The Role of knowledge-intensive service activities on inducing innovation in co-opetition strategies: lessons from the maritime cluster of the Algarve region

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Abstract: The formalisation of co-opetition strategies by clusters encourages the maintenance of a collaborative mindset, but only if companies and other cluster members are able to deal with the apparent contradiction involving competitive cooperation. One way of increasing the efficiency of the open innovation processes increasingly adopted refers to the use of knowledge-intensive service activities (KISAs). Through enquiries carried out over a sample of 127 firms of the maritime cluster of the Algarve, we evaluate: the importance and current degree of consolidation of co-opetition dynamics inside the maritime cluster of the Algarve and the firms’ perception towards their relevance. The role played by the activities based on knowledge-intensive business services on inducing and facilitating those co-opetition dynamics capable of triggering innovation within the cluster. A better understanding of the ways in which KISA contribute to innovative activities in the context of co-opetition dynamics inside clusters may lead to more effective public policy measures. As major outcomes of this study, we highlight that co-opetitive relationships must be constructed and managed through the enhancement of certain critical dimensions of firms’ competitive strategies, inter alia, those based upon the development of more intensive competitive collaboration aimed at technological innovations and increased technological diversity.

Keywords: co-opetition; innovation; knowledge-intensive business services; knowledge-intensive service activities; maritime cluster.

Clusters are argued to have a positive impact on innovation due, among others, to knowledge spillovers, labour market pooling, formal and informal networks and competitive pressure. When comparing the general survey on innovative firms presented in the Innobarometer 2004 with the Innobarometer 2006 dedicated to “Cluster’s role in facilitating innovation in Europe”, both published by the European Commission, there are evidences pointing to the fact that clustering may foster more efficiently firm-level innovation. The data collected show that firms within clusters did more market research than firms located outside clusters (53 vs. 33%) and are twice more likely to cooperate with universities, research institutes or other firms in innovative activities (41 vs. 20%). They also registered more patents (29 vs. 12%), introduced more innovative products (78 vs. 74%) and introduced new or significantly improved production technology (63 vs. 56%).

The ‘triple helix’ concept (Leydesdorff and Etzkowitz, 2001; Etzkowitz, 2002; Leydesdorff and Etzkowitz, 2003; Goktepe, 2003) relies upon the virtuous cornerstones that sustain innovation networks in clusters, that is, academic and research institutions (Academia), companies, capital and entrepreneurship (private sector), as well as favourable framework conditions (Government). Arguing that the triple helix model is not enough to sustain long-term innovative processes, several authors defend the introduction of a fourth helix (civil society) to stress its importance in the knowledge creation process (Liljemark, 2004). Cluster organisations and forums that facilitate the networked collaborations are also frequently highlighted as instrumental in clusters. At the basis of clusters, competitiveness is the virtuous interaction (cooperation + competition) that occurs between the various actors of the value chain that affects their inner dynamics including the pressure to innovate. Dagnino and Padula (2002, p.2) stress that “co-opetition does not simply emerge from coupling competition and cooperation issues, but rather it implies that cooperation and competition merge together to form a new kind of strategic interdependence between firms, giving rise to a co-opetitive system of value creation”.

On the perspective presented at DG Enterprise and Industry (2007, p.4), innovation is increasingly characterised as an open process, in which many different actors - companies and their competitors, customers, suppliers, investors, universities, and other organisations - not only cooperate but also compete in a complex way. Ideas move across institutional boundaries more frequently. The interactive process perspective of
organisational innovation has gained popularity in recent years for investigating the nature of the innovation process, examining how and why innovations emerge, develop, grow and end. This perspective describes innovation as a complex process (not static), produced by interactions between structural influences and the actions of individuals, which occur simultaneously. The term ‘interactive process’ has been used to describe the activities within and between companies (Edwards, 2000). Gigt (1997) refers that the innovative process is not deterministic and does not follow a pre-established formula; instead, it is socially constructed by the actors involved or interested in the generation of innovation and, therefore, must be understood as a series of interactions and exchanges among researchers, users, technicians, scientists, governments, companies, which are the innovation network. The traditional linear model of innovation with clearly assigned roles for basic research at the university, and applied research in a company RDI centre, is no longer relevant. Consequently, it is no longer so much the co-location of innovation stakeholders that counts as the nature and intensity of their ‘connectivity’ and the fact of belonging to the same social innovation network or ‘interlinked community’ (Amin and Cohendet, 2005).

