



UNIVERSIDADE DA BEIRA INTERIOR
Ciências Sociais e Humanas

Influence of Knowledge Intensive Business Services (KIBS) on Firm Innovation

Alexandra Maria da Silva Braga

Tese para obtenção do Grau de Doutor em
Gestão
(3º ciclo de estudos)

Orientadora: Prof. Doutora Carla Susana da Encarnação Marques
Co-orientadora: Prof. Doutora Zélia Maria da Silva Serrasqueiro

Covilhã, outubro de 2016

Folha em branco

Dedicatória

Aos meus pais
À Bianca
Ao Filipe
Ao Vítor

Folha em branco

Acknowledgements

There were several people who, directly or indirectly, contributed and made this thesis possible. The personal enrichment resulting of these contacts exceeded, inevitably, the scientific work. To all, in general, I want to express sincere thanks. I would, however, leave a word of acknowledgment to certain people and entities.

First, a word of genuine thanks and admiration to Professor Carla Susana Marques, academic supervisor of this thesis, for accepting the challenge of this project, and to have accompanied, always, and at any time, contributing with all her availability, critiques and assertive suggestions. I am thankful for her patience, for believing in the final result of this work and, above all, for the friendship over the years.

I am thankful to Professor Zelia Serrasqueiro, co-supervisor of this thesis, for accepting the challenge of an on-going process, for the availability, patience, suggestions and criticisms provided, critical to the improvement of this work.

To Vitor Braga, not only for the bond of kinship, but also as a colleague of profession and head of department, for all the support, collaboration and shared knowledge; the commitment and motivation to complete this process; for his constant and friendly presence, and the endless words of encouragement that made possible to believe on the possibility of achievement.

To Amelia, Beatriz and Helena, friends and doctoral colleagues who accompanied me in the Ph.D. "battle", since the academic part until, for the words of encouragement, the fellowship, the entertainment and laughter moments that made the last few years more "bearable" allowing me to "survive".

To several colleagues and friends from the School of Management and Technology of Felgueiras, who participated and facilitated this process, namely, Aldina, Marisa, Amelia, Teresa, Vanda, Catarina, Sérgio, Gonçalo and Rui, a word of full gratitude.

To the presidents of School of Management and Technology of Felgueiras and Polytechnic of Porto, for the support and encouragement demonstrated.

To my students, for their patience and wait for the assessment results, for understanding the lack of availability for further monitoring and mentoring, and mainly for their recognition shown, resulting, often, as an incentive and inspiration.

To the firms that responded to the survey, for the friendliness and availability that allowed us to collect data, and making possible the development of this research. A special word of appreciation and thanks to CEO's and academic experts who participated in the qualitative study, for their time and the useful contributions and knowledge.

To the University of Beira Interior, in particular to the Director of the PhD Program in Management - Prof. João Ferreira - for the support and availability.

The last, but not least, a big appreciation is dedicated to my family and friends, for their words of incentive, tolerance to my constant absences, and patience. A special word goes to my husband Filipe for postponing some personal and professional projects and for the additional burden in the housework; and to my daughter Bianca, who often had to give up her mother's presence and accompaniment, being, at this stage, unable to understand the importance of such absences and the many times of dedication to this work.

Abstract

The ability to innovate is recognized, internationally, as a key factor of competitiveness in the business world. In the services sector, the rapid growth of knowledge intensive business services (KIBS), has demonstrated that they have a very important role in innovation processes. The scientific community, increasingly, recognizes that service firms innovate alone, but, more importantly, innovation, in this sector, affects all sectors of the economy, due to the transfer of their innovation to other economic activities. The KIBS act as knowledge spreaders, contributing, in different ways, to the process of innovation of related firms: facilitators, carriers and/or sources of innovation. The literature also emphasizes its role as innovation co-producers. In this context, through inter-firm cooperation, it is possible to share and/or create knowledge. This provides a positive output for the firms involved, either in terms of technology, or by creating new products/services. In light with such arguments, approaching the influence of KIBS in firms with regard to innovation seems to be critical to knowledge.

In order to achieve this goal, we developed a study mapping scientific publications, intellectual structure and research trends on the intensive business services in knowledge, highlighting the current mainstream approaches on the topic of innovation and knowledge, supported empirically, which identified the relationship between the dimensions that influence the processes of innovation and internationalization in Portuguese KIBS firms. The framework consists of five key dimensions: innovation, knowledge, cooperation, localization and internationalization. A first approach used qualitative data (interviews with KIBS' CEOs and academic experts). Subsequently two quantitative studies used data gathered through investigation in KIBS firms listed statistics official on R & D in Portugal, produced from the Survey on Scientific and Technological Potential (IPCTN) Firms, yielding a total of 58 responses (approximately a response rate of 15%). To empirically test the research hypotheses, we used univariate and multivariate statistical analysis.

The results obtained support the relationships between the selected key dimensions (innovation, knowledge, network, location and internationalisation) – proposed on the literature review.

The results show that knowledge personalisation has a positive influence in proactive strategies of internationalization, such as, external innovation and new organizational methods. When KIBS cooperate with clients it has a positive impact in reactive and cost strategies of the internationalization process. Therefore, the results of this study indicate that high levels of cooperation with other firms and universities, urban location and social, institutional and technical knowledge of KIBS, favor both the firms' innovation and their entry into new foreign markets - internationalisation.

Keywords

KIBS, Knowledge-Intensive Business Services, Innovation, Knowledge, Internationalization, Location, Networks, Cooperation, Co-creation, Clients, Higher Education Institution (HEIs)

Resumo

A capacidade de inovar é reconhecida, a nível internacional, como um fator fundamental de competitividade no mundo empresarial. No setor dos serviços, o rápido crescimento dos serviços empresariais intensivos em conhecimento (Knowledge-Intensive Business Services - KIBS), tem mostrado ter um papel muito importante nos processos de inovação. A comunidade científica cada vez mais reconhece que as empresas de serviços inovam por si próprias e, além disso, a inovação neste setor afeta todos os setores da economia, ao transferir a sua inovação para outras atividades económicas. Os KIBS funcionam como transmissores de conhecimento, contribuindo de diferentes formas para o processo de inovação das empresas com quem se relacionam: como facilitadores, transportadores e/ou fontes de inovação. A literatura sublinha mesmo o seu papel de co-produtores de inovação. Neste contexto, e através da cooperação entre empresas, é possível partilhar e/ou criar conhecimento. Daqui resultará algum output favorável para as empresas envolvidas, seja em termos tecnológicos, seja através da criação de novos produtos/serviços. Perante este cenário, faz todo o sentido abordar a influência dos KIBS nas empresas, no que respeita à inovação.

De forma a alcançar este objetivo, desenvolveu-se um estudo assente num mapeamento das publicações científicas, estrutura intelectual e tendências de investigação relacionadas com os serviços empresariais intensivos em conhecimento, destacando-se as abordagens atuais de referência sobre a temática da inovação e do conhecimento, corroborado por um suporte empírico que permitiu identificar as relações entre as dimensões que influenciam os processos de inovação e internacionalização nas empresas KIBS portuguesas. O quadro de referência é composto por cinco dimensões chave: inovação, conhecimento; cooperação, localização e internacionalização. Numa primeira abordagem desenrolou-se um estudo qualitativo, que consistiu na realização de entrevistas a CEOs de KIBS e a especialistas académicos, e que culminou em dois estudos quantitativos, os quais utilizaram dados recolhidos, através de inquérito, em empresas KIBS que constam das estatísticas oficiais sobre I&D em Portugal, produzidas a partir do Inquérito ao Potencial Científico e Tecnológico Nacional (IPCTN) às Empresas, tendo-se obtido um total de 58 respostas (taxa de resposta de cerca de 15%). Para testar empiricamente as hipóteses de investigação, recorreu-se à análise estatística, univariada e multivariada.

Os resultados obtidos permitem apoiar as relações entre as dimensões chave selecionadas (inovação, conhecimento, redes, localização e internacionalização) - propostas na literatura.

