companies.

With a lower density, but also important, are the areas around the cities of Seville and Córdoba, Valencia, Zaragoza, A Coruña and Pontevedra. Finally, there is also a considerable density around the cities of Bilbao and Valladolid.

The following figure shows the density of archaeological companies according to their location.

Figure 3. Density of companies by municipal districts.

Source: author’s own information

This information was used to analyse the location of companies in relation to the territory, observing that commercial archaeological activity is focused on the capital cities and main metropolitan areas, and characterised by having a reduced size (273 companies), and by being concentrated and specialised. These concentrations are the first indication that make it possible to affirm that companies associated with archaeology carry out a knowledge intensive business type of service (Hypothesis 1).
Apart from the spatial characterisation, it may be seen that the type of activities these companies carry out correspond to KIBS: using the categories defined by Thomi & Böhn (2003). These activities correspond to national economic activity codes numbers 72, 73 and 74. In the results of the study, it may be seen that 13% of these companies are registered as technical architecture and engineering services and other activities associated with technical consultancy services (7420), and a further 13% are listed as carrying out other business activities (7484). In turn, 7.5% are listed under code 7320, research and development in social sciences and humanities, and 2.6% of the companies are listed under code 7310, for research and development in natural and technical sciences.

This means that based on the results of the classification, it may be affirmed that commercial archaeology is configured as a KIBS (Hypothesis 1). By analysing the creation of companies according to the time period and geographic area, it can be seen that there is a trend for archaeological companies to be located around the cities and metropolitan areas, as well as the reduced size of the market and its concentration, factors which are characteristic of KIBS.

Commercial archaeology has been characterised as a KIBS, with the implications that this categorization involves. We are therefore faced with a market that is chiefly located in the main cities and metropolitan areas, where the main clients for these activities are also located. For this reason, the proximity between agents is very important for the establishment of direct and personalised relations. These types of activities define KIBS as a result of not developing mass production processes, stock and/or standardised models, but instead for their flexibility and adaptation to the client’s requirements, i.e. their specialisation.

The human resources associated with this sector are characterised by being highly qualified, constantly learning and generating knowledge. In turn, the offer of archaeological services demands and consumes new and/or improved products and processes that can be applied to their day-to-day activities (such as information technologies), which they often integrate into the processes of creating services; improving their products and/or developing other new products that come to form a part of the offer itself. As a result, this type of activity both creates and diffuses important innovation processes (of learning and knowledge).

Although these companies possess these capacities, there are also important problems and obstacles associated with the structuring of the sector and the type of relations that
are developed with the legal, administrative and academic spheres, which hinder the vitality of the sector.

These are small companies, created by one or two partners, often with just one or no part-time employees, and who hire personnel based on the demand for work. It seems that the majority of these companies have a turnover of less than 100,000€ per year, with the exception of 10% who have a turnover of more than 500,000€ per year. These figures are currently suffering a downward trend as a result of the economic crisis, with 62% of the companies affirming that they have seen a reduced demand from the public sector, and 77% stating they have seen reduced demand from the private sector. On the whole, 80% of the companies believe that the economic crisis is having an adverse effect on the development of the sector.

In general terms, this market grew from 1990 until 2006-2007, but that this development was then paralyzed. We have to take into account the fact that the Spanish archaeological sector depends on the constructing sector. For this reason, the trends seen in the construction sector have a similar effect on the archaeological sector. The effects will be stronger in the Mediterranean regions (Catalonia, Community of Valencia, Murcia), Andalusia, Madrid and Extremadura than in the north of Spain (Galicia, Asturias, Cantabria and the Basque Country). The north of Spain is not so strongly dependent on construction. Furthermore, in the northern regions the population is older, meaning that demands for housing are lower and the effects are not as strong.
There are differences in the effects of the crisis by regions, and the effects in the archaeological sector also differ by regions. The construction sector was the driving force behind the Spanish economy until 2007, but much more so in some regions than others, meaning the crisis has had different effects, most strongly affecting the regions where the construction sector was more important.