The main purpose of this paper is to assess what are the most relevant behaviours in use by the firms of the maritime cluster of the Algarve region (Portugal) with regard to the leverage of innovation through co-opetition phenomena. To do so, we will evaluate, based upon the results of individual surveys collected over a sample of companies related to maritime activities, the following issues:

- The importance and current degree of consolidation of co-opetition dynamics and the firms’ perception towards their relevance.
- The role played by knowledge-intensive business services (KIBS) on inducing and facilitating those co-opetition dynamics capable of triggering innovation within the cluster. A better understanding of the ways in which knowledge-intensive service activities (KISAs) contribute to innovative activities in the context of co-opetition dynamics inside clusters may lead to more effective public policy measures.

This paper is divided into seven different sections. After the introductory section, the context of this paper and its goals are explained. Section 2 is about the scope of the study, that is, the description of the functional region Algarve, which includes a brief characterisation of the main economic sectors of the Algarve's maritime cluster, and the theoretical basis underlying the study, concerning the role of networking and KISA as enablers and supporters of the innovation processes performed in clusters and some insights on clusters and co-opetition. In Section 3, the methodological choices made for the empirical part of this study are introduced, and the main findings are discussed in Section 4. Finally, the main findings and some possible conclusions connected to the set of domains at evaluation are discussed in Sections 5 and 6.

2 Study framework

The organisation of economic activities into a cluster is advocated by several authors like Porter, Markusen, and Gordon and McCan, among others, as the territorial configuration
more suited to stimulate the processes of learning and knowledge creation. According to Porter (1998), clusters are a form of spatial organisation consisting of geographic concentrations of companies and institutions interlinked in a particular area, and that includes on its organisation a series of industries and other entities linked to each other. Co-opetition is one of the main attributes of clusters. Cooperative relationships within clusters may be horizontal - involving companies belonging to the same sector -, vertical - between firms belonging to different sectors within the same industry -, and inter-industry cooperation. Horizontal inter-organisational relationships can be dyadic such as in strategic alliances (Dussauge, Garrette and Mitchell, 2000) or they may involve many firms that take a variety of legal forms and that work out in different sectors. These inter-organisational relationships are characterised by the ambiguity of competition/cooperation relationship established by allied partners around a common project, but who remain rivals (Dussauge, Garrette and Mitchell, 2000).

In these dynamics, the role of KISAs stands out either functioning as sources of innovation, when participating in the genesis of innovation in client organisations, or as facilitators of innovation, when supporting the development of the innovation process in clustered firms, or as vehicles of innovation, when they help in the knowledge transfer between and within R&D organisations, companies or enterprise networks within or between clusters.

2.1 Geographic insertion and characterisation

Portugal’s connection to the sea has gained prominence during the Age of Discovery in the 15th century, which decisively marked the beginning of what so many scholars catalogue as the first globalisation epic in the history of mankind. With about 1.6 million km², the Portuguese Exclusive Economic Zone (EEZ) is the largest in the EU, representing 3.5% of the North Atlantic surface, and one of the largest in the world. It is also possible that the Portuguese jurisdiction might be extended to other maritime zones (it only concerns the seabed and marine subsoil rights and not to any fishing rights), that could more than double the current area of its EEZ; if the continental shelf extension until the 350 miles, proposed by the Portuguese Government in April 2010, is accepted by the United Nations specialised commission on the Limits of the Continental Shelf, Portugal could obtain a territorial acquisition of nearly 2,150,000 km², holding a sea area under its jurisdiction which is more than 40 times its land area, above India’s land area and corresponding to more than 80% of the land area of the EU-27 and thereby strengthening its ranking position among the world’s largest countries on sovereign territory (see Figure 1). Knowing that the immersed part of the Earth has an area of 361 million km², of which 81.6 million km² are covered by the Atlantic Ocean, while the submerged part represents 149 million km², the future Portuguese continental shelf will match a little more than 1% of the immersed part of the planet, 2.5% of the submerged part, and 4.5% of the Atlantic Ocean (Cajarabille, 2010).
Simões, Salvador and Guedes Soares (2014) present the multiplier effects on the Portuguese economy of the main maritime sectors (and their comparison with other economic sectors), particularly the key activities of which they are suppliers or buyers. One way of evaluating economic activities is through the sectoral linkage indexes and their interdependence, displaying their direct, indirect and induced effects, which can be quantified with the use of the Leontief (input-output) matrix. Based on the values of the interdependence coefficients, the economic activities are analysed and classified by its importance to the national economy. The frames of the input-output matrix are constructed to reflect and evaluate the interdependence between the different economic sectors. This interdependence can be analysed in two alternative ways:

1. Each sector has its production, either for consumption and final demand or for intermediate consumption.
2. Each sector demands inputs produced by other sectors and factors of production (labour, capital) which, properly combined according to the available technology, allow the development of the respective sector production process.