Os resultados mostram que a personalização do conhecimento tem uma influência positiva em estratégias pró-ativas de internacionalização, tais como, a inovação externa e os novos métodos de organização. Quando os KIBS cooperam com os clientes há um impacto positivo nas estratégias reativas e de custo da internacionalização. Por outro lado, as estratégias reativas e de custos de internacionalização são influenciadas negativamente pela personalização do conhecimento, partilha de conhecimentos e pela inovação interna. Os resultados deste estudo indicam, também, que os altos níveis de cooperação com outras empresas e universidades, a localização urbana e o conhecimento social, institucional e técnico de KIBS, favorecerem a inovação e a entrada de ambas as empresas em novos mercados estrangeiros - internacionalização.

Palavras-chave

KIBS, Knowledge-Intensive Business Services, Inovação, Conhecimento, Internacionalização, Localização, Redes, Cooperação, Co-criação, Clientes, Instituições de Ensino Superior (IES).

Table of Contents

Part I	1
CHAPTER 1 INTRODUCTION	3
1. Problem statement	3
2. Objectives, research questions and hypotheses	5
3. Research methodology	7
4. Structure	8
Part II	9
CHAPTER 2 Knowledge Intensive Business Services research: Bibliometric study of leading international journals (1994-2014)	11
CHAPTER 3 KIBS' key dimensions: a qualitative study on innovation, knowledge, networks, location and internationalisation	42
CHAPTER 4 Exploring the relationships between KIBS and innovation: a quantitative analyse in Portuguese firms	61
CHAPTER 5 Internationalisation strategy of KIBS: the effect of knowledge, cooperation and innovation	79
Part III	101
CHAPTER 6	103
Final considerations	103
1. Conclusions	103
2. Limitations and future research lines	107
References	110
Annex 1	115
Annex 2	116
Annex 3	121

Folha em branco

Folha em branco

Part I

Chapter 1

Introduction

1. Problem Statement

The issue of innovation and its influence on business performance has becoming increasingly relevant based on studies carried out in various areas.

The scientific literature is unanimous in considering the ability to innovate as a key factor of competitiveness in the business world (e.g. Tidd et al, 2005; Marques & Monteiro-Barata, 2006; Sarkar, 2007; Gupta, 2008; Rasquilha, 2011). The maintenance of competitive advantage has been for a long time, the "*Holy Grail*" of Strategic Management (Barney et al, 2005).

More recently, some researchers have focused their attention on the services sector. The first papers on the industry date back to the 60s, but it is on the early 80s that the interest in research on innovation in services increases, becoming a topic with growing interest for researchers and politicians in general (e.g. Gallouj & Weinstein, 1997; Johnes & Storey, 1998, Howells, 2000; Gallouj, 2002; de Jong et al, 2003; Tether, 2003; Miles, 2000; 2005; Leiponen, 2005; Gallouj & Windrum, 2009; Mention, 2011).

It is more and more recognized that service firms are not simply passive recipients of innovations processed in industry firms, but they, rather, innovate (e.g. Gallouj & Weinstein, 1997; Tether, 2003). Moreover, it is also widely recognized that innovation in this industry impacts on the remaining sectors of the economy, and certain types of services transfer their innovation to other economic activities.

Within the service industry, the rapid growth of the KIBS sector (Knowledge-Intensive Business Service) has shown to have a very important role in the innovation process (e.g. Den Hertog, 2000; Muller, 2001; Howells & Tether, 2004; Toivonen, 2004; Freel, 2006; Koch & Stahlecker, 2006, Kubota, 2009; Mas-Vérdu et al, 2011; Hipp, Gallego & Rubalcaba, 2012; Mas-Tur & Soriano, 2014). KIBS have been playing a dynamic role in relation to innovation through the creation of a "knowledge bridge" or "innovation bridge" between businesses and science (Miles et al. 1995; Czarnitzki & Spielkamp, 2003).

Some studies focus on the role that KIBS play in innovation systems (e.g. Corrocher & Cusmano, 2014; Shi et al, 2014), while its cooperation with firms in other sectors increases the performance of these firms and regions (e.g. Miles, 2000; Leiponen, 2005, Ferreira et al., 2012). Thus, KIBS play a role in facilitating innovation process in the economy, including other sectors than services. To

this extent, it seems pertinent to analyse the role of intensive business services in knowledge - KIBS, which, as Miles, et al. (1995, p. 18) refer, provide “economic activities which are intended to result in the creation, accumulation or dissemination of knowledge”.

A general definition of KIBS firms can be found in den Hertog (2000, p. 505) who refer to “private firm or organisations that rely on professional knowledge, i.e. knowledge or expertise related to a specific (technical) discipline or (technical) functional domain to supply intermediate products and services that are knowledge-based. In this perspective, several authors divide KIBS into two groups: Technological KIBS (T-KIBS), which include the activities related to information technology, research and development, engineering and architecture activities and activities related to consultancy, technical activities of testing and analysis; and Professionals KIBS (P-KIBS): legal sectors, accounting, bookkeeping and auditing activities, tax consultancy, market research, as well as all the advertising industry (e.g. Frell, 2006; Doloreux & Muller, 2007, Shearmur & Doloreux, 2008).

According to Koch and Strotmann (2008) there is still room to accommodate more studies on innovative activity in the service sector. The fact that it is a very heterogeneous sector in its genesis (Consoli & Elche-Hortelano, 2010) is the main reason for discouraging researchers to study innovation in the service sector (Howells, 2000). Nevertheless, and in line with the previous debate, the importance of investigating how firms develop, integrate and organize knowledge has emerged. Some studies on KIBS have been dedicated to the investigation of KIBS’ relationship with its clients (usually firms in other sectors) (e.g. Antonelli, 1998; Bilderbeek et al., 1998; Den Hertog, 2000; Kox, 2002; Skjolsvik et al, 2007, He & Wong, 2009; Landry et al, 2012; Scarso & Bolisani, 2012; She & Nagahira, 2012), given that KIBS began to be seen as producers of innovation and drivers of knowledge dissemination through its close relationship with clients (den Hertog, 2000; Muller, 2001). According to the literature, KIBS play a role of innovation facilitators becoming the interface between the generic knowledge available in the economy and tacit knowledge located in firms (Kubota, 2009). Authors such as Haukness (1998); Miles et al (1995) and Bilderbeek, et al (1998) refer three functions of KIBS: (1) they are facilitators of innovation, when KIBS support a client in their innovation process; (2) they can be carriers of innovation, when KIBS transfer existing innovations from one firm to another or within the industry; (3) they can be a source of innovation to play a central role in the initiation and/or development of innovation, as clients, or for their clients. Moreover, on many occasions, the relationship between KIBS and their clients is so close that both depend on the efforts of one another in R & D to be competitive (Czamitzki & Spielkamp, 2003).

Thus, according to Capasso, et al (2005), over the last decade the literature focused on processes of generating, sharing, identification and transfer of knowledge within and between firms has increased. The focus on knowledge transfer is related to three perspectives, apparently distinct, but complementary, on the agenda of the strategic organization. First, the perspective of strategic capabilities, “looking to the firm’s capabilities as organizational and management systems that

support learning processes required in knowledge transfer intra and cross-organizational" (e.g. Amit & Schoemaker, 1993; Teece et al; 1997; Eisenhart & Martin, 2000); second, the growing knowledge-based theory "looking to the firm as a repository of knowledge and a entity of knowledge creation" (e.g. Kogut & Zander, 1992; Grant, 1996, 2003; Porter-Liebeskind, 1996; Nonaka et al, 2000; Bettencourt et al, 2002; Eisenhardt & Santos, 2002). Third, the perspective of strategic networks "claiming the relevance of inter-firms relations as learning platforms and inter-organizational evolution" (Gulati, 1999; Gulati et al., 2000; Hansen, 2002; Capasso, et al, 2005: 2-3).

Following the previous perspectives, Lanza (2005) adds that this process of knowledge development consists of two related phases: the phase of sharing and the phase of creation, and to share knowledge with competitors partners is a key step to effective activities of knowledge creation (which is, effectively, to compete in the market).

Fernandez-Esquinas and Uyarra (2015) add that KIBS make a vital contribution to regional innovation. Its relevance is potentially greater in peripheral areas, because they assist small and medium firms to access knowledge.