In general terms, access to funding and the management of economic resources are seen as the main issues hindering their development and growth. In addition, there are no specific academic qualifications for archaeology in Spain, nor any professional associations that defend the rights of this sector, although it does seem that an association is gradually being formed to deal with these matters.

Furthermore, in the legal and administrative sphere there are seventeen different models for the management of cultural and archaeological heritage, in each region, leading to a diverse and complex legal and administrative framework in which different public bodies are involved (heritage departments, environmental departments and urban planning departments) at different territorial levels. This situation often hinders coordination between the different authorities and agents involved in the sector (Hypothesis 2).

For these reasons, both the multiplicity of regulations and agents responsible for heritage management and the absence of standard directives are leading to a significant structural weakness in the sector, with an absence of standardised public policies in
terms of budgets, regulations and controls that could support the correct management of heritage and the development of commercial activity (Hypothesis 2).

The absence of these types of measures often leads to another type of problem. A frequent obstacle is the limited cooperation and/or presence of conflict between the different agents involved in the archaeological sector (such as the authorities, universities, companies, clients and suppliers), who have different interests but which must be coordinated in order to comply with the regulatory requirements established by the authorities of the autonomous region in question. As a result, there are often conflicts of interest between the actors, organisations and institutions involved in the process of heritage management, as they have to respect the established guidelines, without these helping to resolve the different types of conflicts (Hypothesis 2).

As an example, clients who request archaeological services seek the elimination of any type of capital-related obligation affecting the land to continue with their activity, and as a result place special emphasis on the work of archaeology companies. In turn, these clients want to satisfy their own clients and streamline the processes, although in turn they have to be in contact with the authorities and take the appropriate measures to ensure the protection of heritage elements. This often leads to conflictive situations between agents who have different interests, which when combined with the absence of regulatory and management standards, may lead to a situation in which heritage elements are not properly protected, in contrast to the objectives sought by the legislation in relation this area.

It could be thought that the legal and administrative sphere is not responsible for establishing all of the possible conflictive situations through legislation and management; however, if no institution exists which is responsible for judging and resolving these situations, the result may be poor heritage management, and even worse heritage conservation.

4. CONSEQUENCES

As a result, and in the light of the potential that heritage management has as a driving force for economic and social development, one consequence of this study in heritage terms is the need for a management model that unifies and balances criteria in order to guarantee the correct conservation and management of cultural and archaeological heritage.
In addition to the need to standardise the parameters for heritage management, is the fact that neither is there any institutional figure that recognises the archaeological profession and which refers to the type of knowledge, experience and methodology that characterises these parameters. For this reason, there are no standardised studies for the development of the profession, nor any uniform parameters in Spain to make this activity effective: this adds a sensation of confusion and ambiguity to the correct management of Spanish archaeological heritage.

As a result of this, through the results of this study it is recommended that in order to make the sector more dynamic in general terms, the parameters affecting the management of heritage and the archaeological profession should be standardised. Despite these limitations, and considering the importance of the legal and administrative environment as an agent that helps or hinders (in this case) industrial development, an essential requirement is positive and sustainable innovative performance in relation to heritage legislation and management. For this to occur, it is necessary to establish a series of foundations that genuinely promote the protection of heritage, at the same time as an entrepreneurial culture between individuals through specific and complementary policies.

Although this study has not explored the relations between the academic environment and the industrial environment in detail, a series of consequences may be established based on the results of the study. One of the characteristic features of KIBS is their capacity for cooperation between agents in the scientific and technological sphere, such as universities or research centres, thereby creating innovative processes and relations for the transfer of knowledge, with feedback for both agents.

In the case of the archaeological sector, this does not occur. Despite being a KIBS, from the outset there has been a confrontation between both spheres, which has led to the existing resources being underused by the industrial and academic sphere.

Through the results of this study, it can be seen that the type of collaborations established between the companies and academic institutions seem to correspond to initiatives based on personal contacts and friendships to resolve specific and occasional issues. The percentages for joint activities in terms of relations established through formal and informal channels are very low. In addition to this is the very limited investment and/or development of activities associated with research by these companies, and the virtual absence of contact from research bodies to carry out applied research in the industrial sector.
It is important to note that there is general consensus in considering relations between universities and companies as factors that are capable of creating processes of innovation that are both applicable to economic sectors and able to increase their dynamism. Academic institutions, through their scientific studies, tend to provide a direct value that is applicable to companies, implemented through their products and services.