Concerning the analysis of the multiplier effects of type-1 and type-2, Simões, Salvador and Guedes Soares (2014) verify the importance of the activities of ‘shipping’ and ‘recreational boating and marinas’. With the exception of ‘water transport’, the remaining sectors of the maritime cluster have weak links, meaning a slight influence on the national economy.

On relation to the study of fields of influence, these authors highlight the significant fields of influence in three sectors: ‘recreational boating and marinas’, ‘water transport (shipping),’ and ‘auxiliary services to water transportation (ports)’, in terms of both suppliers and consumers' services, in accordance with the values obtained for the multipliers.

Monteiro (2012, p.403) presents an architectural design for the case of the maritime cluster of the Algarve region (Figure 2).
Figure 2  The maritime cluster of the Algarve region (see online version for colours)

Note: The size of the symbols representing the sectors (‘main’ and ‘complementary’) is proportional to their relevance within the cluster

Source: Monteiro (2012)

There is no city, town, or village of the Algarve coast that has not had been originated from fishing or related activities. Portimão, Faro and Vila Real Sto. António are typical cases of cities where today there is still a significant impact of fishing activities on their social dynamics.

Fisheries and fish processing industry (the tuna capture in the Algarve coast goes back before the Roman occupation) have always been crucial economic activities with a strong tradition (at the beginning of the 20th century, there were 17 bluefin tuna traps released throughout Algarve’s nearshore; the first factory built in Portugal for the conservation of fish, essentially tuna, was ‘Casa Parodi’, located in Vila Real de Santo António and inaugurated in 1879, and in the first half of the past 60 decades there were 60 active factories across the Algarve).

Due to the excellent natural conditions for oyster production in the Algarve, either in the lagoon systems (Ria Formosa and Ria de Alvor) or offshore (e.g., fattening juveniles held off Sagres, 2 miles away from the coast), the Algarve oysters have excellent quality and reach commercial maturity by 1.5 years, while for example in Brittany, one of the major producing regions of France, it takes 4 years. Ria Formosa is by far the biggest contributor to aquaculture production in Algarve, accounting for 94% of all bivalve mollusc nurseries existent in Portugal.

Algarve has excellent natural conditions for the development of aquaculture production. Since 2008, the region has showed a very interesting capacity to attract significant investments namely on offshore production systems (mostly longlines not only for bivalve molluscs like mussels, oysters and scallops, and bluefin tuna traps, but also fish cages for gilthead bream and sea bass, among others). The estimated production for new offshore aquacultures investments co-funded by the European Fisheries Fund during the Programming Period 2007–2013, recently concluded or ongoing in the
Algarve region, reaches more than 14,000 tons in an area of 416 hectares and represents a total expenditure of more than 19 million Euros.

More recently, activities related to nautical tourism and recreational boating have been gaining increasing importance. One major positive externality of nautical tourism, particularly concerning the segments related with yachts and nautical sports, is the potential mitigation of tourism seasonality in the region, benefiting among other aspects from the quality and exquisite location of the infrastructures available and the tempered Mediterranean climate. The Algarve Marinas reach in August occupancy rates consistently above 80%, but, perhaps more important, is the fact that annually these rates rarely fall below 70% in a region where classified accommodation establishments presented in 2007 an Seasonal Amplitude Index of 3.58 (Perna et al., 2008).

According to the World Tourism Organisation, the segment of diving and underwater tourism has a strong growth potential worldwide. To explore this market niche, in the area of the Portimão Municipality, a public-private consortium sank, three miles away from the entrance of the Portimão bar, and about 30 feet deep, four vessels decommissioned from the Portuguese Navy. The aim is to create, through the ‘Ocean Revival’ initiative, an artificial reef and simultaneously the first Portuguese underwater museum. The joint combination of such initiatives with the right international promotion has the potential to create a market of 100,000 dives per year and € 70 million of revenue.

In the Algarve, shipping holds a clearly inferior significance comparing to other modes of transport. The two active commercial ports (Faro and Portimão) are limited by their small size, deficient infrastructural conditions, and the competition from much bigger neighboring ports (Sines, Setúbal and Huelva). However, the port of Faro closed the year 2013 with almost 400 thousand tons of cargo handled, an increase of more than 30% on relation to last year and thereby reinforcing its importance for the trade of regional production: cement exported to Algeria and Cape Verde, stone, iron and tile to be sent to Gibraltar, carob to England, salt and rock salt, tuna from the offsohre traps going to Japan, are the most significant exports.