Combining the proliferation of KIBS in modern economies with the relatively early stage of research in academia and, taking into account line that KIBS play an increasingly active role in innovation and competitiveness of any economy, it is crucial to identify the influence of KIBS on other firms with respect to innovation, which is precisely the purpose of this research. Thus, this investigation aims to analyse the role of KIBS in the business innovation process. Whereas, to our knowledge, there are no studies, in the literature, that, simultaneously, focus on the relationship between the five dimensions previously mentioned: innovation, knowledge, cooperation, localization and internationalization, one expects that this research results in a gain for the academic knowledge and to the business community.

2. Objectives, research questions and hypothesis

The general objective of this research is to analyse the role of KIBS in business innovation processes. To achieve this general objective, the following specific objectives were outlined: (1) To map the scientific publications, intellectual structure and research trends related to the intensive business services in knowledge, in order to develop a description of the main characteristics of KIBS and to identify the theoretical approaches used in the analysis of this type of business (eg, creation, sharing and knowledge transfer focused on KIBS, cooperation and innovation networks, localization and internationalization strategies), and the different connections between the different dimensions; (2) To propose a conceptual model of analysis to be tested empirically in subsequent quantitative studies; (3) To explore the effects and relationships established at the level of knowledge, cooperation and internationalization in

the process of innovation co-production of KIBS firms; (4) To identify and to explore the effects of innovation, knowledge and cooperation in the internationalization of KIBS.

Considering the aforementioned conceptual framework and the objectives of this research, the following research questions were defined: (1) What are the main research trends on KIBS?; (2) What relations are established between the key dimensions in Portuguese KIBS firms?; (3) How is the accumulated knowledge transmitted for firms with which the KIBS relate?; (4) What contributes to the co-production of innovation? (5) What is the contribution of the key dimensions to the process of internationalization of KIBS?

To answer the objectives of the study there are several units of analysis. With regards to the goal of mapping scientific publications, intellectual structure and research trends the unit of analysis are scientific articles. In order to validate the measurement instruments and to define the conceptual model of research, we used interviews with KIBS' CEOs and national and international academic experts. These are the unit of analysis. With regards to the collection of primary data, a questionnaire, previously validated, was applied, and the unit of analysis was KIBS firms. In what regards the collection of primary data, a questionnaire, previously validated, was applied, and the unit of analysis was the KIBS firms (see table 1).

Table 1: objectives, research questions and analysis units

Objectives	Research questions	Analysis units
To map scientific publications, intellectual structure and research trends related to the intensive business services in knowledge, in order to develop a description of the main characteristics of KIBS and to identify the theoretical approaches used in the analysis of this type of business (e.g. creation, sharing and knowledge transfer focused on KIBS, cooperation and innovation networks, localization and internationalization strategies), and the different connections between the different dimensions.	What are the main research trends on KIBS?	Scientific Articles
To propose a conceptual model of analysis to be tested empirically in subsequent quantitative studies;	What relations are established between the key dimensions in Portuguese KIBS firms?	KIBS' CEOs; national and international academic experts
	How is transmitted the accumulated knowledge for firms with which the KIBS relate?	
To explore the effects and relationships established at the level of knowledge, cooperation and internationalization in the process of co-production innovation of KIBS firms	What contributes to the co-production of innovation?	KIBS' CEOs
To identify and to explore the effects of innovation, knowledge and cooperation in the internationalization of KIBS.	What is the contribution of the key dimensions to the process of internationalization of KIBS?	KIBS' CEOs

3. Methodology

Taking into account the sector in study and the research questions, we opted, in this research, for a qualitative and quantitative research, using data collection instruments of both types. As a result, we conducted four studies.

The first empirical study "Knowledge Intensive Business Services Research: Bibliometric study of leading international journals (1994-2014)" is a quantitative research and presents a bibliometric analysis of the scientific production in the field of Knowledge Intensive Business Services, using the publications indexed on the ISI Web of Science - WoS, for the period 1994-2014. The bibliometric analysis involves the application of a quantitative statistical analysis to the publications and respective citations. According to some authors (eg Small, 1973; Zitt & Bassecoulard, 1994), the analysis of co-citations is often used to outline, in detail, the publications in a given field of research, allowing identifying articles with the greatest impact. This study aimed to analyse the characteristics of academic production, considering a number of keywords associated with the theme, in order to know, evaluate and measure productivity in this scientific field, the main authors and journals of greatest impact and the collaboration relationships between institutions and countries. This study also served to identify the main research focus that supported the construction of the research model and the questionnaire that allowed the collection of data for the subsequent studies.

The second study "KIBS' key dimensions: a qualitative study on innovation, knowledge, networks, location and internationalization", focused on findings from the bibliometric study, and allowed to promote a better understanding of the key topics associated to the study of KIBS. In this study, we choose a qualitative methodology through the application of semi-structured interviews to six KIBS' CEOs firms and four academics (national and international), experts in the field of research with scientific publications in international journals indexed (SSCI), in order to validate the questionnaire based on the literature review; the dimensions emerged; as well as the links/relationships between them. Cassel and Symon (2004) argue that the interview remains the most common method of data collection in qualitative research and that allows a better understanding of the inherent categories and sub-categories and of their relations.

The data analysis allows confirming the dimensions defined in the first study; to understand if there are deviations or new suggestions/approaches; to identify a number of potentially interesting variables; and to explore the relationship between the dimensions, to be tested, using a more quantitative research model in the subsequent studies, in order to validate the findings outlined. In this study the propositions were defined (hypotheses to test in further studies), and they were presented the proposed research model.

In the third empirical study "Exploring the relationships between KIBS and innovation: a quantitative analyse in Portuguese Firms" and in the fourth study "Internationalisation strategy of KIBS: the effect of knowledge, cooperation and innovation" a quantitative approach was chosen, using the questionnaire as a research tool administered to KIBS firms.

The sample was extracted from the Survey database to the National Scientific and Technological Potential, with KIBS in activity in 2014/2015. The option for the questionnaire as the instrument of analysis seems to be an appropriate tool, given that they can be useful when one wants to gather information from a large number of individuals, and collecting information in a consistent and comparable way is important (Ryan et al., 2002).

Upon completion of data collection, the results were obtained through the use of factor analysis and linear regression that allowed drawing conclusions about the goals we proposed us to achieve.

4. Structure

This thesis is structured into three main sections. This first section includes the introduction, which provides an overview of the literature related to the items that constitute the body of the thesis, detailing the objectives and research questions, the units of analysis and the underlying methods. The second section consists of four chapters corresponding to the four empirical studies, previously mentioned. The third, and last section, presents the final considerations of the thesis, the conclusions and the contributions of this investigation. A summary of thesis structure is shown in Figure 1.