As it is not possible to explore these issues in greater detail, as this was not the aim of this study, it is important to emphasise, as a recommendation, the importance of establishing relationships of cooperation between the academic and industrial spheres, in order to make the sector more dynamic in research and market terms; and also cultural relationships to promote correct heritage management.

Also, it is necessary to highlight the fact that the legal and administrative sphere is responsible for developing mechanisms that encourage collaboration between both agents, an essential part of the public policies that normally favour the development of innovation, and the processes of learning and knowledge. These types of activities are essential in order to be able to consolidate the archaeological sector as an activity which is capable of generating social and economic impact in terms of employment, the GNP and resources, in a correctly planned, sustainable manner.

In summary, the design and implementation of policies that favour the innovation and structuring of the sector are very important in order to build bridges between the agents who are associated with a knowledge-intensive sector, in which research is essential for the development of intangible results, of services. This infrastructure must facilitate interaction between agents who are creators and users of knowledge, for their transfer and application.

The situations described above lead, intrinsically, to a series of effects in the development and structuring of the industrial environment, the main receiver of the management models established in the sector. In general terms, Spanish archaeology companies are characterised by being numerous for such a specialised sector (273 companies), but small (limited companies with one or two partners, who employ one or two people on a part-time basis), without a strong structural fabric and with considerable problems in terms of resources (with the exception of 10%). The geographic area in which they carry out their activity is usually the region in which they are located, and their average yearly turnover is between 10,000 and 75,000€ (with the exception of 10%, who have a turnover of more than 500,000€ per year). It is
particularly interesting to note the high academic level and degree of specialisation of all of the personnel associated with these companies, who at least have a degree. The majority of these company carry out some type of innovative activity or process, despite the fact that their work is carried out with no connections whatsoever to research. However, these innovative processes are not formalised, and are often difficult to quantify. In addition, there is a very limited sense of association between professionals in the archaeological field, who far from establishing agreements to structure their profession, remain isolated in their own sphere, and from all other spheres. For all of these reasons, it would seem to be important to establish channels of communication between administrative departments, institutions and agents involved in the sector. In particular, links must be forged between the industrial sphere and the academic/university sphere to provide a greater boost to the resources that exist in both these spheres. Another priority would seem to be establishing protocols for action and coordination between institutions as a means of improving relations between the different agents, which favour the development of an integral management for archaeological and cultural heritage. This weak structural fabric, combined with the economic effects of the crisis on this activity, has led to major problems for the consolidation of this market, frequently resulting in situations of instability in terms of employment, economic factors and services. The close relationship with the construction sector as one of the main users of archaeological services in the private sphere, and the paralysis of this demand as one of the main effects of the crisis, is having a serious effect on the stability of the archaeological market. In order to mitigate these effects, it could be of interest for these companies to diversity their offer of services, for example by carrying out preventative archaeology and the management of cultural resources, which apart from being an alternative source of business, could encourage the protection and management of heritage through sustainability, with important socio-economic impacts in other international contexts. Also, the study has revealed the existence of a considerable percentage of stable, dynamic archaeology companies (around 10%), as a result of which it is recommended that the industrial sphere develops good practice models that encourage the implementation of systems for quality control and continuous improvement for the activity, with the aim of consolidating this commercial activity in the market.
Associative practices are therefore revealed as a measure that could favour stabilisation in the market, and the starting point for the development of an archaeological cluster connected with research institutions, suppliers, clients and other agents in the sector.

Finally, it should be noted that this project is characterised by being a pioneering activity in Spain and Europe, with the ability to structure, organise, centralise and create knowledge as an activity for the transfer of knowledge, due to the fact that it would contribute towards the consolidation and strengthening of the archaeological sector, which is affected by the economic crisis and a range of structural problems. Through this initiative, the research results would be provided for the use of the sector and potential users, as a tool for encouraging improvements in the competitiveness of companies, the transfer of knowledge, and the technological and productive invigoration of the sector.
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