The Cruise Port of Portimão started operations in 1996. For those ships coming from the Atlantic, Portimão is the last cruise port before entering the Mediterranean, hence its strategic importance while being just a night of navigation from the Port of Lisbon. In 2013, the Cruise Port of Portimão continued its sustainable growth (for the third consecutive year) having received 35,000 passengers, an increase of about 44% with respect to 2009, corresponding to 55 ship stops.

In the domain of the R&D activities dedicated to maritime/marine fields of expertise, the Algarve can be considered well equipped in terms of number and quality of the reference institutions regionally located (e.g., associated laboratories of the University of Algarve like Centre of Marine Sciences and Centre for Marine and Environmental Research, the National Laboratory for Fisheries and Aquaculture Investigation of the Portuguese Sea and Atmosphere Institute), which are important cornerstones of the regional and national innovation systems in this particular field.

According to the data presented in Table 1, the set of direct sea-related activities in the Algarve represents approximately 2.2% of the total enterprise gross value added in the region.
Knowledge-intensive service activities in co-opetition strategies

Table 1  Direct sea-related activities - Main variables (2012), Algarve

<table>
<thead>
<tr>
<th>Economic sectors</th>
<th>Total number of employees of the companies</th>
<th>Business volume of the companies (€)</th>
<th>Gross value added of the companies (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algarve (Total)</td>
<td>135,025</td>
<td>6,342,436,700</td>
<td>1,459,978,516</td>
</tr>
<tr>
<td>Maritime activities in the Algarve (total)</td>
<td>3,461</td>
<td>182,438,138</td>
<td>31,912,495</td>
</tr>
<tr>
<td>Maritime activities in Algarve’s total (%)</td>
<td>2.6</td>
<td>2.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Fisheries</td>
<td>1,525</td>
<td>44,664,833</td>
<td>9,937,073</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>385</td>
<td>6,976,349</td>
<td>1,078,615</td>
</tr>
<tr>
<td>Fish (including crustaceans and molluscs) processing and conservation</td>
<td>263</td>
<td>20,744,620</td>
<td>4,744,397</td>
</tr>
<tr>
<td>Wholesale trade of fish (including crustaceans and molluscs)</td>
<td>404</td>
<td>67,515,072</td>
<td>7,257,947</td>
</tr>
<tr>
<td>Retail trade of fish (including crustaceans and molluscs), in specialised establishments</td>
<td>552</td>
<td>25,172,778</td>
<td>1,111,156</td>
</tr>
<tr>
<td>Water transports</td>
<td>189</td>
<td>4,836,093</td>
<td>2,318,511</td>
</tr>
<tr>
<td>Auxiliary activities to water transportation</td>
<td>18</td>
<td>718,026</td>
<td>268,627</td>
</tr>
<tr>
<td>Rental of sea and river means of transportation</td>
<td>62</td>
<td>1,506,685</td>
<td>405,538</td>
</tr>
<tr>
<td>Marinas</td>
<td>63</td>
<td>10,303,682</td>
<td>4,790,631</td>
</tr>
</tbody>
</table>

Note: Average size of the companies: Total number of employees of the companies/total number of companies; Business volume of the companies per capita: business volume/total number of employees of the companies.


2.2  Theoretical basis

As expressed by Wegner et al. (2004), today it is recognised that enterprise networks and clusters are viable alternatives and often necessary for the survival of small businesses, because isolation makes it impossible for these companies keeping pace with the changes and demands of technological upgrading and management, as well as on adapting to market trends and on generating economies of scale necessary for competition, while collaboration makes it possible to achieve these requirements at substantially lower cost. International experience shows that such mechanisms (networks and clusters) can even elevate the status of small business to become the engine of the economy, rather than simply offering them a marginal condition and of little relevance. Brett and Roe (2009) assume that the presence of internal competition is an important factor for cluster nourishment and a strong competitive indigenous environment helps the firms within the
cluster to behave in a more dynamic way. The rivalry on the domestic market place helps firms succeed in the international markets. If firms within a cluster do not have to fight through constant innovation to maintain their customer base and market share, Porter believes that it is therefore unlikely they will perform dynamically in international markets, and in doing so weakening the cluster in the international arena.