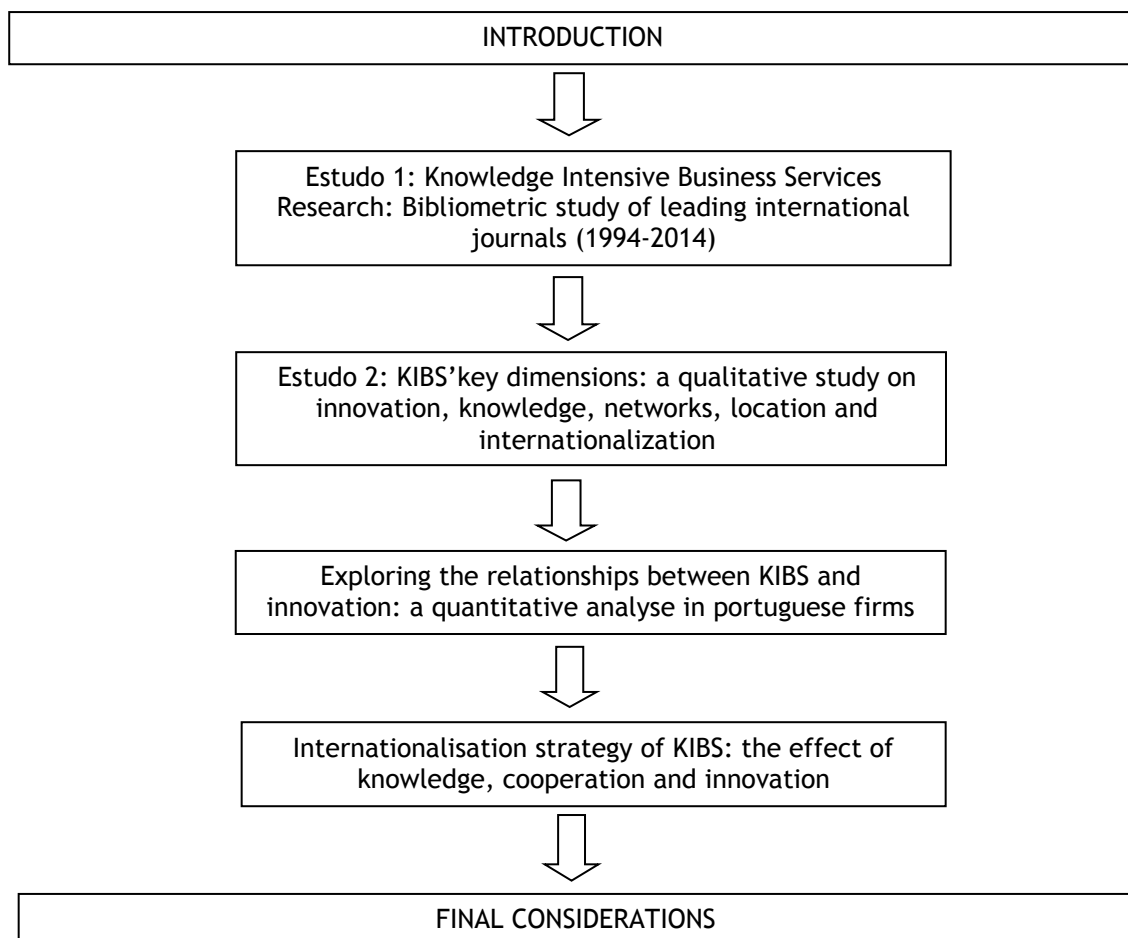


Figure 1: Thesis Structure

Part II

CHAPTER 2

Knowledge Intensive Business Services research: Bibliometric study of leading international journals (1994-2014)¹

Introduction

Over the last 20 years, Knowledge Intensive Business Services (KIBS) have grown considerably in many European and Asian countries and they have a significant influence on innovation activities across the whole economy (e.g. Shi et al., 2014; Hu et al., 2013; Abreu et al., 2010; Viljamaa et al., 2010; Wood, 2005; Miles et al., 2000; Mas-Verdú et al., 2011). For this reason, KIBS have recently become an important field of both theoretical (e.g. Murray et al., 2009; Bettiol et al., 2012; Chae, 2012; Gimzauskiene and Staliuniene, 2010) and empirical study (e.g. Miozzo and Grimshaw, 2005; Yam et al., 2011; Palacios-Marques et al., 2011; Santos-Vijande et al., 2013a; Carmona-Lavado et al., 2013).

Regional innovation research still echoes national studies by assuming the primacy for regional competitiveness of process-orientated, technologically driven innovation. It has nevertheless recognised the growing importance for such innovation of regional institutional interaction and flexibility and of key service expertise, especially through KIBS (Wood, 2005). Santos-Vijande *et al.*, (2013a) argue that as the dynamism of the KIBS sector has an impact on the whole economy, it is also necessary to understand the most advisable management practices in KIBS to foster innovation and improved performance, although relatively few studies have approached this issue.

In order to assess the KIBS structure in a certain field, an important method - bibliometric analysis - can be used to analyse the trends in the published research. Bibliometric studies have been used in several areas of business and economics (Dragos *et al.*, 2014), entrepreneurship (Ávilla *et al.*, 2014), technology entrepreneurship (Ferreira *et al.*, 2015), innovation (Toivanen, 2014), social innovation and social entrepreneurship (Philips *et al.*,

¹ Este artigo encontra-se publicado, com a referência:

Braga, A.M. & Marques, C.S. (2016), Knowledge Intensive Business Services Research: a bibliometric study of leading international journal (1994-2014). In J. Ferreira, M. Raposo, C. Fernandes & M. Dejardin (Eds.), *Knowledge Intensive Services and regional Competitiveness*". (pp.11-47). New York, Routledge. Disponível em : <https://www.routledge.com/Knowledge-Intensive-Business-Services-and-Regional-Competitiveness/Ferreira-Raposo-Fernandes-Dejardin/p/book/9781138859364>

2015), service innovation (Zhu and Guan, 2013), etc. However, no prior evidence of a systematic literature review in the leading international journals in this area has been found. In light of this consideration, this study aims to map and analyse the scientific production within the field of KIBS, using the publications database ISI Web of Science - WoS, for the period between 1994 and 2014.

Specifically, our objectives are: (1) to identify how the topic is defined in the international literature and the progress achieved in the research field; (2) to evaluate and measure the research productivity, key authors and scientific journals with the highest impact on this research field and the networks of association between the respective institutions and countries of origin; (3) and to analyse and map citations, co-citations and research themes to identify which topics and dimensions are related to KIBS in order to support future research.

This paper is organised as follows. In Section 2, the emergence of the field of study on KIBS and an overview of the literature on its concept are discussed. Section 3 presents and discusses the methodological features of the research, the sample and introduces the bibliometric analysis method. The subsequent section presents the results in terms of the KIBS' core areas and presents visual maps of the KIBS network research. The last section concludes the paper, presenting observations and suggesting opportunities for future research.

Knowledge intensive business services

Although the term “Knowledge-intensive business services” has been used since the early nineties, only recently it has become a major theme of investigation and empirical research (Mas-Verdú *et al.*, 2011). Despite this relatively recent concern of the academia in studying KIBS, the literature has already provided many definitions of KIBS firms that, in many cases, do not differ significantly, but rather display different nuances. The different definitions of KIBS found in the literature can be explained by the purpose of the studies, in which a definition serves a particular purpose.

Bettencourt *et al.*, (2002, p.100), describe KIBS firms as those aiming to generate value-added service activities, and that these activities consist in “the accumulation, creation, or dissemination of knowledge for the purpose of developing a customised service or product solution to satisfy the client’s needs.” The knowledge that serves as the basis for their business can, according to Miozzo and Grimshaw (2005), be social and institutional knowledge (e.g. accountancy; management consultancy) or technical knowledge (computer R&D; engineering services). Many authors (e.g. Borodako *et al.*, 2014; Muller and Zenker, 2001; Fernandes and Ferreira, 2013; Huang and Ji, 2013; Hakanen, 2014) refer to the

concept presented by Miles *et al.*, (1995), who have distinguished KIBS as traditional professional KIBS (P-KIBS) and new technology-based services (T-KIBS). P-KIBS help their clients to navigate or negotiate complex systems such as social, physical, psychological, and biological systems (for example, marketing or consultancy services). T-KIBS are services that rely heavily on professional knowledge (e.g. IT services, communication, and computer services), thus, their employment structures are heavily weighted towards engineers and scientists.

In light with this consideration, Wong and He (2005) include three major KIBS sectors in their study: IT and related services, business and management consulting, and engineering and technical services. Based on Borodako *et al.*, (2014), the third type of division is made according to the relationship of the KIBS to the (client) company and the market. Here, three groups of KIBS are identified: market KIBS (key services: market research; advertising; and research and experimental development in social sciences and humanities); enterprise KIBS (IT and programming services; legal services; accounting and tax advisory services; management advisory and PR services; temporary employment agencies; and other recruitment services); and technical KIBS (multilevel KIBS - connecting both the above groups of market and enterprise services: architectural activities; technical testing and analysis; research and experimental development in natural sciences and engineering; engineering activities).

According to Borodako *et al.*, (2014), most definitions in the literature stress the following key aspects of KIBS: they are offered by private business to other business (e.g. Hertog, 2000); they are based on knowledge or expertise - mostly highly advanced and related to a specific field; and the consumption of the service usually improves the client company's intellectual capital. When focusing on the role of KIBS services in client innovation, three different aspects can be perceived: KIBS act as (1) facilitators (if it supports a client firm in its innovation process); (2) carriers (if it plays a role in transferring existing innovations from one firm or industry to the client firm or industry); or (3) sources of innovation (if it plays a major role in initiating and developing innovations in client firms, mostly in close interaction with the client firm) (Hauknes, 1998).

A strong characteristic of KIBS firms, given the nature of their business and the importance of knowledge on the society, is the impact they have on the economic tissue. Wong and He (2005), with this respect, refer that KIBS firms are “group of services which are very actively integrated into innovation systems by joint knowledge development with their clients, and which consequently create considerable positive externalities and possibly accelerate knowledge intensification across the economy”.

