Chapter 2
Technological vs. Professional Services and Location Influences on KIBS Innovative Capacity in Times of Crisis

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Abstract This research seeks to ascertain the extent to which the innovative and competitive capacities of knowledge intensive business services (KIBS) companies are influenced by the service type (technological vs. professional) and their respective location (rural vs. urban) in times of crisis. Through recourse to structural equation models, the results demonstrate that innovative capacities are strongly dependent both on the type of service and the respective company location. We found that urban technological KIBS companies display greater innovative capacities and better financial performance than their professional service peers. Furthermore, networks were identified as the key explanatory factor behind these innovative capacities.

2.1   Introduction

Entrepreneurial activities, in conjunction with all the factors perceived as driving them, and their influence on regional economic development have been the subject of studies by a diverse range of authors (Birley 1985; Storey 1994; Acs 2002; Henrekson and Johansson 2010). Correspondingly, the National Commission on Entrepreneurship (NCOE) White Paper (2001) identifies innovation as the greatest contribution made by entrepreneurship at the local level. As far as the relationship between entrepreneurship and economic growth is concerned, many authors have deemed it a fundamental factor to economic growth and perceiving the role of

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entrepreneurs as highly important in the creation of employment and fostering innovation (Thurik and Wennekers 2004; Welter and Lasch 2008). As a result of research conducted in recent decades, and the increasingly unfavourable economic conjucture, entrepreneurship promotion has come to occupy a central role in the twenty-first century economic paradigm (Shane and Venkataraman 2000).

The effective implementation of innovation has gained increasing recognition as a synonym for building sustained competitive advantage and thereby boosting organisational performance (Koc and Ceylan 2007). Innovation stems from the flexibility of companies able to choose between different options for the satisfaction of consumer needs (Banbury and Mitchell 1995) through sustained strategies and based upon the resources and capacities existing in companies, which not only enable them to meet such needs today but earn the revenues necessary to do so into the future (Lemon and Sahota 2004). Despite the existence of many voices defending the scope of the importance and the role Knowledge Intensive Business Services (KIBS) play in regional economic dynamics (Muller and Zenker 2001), there remain very few studies making any approach to innovative activities ongoing in this service sector (Koch and Strotmann 2008). The location of KIBS within the urban environment, their sensitivity to the general agglomerative effects of economies (Wernerheim and Sharpe 2003) and their trends towards forming spatial clusters (Coe 1998; Keeble and Nachum 2002) have been documented through recourse to various methodological tools. This research aims to ascertain the extent to which the KIBS innovative capacities are influenced by the service type (technological vs. professional) and their respective location (rural vs. urban) in times of crisis.

Our research is structured as follows, following this introductory section; we carry out a review of the literature relevant to the KIBS role in innovation, the innovative capacities and the locations of KIBS. We then set out the methodology adopted, which we described in the sample above, the statistical methods and the variables utilised. This is followed by analysis and discussion of our results before putting forward our final considerations.

2.2 Theoretical Background

2.2.1 Innovation Drivers

Innovation is perceived as a driver of progress, competitiveness and economic development (Romer 1994; Johansson et al. 2001). However, innovation represents a highly complex process with small- and medium-sized companies encountering obstacles to innovation and only able to make significant progress when cooperating with other entities optimised at deploying their internal knowledge in combination with the specific skills of their partners (Muller and Zenker 2001). Kleinknecht (1989) identifies the following key barriers to innovation: (1) a lack of financial capital; (2) a shortage of management level qualifications; and (3) difficulties in obtaining the technological information and know-how necessary to innovation. Greater utilisation of information flows is essential to the creation of organisational

capacities and has led to the establishment of the core foundations to organisational success (Cohendet and Steinmueller 2000). In turn, Bughin and Jacques (1994) propose that the major obstacle to innovation is not so much related to companies experiencing some kind of short sightedness but rather fundamentally due to the incapacity of companies to adopt that which they term "the key principles to management": (1) marketing and R&D efficiency; (2) synergies between marketing and R&D; (3) communication capacities; (4) organisational and innovation management excellence and (5) the protection of innovation. This suggests that internal R&D, at least in the case of the majority of companies, proves insufficient for them to identify, leverage and maximise their innovation potentials. We correspondingly propose the following six research hypotheses:

H1: Difficulties in accessing financing produce a negative impact on innovative capacities
H2: Difficulties in demand (limited client base) produce a negative impact on innovative capacities
H3: Shortages in qualified human resource skills produce a negative impact on innovative capacities
H4: Organisational related difficulties produce a negative impact on innovative capacities
H5: Cooperation related difficulties produce a negative impact on innovative capacities
H6: KIBS innovative capacities have a positive impact on financial performance