Asheim and Cooke (1999) contend that there exist two main types of innovation networks. Besides the endogenous networks that appear on the basis of local industrial clusters of small- and medium-sized enterprises with traditions and expertise of mutually beneficial exchange of information as well as interactive learning in the process of joint innovation activity (e.g., Baden-Württemberg in Southern Germany, and Tuscany and Emilia-Romagna in Italy), they also refer the existence of exogenous innovation networks, mainly observed as technoparks in technopolises. The latter appear when large companies single out R&D into a separate functional unit and place it in a territory that is best for the emergence of non-commercial interdependencies (e.g., Sophia Antipolis and lIle-de-France in France); or when an innovation network is set up administratively as a planned action to establish and deepen cooperation between research institutes and enterprises (e.g., technoparks located in the United States and United Kingdom).

According to Noronha Vaz, Cesário and Fernandes (2006), the transition from a closed regional environment to an open inter-regional system demands an evolution of economic activity from simple forms of activity branches into complex technological regimes. In such a dynamic system, technological learning, entrepreneurial strategies, coordination systems and institutions, and overall regional conditions are factors that determine firm attitudes to innovation. Porter assumes that proximity (understood as the placement of companies, customers, and suppliers) amplifies all the existing pressures to innovate and improve economic performance. This localised learning that companies may benefit consists essentially of technological spillovers, originated from dominant or innovative companies, to the followers (Markusen, 1996; Maskell, 2001). It is now believed that diffusion and spillovers are the mechanisms that link R&D with growth, not simply levels of R&D investment (OECD, 2007).

Neto (1999) argues that the strategies for networking and affirmation of the functional territories modify the organisation and spatial and economic interrelationships of sectors and their organisations, as well as the economical specialisation of the territories, by this means reshaping the comparative and competitive inter-territorial advantages, while Andersson et al. (2004) mention that these connections and interrelations between actors are one of the main driving forces and determinants of success for clusters. The life cycle of industrial clusters has been focused in a large number of research studies. One common finding is the stages from emergence, growth, sustaining, and declining. In the sustaining phase, the cluster is typically characterised by focused competences, open networks, synergies, and use of external knowledge (Menzel and Fornahl 2009; Holte and Moen, 2010). In the declining phase, reduction of demand is often combined with strong focus on a narrow trajectory, closed networks and reduced ability to change and adapt to external developments.

Andersson et al. (2004) state that clusters are inherently idiosyncratic in nature with different applications of the concept suiting various situations. However, collecting all the contributions of several authors regarding the cluster dimensions, seven elements can be adopted as key for the notions:
Geographical concentration: It has been central to the cluster idea from the outset. Firms may experience that their belonging to a set of inter-related actors which - in a given region - can serve to enhance efficiency, underpins productivity growth and raises innovativeness, especially due to better access to knowledge, ideas and skills.

Specialisation: A cluster is traditionally viewed as specialised in the sense that the participating actors are linked together through a core activity, which provides direction towards emphasis on the same markets or processes.

Cluster actors: Firms form the natural and obvious components or building blocks of clusters. However, clustering is also about pluralism, not about single firms. In the absence of such pluralism, an observed agglomeration is likely to consist of an enlarged enterprise, where the other companies or units may merely serve as subcontractors or clients with regard to the main entity.

Cluster dynamics and linkages: Competition and cooperation (co-opetition) - the fourth cluster element - relates to the connections and interrelations between the actors. Typically, as firms and individuals compete with each other, pressures for improvement are generated. Depending on market characteristics, actors may strive to gain advantage by reducing costs or prices, raising quality, acquiring new customers, or entering new markets. At the same time, the actors in a cluster may cooperate around a core activity, using their key competencies to complement each other. By operating in tandem, firms may also be able to attract resources and services that would not have been available to them isolated.

Critical mass: In order for a cluster to achieve inner dynamics, it needs to engage numerous actors and reach some sort of critical mass. Critical mass may serve as a ‘buffer’ and make a cluster resistant to exogenous shocks or other kinds of pressures, including ‘losses’ of companies, even when they might be regarded as ‘key companies’, as long as a critical threshold of remaining players is not exceeded.

Cluster lifecycle: Clusters and cluster initiatives do not represent temporary solutions to acute problems. They have a sense of direction and inner stability over time. Any cluster will pass through a number of stages. These may not be identical, and the pace of their evolution may vary. Still, there is an inherent logic to the way that clusters develop, which makes it possible to discern certain characteristic patterns.

Innovation: Here understood in a broad sense, incorporating technical, commercial, and/or organisational change.