In the academia, KIBS literature has addressed the concept from several different perspectives. The topic of KIBS can be interpreted in different ways and types of study. Table 1.1 provides some examples of how the literature has dealt with KIBS concept.

Table 1.1 KIBS concepts from the literature

<i>Reference</i>	<i>Definitions of KIBS</i>
Miles et al. (1995)	KIBS are services involving economic activities which are intended to result in the creation, accumulation or dissemination of knowledge.
Muller and Zenker (2001)	KIBS do not only “transmit” knowledge, in fact they play a crucial role in terms of “knowledge re-engineering”. KIBS has potentially as receptors, interfaces and “catalysators” in terms of knowledge-creation and diffusion. KIBS can be described as services offered by firms, usually to other firms, incorporating ‘a high intellectual value-added’.
Wong and He (2005, p. 27)	“KIBS firms’ innovation efforts extend far beyond their internal organisation to the service relationship and directly into the domain of service clients by providing competence enhancing knowledge services to their clients”.
Bettiol et al. (2011)	The KIBS sector constitutes a service subsector that includes establishments whose primary activities are mainly concerned with providing knowledge-intensive inputs to the business processes of other organisations, including private and public sector clients
Santos-Vijande et al. (2013)	KIBS are private companies or organizations which have a high degree of professional knowledge
Corrocher and Cusmano (2014)	KIBS are key players in innovation systems, particularly in advanced regions where manufacturing competitiveness largely depends on knowledge contents provided by highly specialized suppliers.
Shi et al. (2014)	KIBS are becoming a major force in promoting innovation and that effect is highly related to the average level of human capital.
Doloreux and Laperriere (2014)	The KIBS firm has developed a core portfolio of services, methods or solutions and achieves growth through the penetration of new markets and/or client groups that demonstrate similar needs.

Many studies analyse the relevance of KIBS to innovation (e.g. He and Wong, 2009; Santos-Vijande *et al.*, 2013b; Mas-Tur and Soriano, 2014; Alvarez-Gonzalez and Gonzalez-Morales, 2014; Shi *et al.*, 2014; Doloreux and Laperriere, 2014; Santos-Vijande *et al.*, 2013b; He and Wong, 2009) and it is increasingly recognised that KIBS are key to innovation systems (e.g. Mas-Verdú *et al.*, 2011, Corrocher and Cusmano, 2014; Hu *et al.*, 2013) and are vectors of knowledge transmission (e.g. Skjolsvik *et al.*, 2007; Larsen, 2001; Muller and Zenker, 2001).

According to Di Maria *et al.*, (2012), the literature so far pointed out that the spatial proximity is necessary for sustaining the interaction between KIBS and the client. Nevertheless, there are few theoretical or empirical analysis focusing on the role of the relationship with the local context (Koch and Strotmann, 2006; Doloreux and Shearmur, 2012;

Huggins and Johnston, 2012; Peiker *et al.*, 2012; Aslesen and Isaksen, 2007), which may be vital for KIBS development (Koch and Strotmann, 2006).

Recent papers also analyse the relevance of KIBS with regards to the penetration in new external markets (e.g. Doloreux and Laperriere, 2014; Di Maria *et al.*, 2012, Abecassis-Moedas *et al.*, 2012, Peiker *et al.*, 2012).

Bibliometric analysis of the KIBS literature

Selection of the articles

Considering the growth of academic interest in KIBS, this study attempts to provide a comprehensive review of the existing studies, through a systematic review of the literature. Bibliometrics is the mathematical and statistical analysis of communication in the form of documents aiming to providing a relatively robust and less subjective method to analyse the foundations of a scholarly discipline (Wallin, 2012). Bibliometric studies may be used to examine, for instance, the most cited works, the co-citation networks and, to understand the intellectual structure of literature (Ramos-Rodríguez and Ruíz-Navarro, 2004). The analysis of co-citations is often used to identify papers with higher impact (Zitt and Bassecouard, 1994). According to (Smith, 1981), two documents are considered co-cited when they are cited together in other documents. Previous research has applied bibliometric analysis to e.g., measuring publication in leading management journals as a measure of institutional research performance (Stahl *et al.*, 1988).

In this study, the clusters and respective networks of references were obtained following the methodological guidelines proposed by (van Eck and Waltman, 2010). The simple graphical representations were provided by software packages such as SPSS and Pajek. For the analyses, we used the software VOSviewer (www.vosviewer.com)ⁱ and CitNetExplorerⁱⁱ (<http://www.citnetexplorer.nl>) which supported the construction of the bibliometric maps, and TreeCloud.org (<http://treecloud.univ-mlv.fr>) to generate “tree of words”.

This research was based on a sample of international and national scientific papers collected from the Social Science Citation Index (SSCI), compiled by the Thomson Reuters online database, which contains, in addition to the publications, bibliographic information about authors, affiliations and citations.

The data collection was conducted through the indexed databases ISI Web of Sciencesⁱⁱⁱ, over the last two decades (between 1994 and 2014) and according to the following criteria (Table 1.2). Firstly, we searched for publications using the research terms in the topic: “KIBS” or “Knowledge Intensive Business Services” or “Knowledge-Intensive Business Services”, and we

found 267 articles (we found only one difference of 2 articles for the period 1900-2014, which were related to patents). Then, we refined the results for the following criteria: (a) document types: articles (excluding proceeding papers, review, and editorial materials) (and we reduced the results to 181 articles); (b) data bases: web of science core collection (resulting in 167 articles); (c) research domain: social sciences (158 articles); (d) research area: business economics (there was no difference if we included operations research management science) and, finally, we found 140 articles. The papers were selected on the basis of their title, abstract and keywords. The citations identified were reviewed according to the inclusion and exclusion criteria (Table 1.3).

The search performed resulted in 140 scientific articles with publications dates between 1994 (1 article and the first being published since 1900, according to the criteria in our study) and 2014 (17). We considered articles published between January 1994 and December 2014^{iv}. The unit of analysis in this research is the publication, and the variables correspond to authors and respective affiliations, journals, number of citations and cited references. The process of literature collection took place during December 2014 until May 2015.

Table 1.2 Settings of the research

<i>Basic search</i>	<i>Times pan</i>	<i>Databases</i>	<i>Research domain</i>	<i>Research areas</i>	<i>Document type</i>
TOPIC: "KIBS" <i>OR: "Knowledge Intensive Business Services"</i> <i>OR: "Knowledge-Intensive Business Services"</i>	From 1994 to 2014	Web of Science™ Core Collection	Social Sciences	Business Economics	Article

Table 1.3 Inclusion and Exclusion Criteria

<i>Criteria</i>	<i>Reasons for inclusion</i>	<i>Reasons for exclusion</i>
Pré-1994		Contributions toward knowledge intensive business services have developed in the past 20 years
All countries	To ensure a cross-cultural view of KIBS	
Editorial, Patent, Clinical Trial, Meeting, Review, other		Focus on high-quality peer-reviewed research
Theoretical and empirical articles	To capture all existing studies	
Science Technology, Arts Humanities		To focus in the social sciences area - limited to one research domain

The emergence and evolution of KIBS

The literature on the Knowledge Intensive Business Services is a relatively new field of research that has spread remarkably in the past 20 years. Knowledge Intensive Business Services research has flourished in 1994, mainly in Europe and USA. The earlier published

paper found in WoS was written by Simone (Strambach, 1994), from University of Stuttgart, Germany, and it was published in *Tijdschrift Voor Economische en Sociale Geografie*, a journal published by Wiley-Blackwell (USA), which web of science categories are economics and geography (2013 impact factor: 1,012). The article entitled “Knowledge Intensive Business Services in the Rhine-Neckar Area” emphasizes the importance of network relationships for knowledge-intensive service firms and shows that network relationships play a key role in the interaction between suppliers and clients. Later, other authors have explored this link (e.g., (Plaza et al., 2011, Hakanen, 2014, Najafi-Tavani et al., 2014).

The data in Figure 1.1 shows an increase in the number of articles on KIBS published, per year, with particular emphasis on the last decade (about 94% of the total publications). It is also important to mention that half of the papers (70) were published over the last three years (Figure 1.2). Since 2008, this number has been greater than (or equal to) 10 every year. In 2012 and 2013 the highest number of publications in the field, was achieved, with 30 and 23 articles published, respectively).