New products require new capacities and, in a final analysis, a new combination of already existing competences (Koch and Strotmann 2008). These new competences represent a precondition for generating new products and services and may be considered the result of the acquisition, assimilation and dissemination of new knowledge (Cohen and Levinthal 1990) and that understood as the innovative capacity. Specific innovative capacities result from individual competences, already acquired knowledge and the specific skills of companies as well as recourse to diverse means of knowledge (Cohen and Levinthal 1990; Schmidt 2005). Very often and in particular at innovative small and medium-sized companies, idiosyncratic internal capacities are particularly related with the profile of the respective entrepreneur, hence bound up with his/her experiences, motivations, networks, creativity, strategic orientation as well as the prevailing innovation activities (Webster 2004). Hence, we arrive at our next research hypothesis:

H7 a: The entrepreneurial profile influences innovative capacities (Length of Service)
H7 b: The entrepreneurial profile influences innovative capacities (Years of Experience)

Recently, research has shown particular interest in detailing and highlighting the company characteristics and factors that drive innovation (Lemon and Sahota 2004; Tidd and Bessant 2009). Some studies maintain that the emergence of new ideas, clearly fundamental to any company innovative capacity, only arise out of the creation of knowledge (Cohen and Levinthal 1990; Koc and Ceylan 2007). Interlinked

with this importance attributed to new ideas comes the relevance of its appropriate conveyance and application within the scope of the company so that ideas may be shared and thereby foster the likelihood of innovation (Tidd and Bessant 2009). The internal company environment proves a mitigating factor across the dimensions of organisational structure and development, establishing a suitable innovation strategy and communicating this to employees and all fundamental factors for innovation (Lemon and Sahota 2004). An organisational culture that nurtures creativity and the spread of knowledge between the different employees with distinct capacities will enable a company to generate solutions while simultaneously leveraging potential synergies (Lemon and Sahota 2004). From the perspective of Tidd and Bessant (2009), a company's innovative capacity may be measured based upon factors related to strategy, organisation, learning, process and networks. Within this framework, we correspondingly set out the following four research hypotheses:

H8: Strategy has a positive influence on innovative capacities
H9: The organisation has a positive influence on innovative capacities
H10: Learning has a positive influence on innovative capacities
H11: Process has a positive influence on innovative capacities
H12: Networks have a positive influence on innovative capacities

2.2.2   KIBS Innovative Capacities and Location

According to the OECD (2007), the motivation underpinning such support should be based upon studies of the differences between regional innovation hence enabling policies to be put into practice enabling lesser developed regions to boost their performances particularly in terms of innovation. Nevertheless, there still remain relatively few such studies examining the impact of the innovation processed by KIBS at the regional level (Shearmur and Doloreux 2008). Studies done thus far on KIBS have focused on: (1) the impact that they have on employment (Shearmur and Doloreux 2008); (2) the impact on the growth of cities (Simmie and Strambach 2006; Aslesen and Isaksen 2007); (3) the proximity effect on the transfer of knowledge and their clients (Aslesen and Jakobsen 2007); (4) the innovation effect on the transformative industry and its cooperative relationships with KIBS (Aslesen and Isaksen 2007) and (5) on the relationship between the surrounding host innovation systems (Koch and Stahlecker 2006). This research seeks to narrow that shortcoming by simultaneously focusing on analysis of the innovative and competitive capacities of these KIBS types in conjunction with their location. Within this context, we put forward the following two research hypotheses:

H13 a: Urban Professional KIBS display greater innovative capacities than the rural
H13 b: Urban Technological KIBS display greater innovative capacities than the rural
H14 a: Urban Professional KIBS attain better financial performances than the rural
H14 b: Urban Technological KIBS attain better financial performances than the rural

2.3 Methodology

2.3.1 Sample

A questionnaire was drafted and applied to a final sample of 500 Portuguese KIBS firms during the October of 2012. These firms were selected according to their CAE (REV.3) and NACE (REV 2) codes, in accordance with other research projects (Freel 2006; Shearmur and Doloreux 2008) The final sample of 500 KIBS companies was thereby structured as follows (Table 2.1): p_KIBS (65.6 %, 328 companies) and t_KIBS(34.4 %, 172 companies). Of the total of these companies, 18.6 % were located in rural regions (93 companies) and 81.4 % in urban environments (407 companies).