Strong clusters emerge and flourish best in open markets where co-opetition (i.e., the presence of coordination in competitive markets) coexists within and between clusters. Clusters emerge where competition across regions enables companies to choose the location of their activities based on underlying economic efficiency, not in response to artificial barriers that influence cross-border trade and investment (Sölvell, Ketels and Lindqvist, 2009). Noting this, Granata et al. (2013) argue that Porter suggested that emerging industry firms faced the dilemma of competitive self-interest or cooperative industry advocacy. Co-opetitive relations could involve a large number of partners over time and concern several activities, particularly in clusters (Granata et al., 2013). Firms develop relationships with various types of firms and other kinds of organisations because they affect, directly or indirectly, their performance. Basically, such interfir
relationships can be formed with customers, suppliers, competitors, and complementors (Brandenburger and Nalebuff, 1996; Ritter, Wilkinson and Wesley 2004), the latter here understood, for instance, as competitors collaborating with each other to enhance the value of their products to customers. The first two belong to a company’s supply chain, and hence such cooperation takes place at the vertical level. With the latter two, in turn, cooperation takes place with actors operating ‘at the same level’ in relation to customers and suppliers, that is, at the horizontal level (Laaksonen and Mäkinen, 2013).

The term ‘co-opetition’, first coined in 1993 by Raymond Noorda, founder and CEO of Novell Corp, was later adopted by Brandenburger and Nalebuff in their 1996 seminal work as a combination of cooperation and competition for value creation. Bengtsson and Kock (2000) claim that co-opetition involves parallel relations of competition and cooperation between the competitors. So, co-opetition is a dynamic and paradoxical relation which arises when two companies cooperate together in some areas, such as in strategic alliances, but simultaneously compete with each other in other areas (Kozyra, 2012).

This is a “hybrid behaviour comprising competition and cooperation” which determine a strategic interdependence and, thus, a co-opetitive system of value creation (Dagnino and Padula, 2002). Co-opetitive relationships are enacted by two types of interactions: ‘hostility’ due to conflicting interests and ‘friendship’ due to the pursuit of common interests characterise actors’ relationships (Bengtsson and Kock, 2000). Das and Teng (2000), Ketchen, Snow and Hoover (2004) explain that when partners have a short-term focus, structural rigidity (such as joint equity ownership or non-recoverable investments) encourages cooperation while structural flexibility (no extra safeguards in place) fosters competition. Maso and Lattanzi (2014) mention that we have to distinguish between co-opetition advantage and competitiveness advantage. The former emerges during the internationalisation process while the latter comes as its consequence. These authors mention that globalisation and cluster evolution can be potentially complementary only if managers and governments realise the importance of simultaneously managing cooperation and competition at a cluster-level relationship, that is, by promoting internal cooperation among the cluster actors they enhance external competitiveness at all levels (local firms, clusters, regions, and countries).

These interactions within clusters create co-opetitive relationships that are crucial for creation and diffusion of knowledge and in this for fostering innovativeness (Jankowska, 2013, p.71). On the basis of the number of interdependent firms and the level of the value chain, Dagnino and Padula (2002) have distinguished two kinds of co-opetition for value creation, dyadic and network co-opetition, each one with two different variations: simple dyadic (i.e., alliance - consortium in the field of R&D - only two partners), complex dyadic (i.e., alliances in automobile sectors - many partners, different fields of cooperation - R&D, manufacturing of components), simple network (co-opetition among multiple firms at one level of the value chain), and complex network (i.e., Italian industrial districts). Clusters are a particular example of the type called complex network.

Through co-opetition, clusters can also help firms leverage economic advantage from shared access to information and knowledge networks, markets and marketing intelligence, and supplier and distribution chains (Enright and Roberts, 2001).

Trying to successfully operate in this mixed environment of ‘co-operation’ and ‘competition’ can pose a dilemma for many SMEs who are members of business clusters (Yoong and Molina, 2003, p.1225), thus looming again the paradoxical nature often associated with co-opetitive relationships (Smith and Lewis, 2011), once for many
companies, having to face the reality of sharing their business knowledge with other competitors is a difficult task as they need to balance between giving up their competitive advantage with a need to satisfy common cluster goals (Yoong and Molina, 2003). In this regard, government policies can have a significant impact on clusters by mobilizing such joint action (Sölvell, Ketels and Lindqvist, 2009, p.28).