The 140 articles considered in our sample display an average citation rate of 12.2 %, with 31 of the articles never being cited and 55 have been cited between one (17) and five times (5). Table 1.4 reveals the top-40 ranking of papers in terms of highest number of citations.

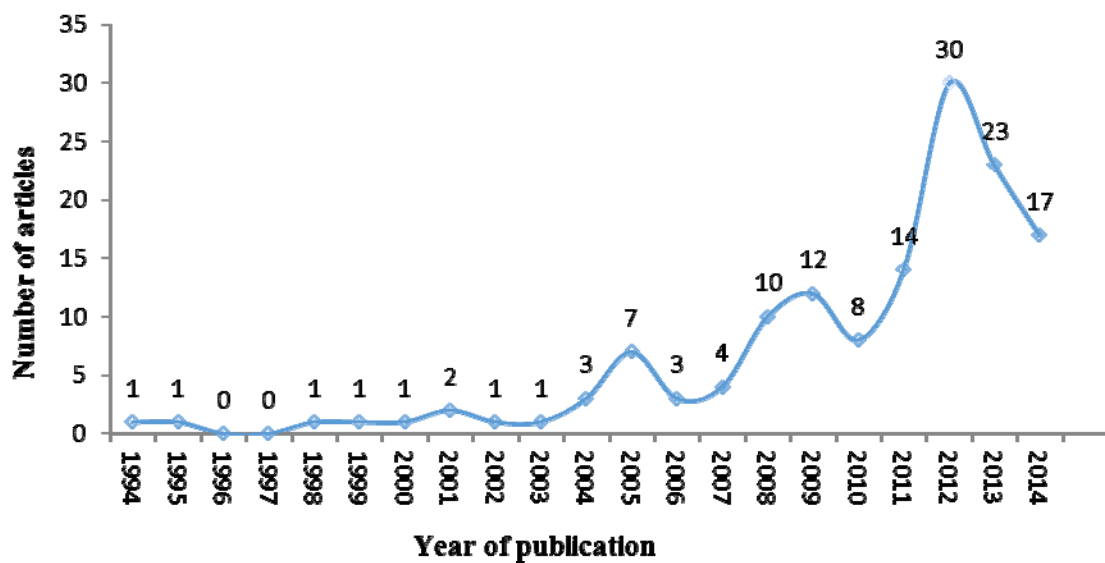


Figure 1.1 Number of articles by year of publication

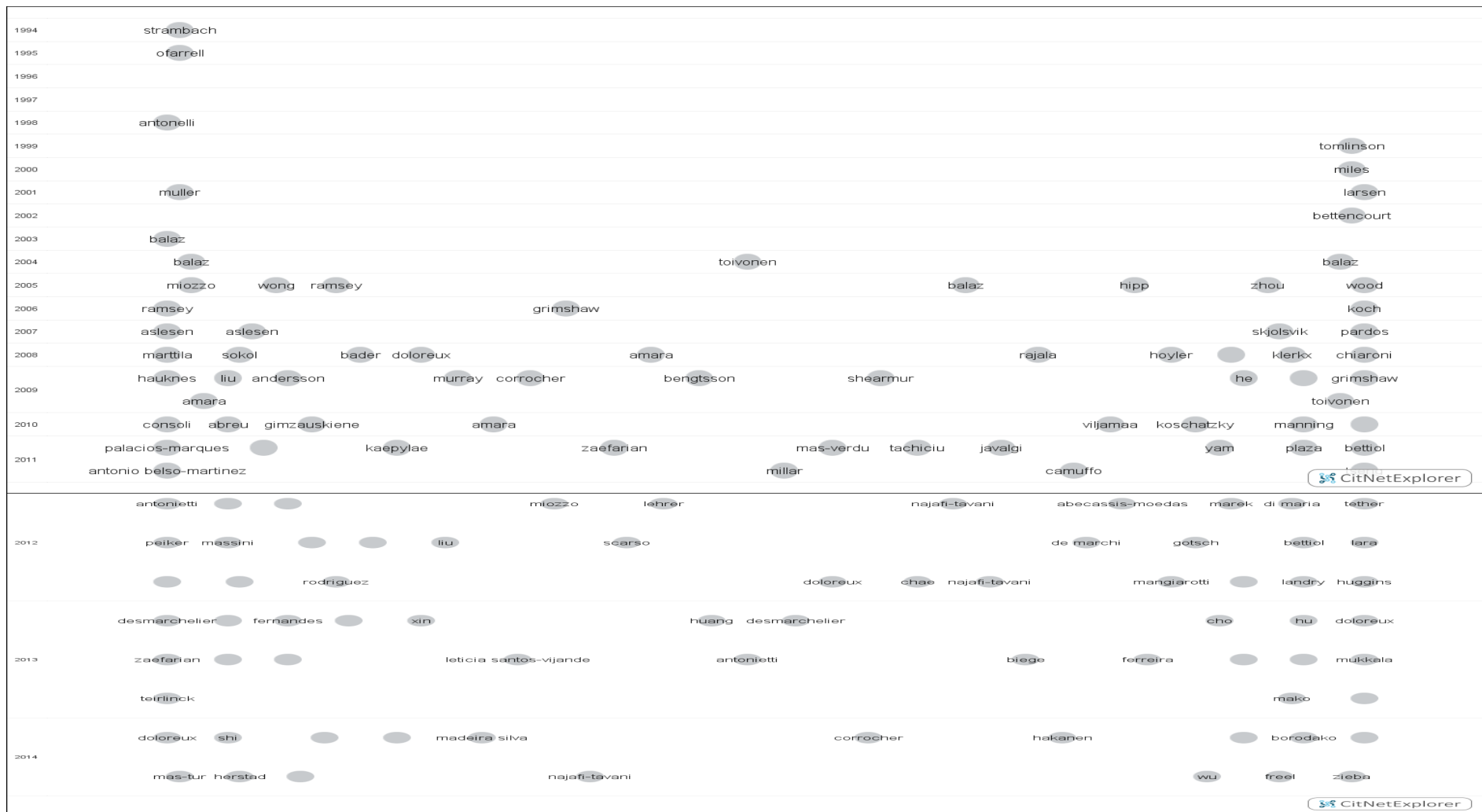


Figure 1.2 Articles published by year

Table 1.4 Most-cited articles in the field of KIBS

	<i>Total citations</i>		<i>Total citations</i>
1 (Muller and Zenker, 2001)	216	21 (Murray et al., 2009)	23
2 (Hipp and Grupp, 2005)	172	22 (Hauknes and Knell, 2009)	22
3 (Bettencourt et al., 2002) (Toivonen and Tuominen, 2009)	165	23 (Shearmur and Doloreux, 2009)	20
4 (Miozzo and Grimshaw, 2005)	63	24 (Skjolsvik et al., 2007)	19
5	62	25 (Grimshaw and Miozzo, 2006)	19
6 (Antonelli, 1998)	54	26 (Doloreux and Shearmur, 2012)	18
7 (Amara et al., 2009)	42	27 (Tseng et al., 2011) (Consoli and Elche-Hortelano, 2010)	17
8 (Amara et al., 2008)	39	28	17
9 (Yam et al., 2011) (Klerkx and Leeuwis, 2008)	34	29 (Hoyler et al., 2008)	16
10	33	30 (Tomlinson, 1999)	16
11 (Larsen, 2001)	32	31 (Ofarrell and Moffat, 1995)	16
12 (Abreu et al., 2010)	30	32 (Bader, 2008)	14
13 (Wood, 2005)	30	33 (Mas-Verdú et al., 2011)	13
14 (Aslesen and Isaksen, 2007) (Aarikka-Stenroos and Jaakkola, 2012)	29	34 (Grimshaw and Miozzo, 2009)	11
15	28	35 (Doloreux and Mattsson, 2008)	11
16 (Miles et al., 2000) (Andersson and Hellerstedt, 2009)	28	36 (Koch and Strotmann, 2006)	11
17	27	37 (Ramsey et al., 2005)	10
18 (Wong and He, 2005)	27	38 (Manning et al., 2010) (Koschatzky and Stahlecker, 2010)	9
19 (De Marchi, 2012)	26	39	9
20 (Corrocher et al., 2009)	25	40 (Bengtsson and Dabhilkar, 2009)	9