2.3.2 Structural Modelling Results

Table 2.1 portrays the estimate results, confidence intervals at 95 % (CI) and structural model p-value. The methodology applied for estimation was that of maximum likelihood with bootstrap. Analysing the adjustment quality (Table 2.2) according to the Averages Comparative Fit Index—CFI, Incremental Fit Index—IFI, Normed Fit

Table 2.1 Structural modelling results (standardized regression weights)

				CI 95 %		
			Estimate	Lower	Upper	p
NET	←	LEAR	0.38	0.27	0.47	<0.01
NET	←	STR	0.23	0.14	0.32	<0.01
INNOV	←	NET	0.12	0.05	0.19	<0.001
INNOV	←	TU	0.20	0.12	0.28	<0.001
INNOV	←	LENGTH	−0.12	−0.18	−0.06	<0.01
INNOV	←	YEARS	0.09	0.02	0.15	<0.01
INNOV	←	PU	0.21	0.13	0.28	<0.001
INNOV	←	DIF	−0.19	−0.24	−0.13	<0.001
TURN	←	TU	0.13	0.02	0.26	<0.01
TURN	←	INOV	0.74	0.59	0.81	<0.01
TURN	←	LENGTH	0.22	0.11	0.33	<0.001

Note: *NET* network, *LEAR* learning, *STR* strategy, *INNOV* number of innovation, *TU* urban t_Kibs, *PU* urban p_Kibs, *DIF* organisational difficulties, *LENGTH* length of service, *YEARS* years of service

Table 2.2 Structural modelling adjustment averages

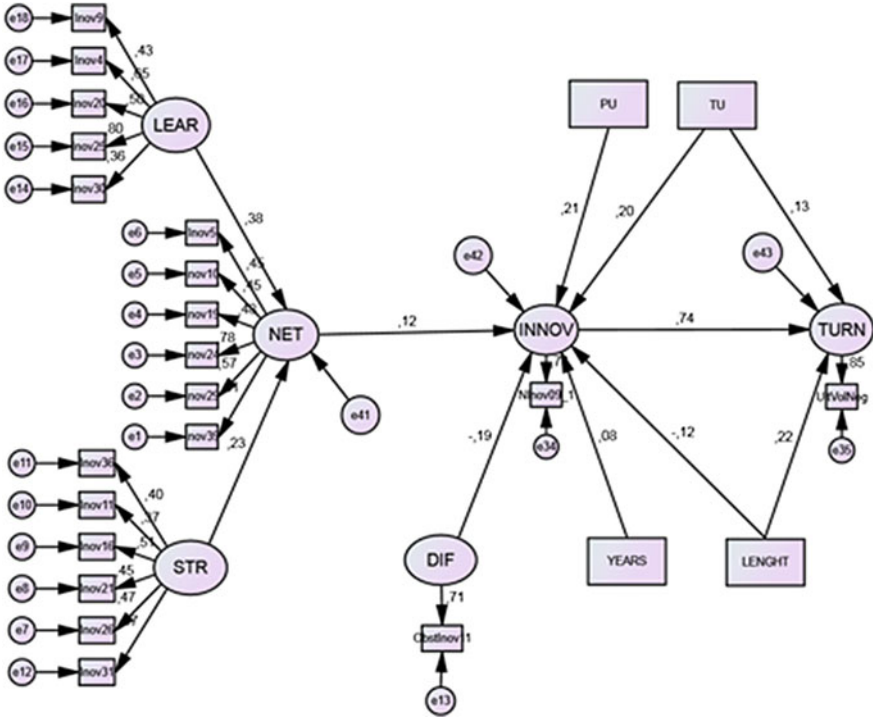| Chi	df	p-Value	CFI	IFI	NFI	RMSEA
198.238	34	0.000	0.905	0.910	0.902	0.074

Fig. 2.1 Structural model

Index—NFI and Root-Mean-Square Error of Approximation—RMSEA concludes that, in addition to the statistical significance of all coefficients subject to testing, adjustment is good.

The model under study, represented in Fig. 2.1, presents the standardized factorial weightings for the final simplified model.

The variables bearing a statistically significant direct influence on the number of product innovations are length of service in years ($\beta=-0.12$; 95%CI: -0.18, -0.16; $p<0.01$), an urban environment location and being a technologically ($\beta=0.20$; 95%CI: 0.12, 0.28; $p<0.001$) or a professionally ($\beta=0.21$; 95%CI: 0.13, 0.28, $p<0.001$) focused KIBS company, the network factor in innovative activities ($\beta=0.21$; 95%CI: 0.05, 0.19; $p<0.001$), and the length of experience of the company manager/owner ($\beta=0.09$; 95%CI: 0.02, 0.15, $p<0.001$).

Analysing the direct, indirect and total effects of the diverse variables subject to analysis in terms of numbers of innovations, we find the factors Learning and Strategy generated no direct and statistically significant impact, however, as they influence the Networks factor, with the latter holding a statistically significant impact on innovation levels, there is an indirect effect of 0.09 (H12) for the aforementioned two factors (learning and strategy). An average increase of one point in the level of alignment between the Learning and Strategy factors causes, and as

mediated by the Networks factor, an increase of 0.14 and 0.09 innovations, respectively. It may thus be concluded that the Networks factor generates a positive impact on KIBS innovative capacities. This thereby corroborates other studies that point to the founding and running of networks as essential to the development of innovation (Moritra and Krishnamoorthy 2004). The length of manager experience also holds a direct impact and total of 0.04 this reflects how an additional year of experience fosters an average increase of 0.04 innovations (H7b). Hence, the fact that an entrepreneur or owner has built up greater experience in the sector implies that they shall seek to foster innovation into the future.