3 Methodology

This study comprised the collection and treatment of both secondary and primary data. Under secondary research, a thorough desk review was undertaken to develop insights into the key areas that needs to be focused during the primary. The methodology that was used for the empirical part of this study consisted of primarily data research through a survey conducted over a sample of 127 firms located in the Algarve region and doing business in sea-related economic sectors such as fisheries, aquaculture, fish processing and trade, nautical tourism and recreational boating, naval repair/shipbuilding, and shipping. The response rate reached 31% (40 questionnaires returned). The intention was to diagnose what are the companies’ main drivers and outputs of innovation on relation to co-opetition dynamics and also to evaluate and characterise the role of KISA assistance on the innovation processes undertaken by the firms of the sample. We used univariate statistical techniques for the data treatment of the enquiries received, that is, each variable was treated separately from the others. The results were presented through the distribution of relative frequencies. The concentration of frequencies in certain categories served as an indication for a trend of data homogeneity surveyed with respect to a particular attribute: when a greater concentration is observed around a certain category, we can assume it as basis for the design of a type profile.

According to the OECD Working Party on Innovation and Technology Policy and its seminal work developed within the project STEP - “Studies in Technology, Innovation and Economic Policy”, KISA refers to the production and integration of services carried out by companies or public actors in the context of industrial production or services, in combination with the outputs of those manufacturing processes or simply as individualised services. Besides being a direct input to innovation, such KISA enables firms to develop knowledge-based capabilities and skills.

Hales (2001) has emphasised that one should distinguish between ‘knowledge-intensive’ firms and KISAs. While the former rely heavily on qualified professionals (input), the latter are defined in terms of competence supply (output) activities that can be carried out by external specialised KIBS firms or in-house by employees of the firms using KISA at hand. As defined by OECD (2006), KISA refers to the activities originated by the production and integration of knowledge-intensive services crucial for the innovation process of the firm. Typical examples of KISA include R&D services, management consulting, IT services, human resource management services, legal services, accounting, financing, and marketing services. Activities oriented towards the use and integration of knowledge are considered instrumental for building and maintaining a firm’s innovation capability. In practice, KISA in a firm are achieved by the use of in-house, or the combination of in-house and external, expertise. The capacity of the firm to perform these KISA more effectively may indeed be what differentiates a firm from its competitors.
Miles et al. apud Muller and Doloreux (2007, p.18) defined KIBS as “services that involve economic activities which are intended to result in the creation, accumulation or dissemination of knowledge” and identified three major characteristics of KIBS:

- They rely heavily upon professional knowledge.
- They either are themselves primary sources of information and knowledge or they use knowledge to produce intermediate services for their clients production processes.
- They are of competitive importance and supplied primarily to business.

4 Main results

More than 90% of the sample have done some kind of investment in the area of KISA in the last 3 years: 45% have mentioned technical consultancy in areas like engineering/finance/accounting/legal/fiscal/management-market research or preparation for the launching of new products in the market; 25% of those investments were made in information and communication technologies (ICT), followed by education and training skills (20%); less than 10% of the companies promoted investments in R&D.

In respect to the source of the KISA on use by the firms enquired, the most commonly were originated in-house (65% of all responses). The knowledge available internally to the firms (in their employees) is pointed out by slightly less than 60% of the respondents as the main source of ideas for innovative or improvement initiatives, almost twice of what is induced by competitors, suppliers and customers (18%) and by specialised consulting firms (10%) and public R&D institutions (less than 5%). There was no reference to the participation in fairs/exhibitions or conferences/seminars. However, the knowledge available at the R&D regional centres is positively mentioned as an important facilitator on relation to the adoption of innovation by approximately 30% of the intervenient. It is also significant that all the respondents think that the Algarve region has the potential to be a pole of competitiveness and innovation for maritime activities.

Almost 60% of all respondents have already been or intend to be involved in the near future in partnerships with other regional actors, half of which regarding the development of innovation (the partnerships involving entities of the national and regional innovation system or competitors functioning as ‘complementors’ are responsible, respectively, for 35 and 20% of the innovation processes developed), followed by purchases from suppliers (25%); shipment of production to market (15%) and joint marketing campaigns (10%).

Whenever there is an outsourcing of KISA by specialised KIBS providers, the R&D Centres/Universities lead with almost a 55% quota, while in 35% of cases were external KIBS firms; it is interesting to note that only 10% of the sampled firms have catalogued their competitors as ‘complementors’.