The top six studies with the highest number of citations (more than 50 citations) are:

- 1 Muller, E. & Zenker, A. (2001). Business services as actors of knowledge transformation: the role of KIBS in regional and national innovation systems. *Research Policy*, 30(9), Special Issue: SI, 1501-1516. (215 citations)
- 2 Hipp, C. & Grupp, H. (2005). Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies. *Research Policy*, 34(4), 517-535. (172 citations)
- 3 Bettencourt, LA; Ostrom, AL; Brown, SW; Roundtree, RI (2002). Client co-production in knowledge-intensive business services. *California Management Review*, 44(4), 100-128. (165 citations)
- 4 Toivonen, M. & Tuominen, T. (2009). Emergence of innovations in services. *Service Industries Journal*, 29 (7), 887-902. (63 citations)

- 5 Miozzo, M. & Grimshaw, D. (2005). Modularity and innovation in knowledge-intensive business services: IT outsourcing in Germany and the UK. *Research Policy*, 34(9), 1419-1439. (62 citations)
- 6 Antonelli, C. (1998). Localized technological change, new information technology and the knowledge-based economy: The European evidence. *Journal of Evolutionary Economics*, 8(2), 177-198. (54 citations)

The most cited paper (Muller and Zenker, 2001) provides an overview of the role and function of KIBS in innovation systems and their knowledge production, transformation and diffusion activities. This study focuses on innovation interactions between manufacturing small and medium sized enterprises (SMEs) and KIBS and concludes that innovation activities link SMEs and KIBS through the process of knowledge generation and diffusion. The investigation follows a methodology based on the examination of firm samples located in five different regions in France and Germany. (Hipp and Grupp, 2005) focused in the concept of innovation in the service sector, suggesting that the notion of innovation, well established in the manufacturing sector, cannot simply be transposed to the service sector. The authors analysed selected results of the German innovation survey and introduced a new typology aiming to obtain a better understanding of innovation in services. They draw special attention to the inclusion of knowledge-intensive business services because of their particular importance for innovation processes. (Bettencourt et al., 2002) argued that a common characteristic of knowledge-intensive business service (KIBS) firms is that clients routinely play a critical role in co-producing the service solution along with the service provider, which can have a strong effect on both the quality of the service delivered and on customers' satisfaction with the knowledge-based service solution. In the authors' perspective, by strategically managing client co-production, service providers can improve operational efficiency, develop more optimal solutions, and generate a sustainable competitive advantage. This was based on research conducted with an IT consulting firm and work done with other knowledge-intensive business service providers. (Toivonen and Tuominen, 2009) provided analytical and detailed discussion on the nature of service innovations and their emergence. The theories examined are multi-disciplinary including general service theories, general innovation theories and theories associated to new service development and innovation management. This was based on two empirical case studies in Finland in the fields of real estate and construction services and of knowledge-intensive business services. Drawing on an empirical study of IT outsourcing in the UK and Germany, (Miozzo and Grimshaw, 2005) explored the lessons for modularity that can be drawn from the outsourcing of KIBS. In their perspective, given of the inseparability of information and production technologies, IT outsourcing is habitually accompanied by wider transformations in clients' production technologies, which results in the need for knowledge and organisational coordination in the form of the transfer of staff from the client and the retained IT organisation. According to this approach, modularity is often presented as a design strategy that stimulates innovation; however, the intangibility of services exacerbates the conflicts between clients and suppliers, which may present obstacles

to innovation. (Antonelli, 1998) focuses in the co-evolution of new information and communication technologies and the knowledge-intensive business industry to show that new information technology affects the actual conditions of information, its basic characteristics of appropriation and tradability, favouring the role of business services as forces of interaction between knowledge components in the generation of new technology. Using input/output statistics of the European economy in the second half of 1980's, the author found the existence of a correlation between the use of business and communication services and confirmed their high output elasticity. The respective citation network is presented in Figure 1.3.

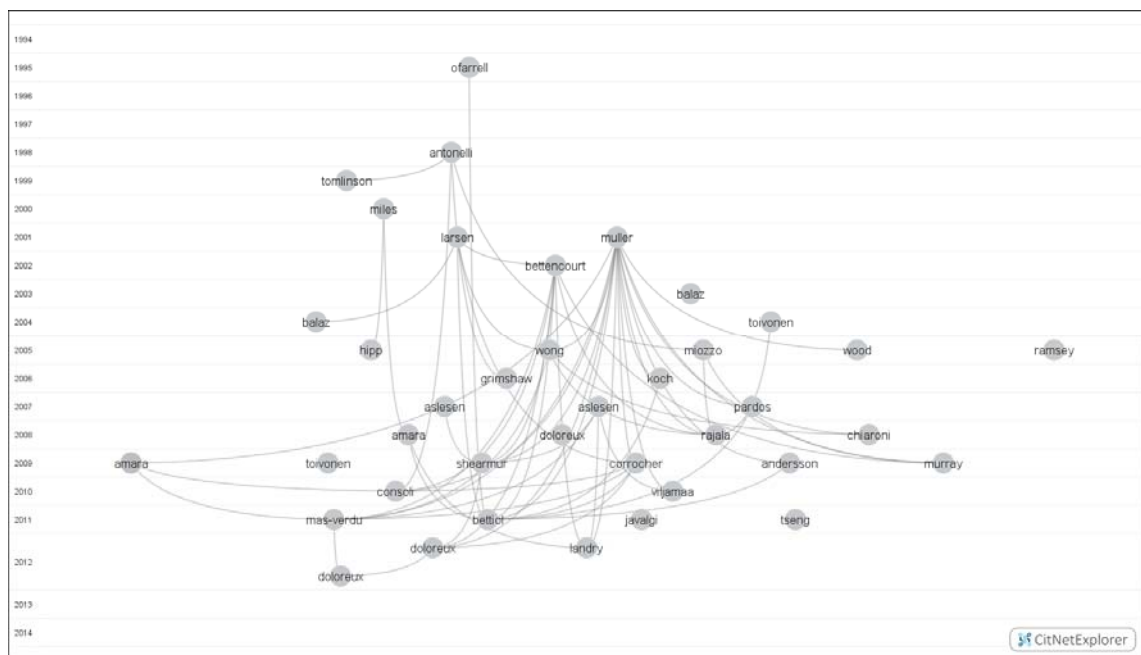


Figure 1.3 Citation network

Evolution and co-citation networks

The initial sample of 140 scientific papers was reduced to papers with at least 10 citations, resulting in a reduced sample of 37 articles quoted 1,435 times. Based on these 37 articles, we performed a co-citation analysis in order to build the respective network, and the size of the sample was reduced to 23 papers (see Figure 1.4) grouped into four clusters (see Table 1.5), which supports the main dimensions related to KIBS, namely: cluster 1 points for innovation: concepts and process, cluster 2 addresses the relation between Knowledge and KIBS, cluster 3 identify articles related to innovation networks and cooperation, and cluster 4 stands for Location and Relationship with Clients.

Concerning to the sources, the 140 papers included in the sample were published in 44 academic journals (with 1.707 citations) and as one can see in Table 1.6, 19 journals display, at least, 10 citations.

The journals with the highest citation number are *Research Policy* (592 citations), *Service Industries Journal* (329 citations), *California Management Review* (184 citations), *Journal of Evolutionary Economics* (104 citations), *Industry and Innovation* (62 citations), *Technovation* (46 citations), and *International Journal of Technology Management* (41 citations). With regards to the number of papers published, special emphasis should be given to *Service Industries Journal* (with 27 articles), followed by the *Research Policy* (with 9 articles), the *International Journal of Technology Management* (with 8 articles) and the *Industry and Innovation* (with 7 articles). Some of these papers are also those that have the greatest impact factor^v, such as *International Journal of Technology Management* (2,704), followed by *Service Industries Journal* (2,617) and *Research Policy* (2,598). The respective network is presented in Figure 1.5 and as can be seen, the co-citation analysis reveals five clusters (Table 1.7).