As defended by various authors, entrepreneurial characteristics are fundamental to the existence of innovation within organisations (Webster 2004). The variable associated to location and given that the results demonstrate that whether KIBS are urban and professional generates a (total) direct impact of 0.46 and it may thus be inferred that a company's location in an urban environment and engaged in professional sector activities leads to a rise of 0.48 in innovations. The urban professional and technological KIBS have a greater innovative capacity as confirmed hypotheses H13a and H13b. Finally the H14b is checked indicating that the urban technological KIBS tees significantly better financial performance.

Aslesen and Isaksen (2007) have proposed urban technological KIBS companies hold greater innovative capacities (even while the gap is not especially large) than their professional KIBS peers, as identified by Freel (2006). The variable related to difficulties in terms organising innovation (H4) has a significantly direct negative impact, −0.21, on the number of innovations. An average rise of one unit attributed to difficulties in organising innovation causes an average slide of 0.21 in innovations. Thus, we find that KIBS companies experiencing internal difficulties in terms of how they handle innovation processes turn in lower levels of overall innovative capacity. As defended by Bughin and Jacques (1994), this is one of the key management principles that companies experience great difficulty in overcoming in the field. Length of service also generates a directly negative effect on innovations of −0.02. Hence, for every extra year of employee company service, there is an average decline of 0.02 in the number of innovations. The fact that the company has a strong or at least established track record may lead to a propensity to drive less innovation.

The variables that have a direct and statistically significant influence on turnover (Table 2.1) are the number of innovations in 2009 ($\beta = 0.74$; 95%CI: 0.59, 0.81; $p < 0.01$), its location in an urban environment and being a technologically based company ($\beta = 0.20$; 95%CI: 0.12, 0.28; $p < 0.001$). The variable applied to urban technological KIBS returns a direct effect of 0.48 on turnover and an indirect effect of 0.53 (total effect of 1.01) and we may correspondingly deduce that where a company is located in an urban context and focused upon the technological sector, its average turnover rises by over 1,010.00 € thousand than would otherwise be the case. The number of innovations also generates a direct impact on estimated turnover of 1.11, which indicates that the increased innovation on average generates additional turnover of 1,111.00 € (H6). Thus, we can conclude that urban technological KIBS firms return a financial performance better than urban professional

KIBS companies. Taking into consideration financial performance is a means of measuring the competitive capacities of a company, we may assume that technological KIBS entities are more competitive given that they not only turn in better financial performances but also prove more innovative.

2.4   Conclusions

We would also wish to emphasise that, despite the prevailing financial and economic difficulties experienced, these KIBS companies did not identify such circumstances as impacting on innovation even though internal organisational issues did. We may thus assume that such difficulties relate to the company encountering certain shortcomings at the organisational level and on occasion resulting in lower levels of innovative capacity.

Bughin and Jacques (1994) also hold that this is one of the key management principles that companies find most difficult to implement. Finally, as regards the competitive level of KIBS as described by the average of their financial performance through turnover, we demonstrate that technological KIBS beyond returning better financial performances than their professional counterparts, also display better innovation capacities. Hence, we may argue that technological KIBS companies are effectively more competitive than professional KIBS. However, the location (urban vs. rural) held no influence in these terms. In Portugal, there are not many KIBS firms located in rural areas and this might result, when analysing them in terms of the remainder of the sample, the urban located KIBS, in a lack of statistical significance as is the case in our study, thereby restricting the applicability of these particular results.

An implication within this scope applies to the terms and conditions of public policies. The authorities need to better understand the complex environment and difficult that companies currently face. Only thus is there any real likelihood of adopting the appropriate policies tailored to the private sector realities of the twenty-first century. Given the looming scale of change, we must adopt new measures and new policies and we believe that funding and financing the founding of such companies does contribute towards regional development and particularly in areas where the rural/urban dichotomy remains so pronounced as well as for the competitiveness of those companies interacting with these KIBS.

Additionally, some scholars preserve that in times of crisis, not all firms within an industry have the capacities to survive the economic slowdown or to adapt to the new economic reality (Caballero and Hammour 1994; Latham and Braun 2011). However, as the disruptive nature of economic recessions on company viability and competitiveness is completely recognised by practitioners and academics alike, comparatively little research has addressed how entrepreneurs can successfully pilot these insidious actions. What are the influential implications of global recession on the innovative capacity of KIBS enterprises? We therefore believe that the results of this research provide a deeper and more detailed insight into this sector hitherto subject to so little researched.

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