More than half of the companies involved in this survey have implemented some kind of innovation during the year before: 35% aimed at implementing a new production process, 30% concerned a new product or a major change in an existing one, whereas 25% were related to a new or significantly improved organisational or marketing method. By type, the partnerships for innovation highlighted refer to: knowledge sharing (in 40%
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of the cases reported), strategic development (30%), technology (20%) and market (10%). Concerning the objectives pursued, approximately 60% of those partnerships for innovation aimed at developing new products, while the development of new technologies/equipment, with 20%, and the improvement of production processes (10%) came next. In relation to the geographical scope of the partnerships at hand, in 45% of the cases they had a regional coverage, 30% involved partners from other EU countries, and 25% from other regions of Portugal. For 60% of the firms that have participated in cooperation partnerships for innovation, the degree of satisfaction with the results achieved is below the initial expectations. Almost 35% of the enquired have identified the high economic risk as the main obstacle towards the adoption of innovation processes, while 45% mentioned the high costs involved and deficient financial aid.

5 Discussion

The results shown so far allow us to build up the following observations in relation to the objectives earlier set:

- The evidences collected seem to admit the existence of some interesting positive relations between the maritime cluster and competitive advantages in terms of productivity and innovation, which are benefic for the cluster to increase its internal level of competitiveness.

- The firms involved on the survey denote some dynamism on conducting investments in the area of innovation and thus in the allocation of resources (human and capital) onto this matter.

- The involvement in networks and partnerships seems to be sufficiently internalised by the firms enquired, but not always those partnerships were able to achieve the desirable level of success. One possible explanation might be that those partnerships are mostly driven for the search of scope economies and/or short time results rather than by Brandenburger and Nalebuff (1996) assumption that when competing organisations cooperate together in networks they are motivated by the need to learn from each other.

- The formal relationships within the cluster permit to federate a high number of partners and tend to develop informal exchange, essential for the maintenance of competition. However, the cluster operations appear to be mainly focus on collaborative action and tend to overshadow the co-opetition mindset, even if competition between members is obvious.

- KISAs are tools frequently used by regional firms to better innovate as they are both sources and carriers of knowledge that influence and improve the performance of individual companies and of the cluster as a whole. However, the enquiries did not provide enough information about the ways in which they improve the ability of private and public sector organisations to develop, absorb and apply knowledge in their innovation processes.

- Concerning the previously referred concept of open innovation, it is possible to observe that both in-house knowledge and specialised KIBS providers facilitate cluster firms openness to the surrounding environment, which represents one of the
main factors for such innovation capacities (Deephouse, 1999), therefore enabling better performance.

- The respondents show some ability to forecast and evaluate the environment as well as on identifying opportunities and threats concerning their current activity. However, the notion of competitors functioning as partners (=‘complementors’) enabling the creation of a new system of value creation (Dagnino and Padula, 2002; Brandenburger and Nalebuff, 1996; Ritter, Wilkinson and Wesley, 2004) is yet very far from being achieved. There are evidences of some strategic cooperation but the latter still lacks to reach an upper stage. Bringing for this purpose the context of game theory, where cluster co-opetition dynamics could be able to create a strategic tension that is greater than the sum of the parts, we do not observe for the case at hand the simultaneous presence of Grimm and Smith (1997) key game elements that include players (firms), potential strategies for each firm, and each firm’s payoff for all action/response combinations.

6 Conclusions

The results of this study demonstrate, for the case of the maritime cluster of the Algarve, that co-opetitive relationships must be constructed and managed in such a way that they enhance elements of firms’ competitive strategies without undermining other key elements as expressed by Ketchen, Snow and Hoover (2004).

One must assume that the maritime cluster of the Algarve would have much to gain from the development of more intensive competitive collaboration among its members, namely because it enhances the arising of competitive advantages related to technological innovations and increased technological diversity (Gnyawali and Park, 2009) and it may also reduce the costs, risks, and uncertainties associated with innovation (Simoni and Caiazza, 2012).

Developing an healthy co-opetition, for instance, with appropriate public support measures can enhance enterprises in the cluster to achieve ‘win-win’ relations and thus allowing the whole cluster supply chain move towards a higher level, at the same time playing a role in promoting the regional economy. One possible way to do so could result from the idea set forth by Bengtsson and Kock (2000) that firms cooperate early in the value chain, away from customers, but compete nearer to the customer. So, the consolidation of sustainable linkages between co-opetitive interactions and innovation performance might be critical to improve cluster innovativeness (Ritala and Hurmelinna-Laukkanen, 2009).

Future research should build on understanding firm’s behaviour and performance, especially into the nature of knowledge sharing in a co-opetitive relation, as well as the contribution of co-opetition to the overall firm’s innovativeness performance.

References


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