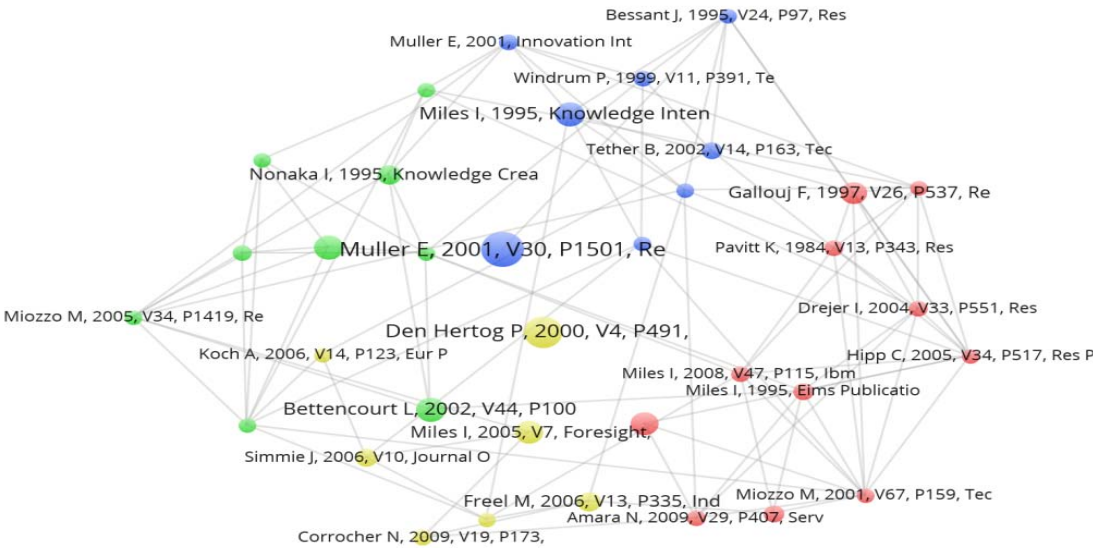


Figure 1.4 Co-citation network

Table 1.5 Resulting clusters from the co-citation analysis performed on the 23 most cited articles

Cluster 1: Innovation: concepts and process			
Article	Focus of the study	Method/ Sample	Main Insights
(Amara et al., 2009)	To develop indicators to capture forms or types of innovation in KIBS; To propose a conceptual framework inspired by the knowledge-based theory using different categories of knowledge assets as explanatory variables.	Multivariate probit regression models 1124 Small and Medium KIBS operating in the province of Québec, in Canada	Process, strategic, managerial and marketing innovations are complementary; and the different forms of innovation are explained by different explanatory variables
(Drejer, 2004)	To apply innovation concepts developed especially for services, thereby contributing to the existing divide between manufacturing and services.	----	Reference to Schumpeter, in particular innovation, as a contrast to activities based on routine systems, in service oriented studies would add a needed theoretical and conceptual strengthening to service innovation studies
(Gallouj and Weinstein, 1997)	To lay the foundations of a theory that can be used to interpret innovation processes in the service sector.	----	Various modes of innovation are highlighted and interpreted in terms of a characteristic dynamic.
(Hipp and Grupp, 2005)	To support the conceptual findings and to identify potential improvements (on innovation).	German innovation survey	Introduces a new typology with a view to obtain a better understanding of innovation in services. Special attention is directed towards the inclusion of KIBS that are of particular importance for innovation processes.
(Miles et al., 1995)	To highlight the contributions of KIBS to innovation; provide the agenda for coherent analyses of KIBS innovation processes; and, draw recommendations for a consideration of KIBS in policy-making.	Case studies of innovative KIBS	The knowledge intensity of all sectors of the economy is increasing. R&D becomes increasingly the basis of new techniques, and networks of innovators become increasingly the basis of accumulation of the knowledge that results in innovation.
(Miozzo and Soete, 2001)	To outline a taxonomy of services based on their technological linkages with manufacturing and other service sectors. The effect of recent technological changes on the transformations in business organisation, industry structure, internationalization, and the role of transnational corporations in these technology-intensive service sectors is explored.	----	The taxonomy identifies a number of technology-intensive service sectors closely related to the use of information that are essential to growth.

(Pavitt, 1984)	To describe and explain sectoral patterns of technical change.	2000 significant innovations in Britain since 1945	Innovating firms principally in electronics and chemicals are relatively big, and they develop innovations over a wide range of specific product groups within their principal sector, but relatively few outside. Firms principally in mechanical and instrument engineering are relatively small and specialised, and they exist in symbiosis with large firms, in scale intensive sectors like metal manufacture and vehicles, who make a significant contribution to their own process technology. In textile firms, on the other hand most process innovations come from suppliers.
----------------	----------------------------------------------------------------	----------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Cluster 2: Knowledge: creation and sharing, co-production and transfer

Article	Focus of the study	Method/ Sample	Main Insights
---------	--------------------	----------------	---------------

(Bettencourt et al., 2002)	To develop co-production management model	25 in-depth interviews were conducted with twelve TechCo associates and thirteen clients.	The co-production model illustrates the importance of considering clients as "partial employees" of the service provider firms and applying traditional employee management practices to developing effective client partnerships.
(Miozzo and Grimshaw, 2005)	To explore the lessons for modularity that can be drawn from the outsourcing of KIBS.	Drawing on an empirical study of IT outsourcing in the UK and Germany.	This results in the need for knowledge and organisational coordination in the form of the transfer of staff from the client and the retained IT organisation. Modularity is often presented as a design strategy that stimulates innovation.
(Nonaka and Takeuchi, 1995)	The main contribution of the book "The Knowledge-Creating Company" is an outline of knowledge creation, use and forms of knowledge.	It includes a novel theory from two authors supported by their case studies from Japanese industry and an extensive philosophical introduction into Western and Eastern epistemology.	The types of implicit knowledge should add a third dimension which may also be important for knowledge-creating, innovative organizations.

Cluster 3: Innovation networks and cooperation			
Article	Focus of the study	Method/Sample	Main Insights
(Bessant and Rush, 1995)	This paper examines the implications of technology transfer within such models, identifying the components of managerial capabilities required to absorb and assimilate new inputs of technology required for successful transfer.	----	Recent models of the innovation activity depict the process as non-linear, and characterised by multiple interactions, systems integration and complex networks. Particular attention is paid to the intermediary roles which can be played by consultants in bridging the `managerial gap', the changing nature and scope of services offered by consultants and the contributions they can make within technology policy.
(Miles et al., 1995)	This report aims to highlight the contributions of KIBS to innovation; provide the agenda for coherent analyses of KIBS innovation processes; and, draw recommendations for a consideration of KIBS in policy-making.	Case studies of innovative KIBS	There is much evidence that the knowledge intensity of all sectors of the economy is increasing. R&D becomes increasingly the basis of new techniques, and networks of innovators become increasingly the basis of accumulation of the knowledge that results in innovation.
(Muller and Zenker, 2001)	Focusing on innovation interactions between manufacturing small- and medium-sized enterprises (SMEs) and KIBS, the empirical analyses grasps KIBS position in five regional contexts.	----	The paper gives an overview of the role and function of KIBS in innovation systems and their knowledge production, transformation and diffusion activities. The analysis leads to the conclusion that innovation activities link SMEs and KIBS through the process of knowledge generation and diffusion.
(Tether and Hipp, 2002)	To examine patterns of innovation and sources of competitiveness, the purpose is to investigate how these patterns differ across services, and in particular how knowledge intensive and technical service firms differ from services more generally.	German service firms	The analysis finds a high degree of customization in the output of service firms, especially amongst the knowledge intensive and technical service firms, the innovation activities of which are also relatively more oriented to product innovation. Knowledge intensive and technical service firms also invest more heavily in information communication technologies, whilst other services invest heavily in non-ICTs. Thus significant diversity is found between the groups of firms examined, but much diversity also exists within the groups.
(Windrun and Tomlinson, 1999)	The paper draws an important distinction between the quantity of services in a domestic economy and the degree of connectivity between services and other economic activities. Particular attention is paid to the role and impact of knowledge-intensive service sectors to international competitiveness.	In addition to the UK and Germany, data is drawn from the Netherlands and Japan.	Using these four comparative cases it explores the distinction between a high representation of services in the domestic economy, and the innovation spill-overs facilitated by a high degree of connectivity between services and other economic sectors within a domestic.

Cluster 4: Location and Relationship with Clients			
Article	Focus of the study	Method/ Sample	Main Insights
(Corrocher et al., 2009)	To investigate the sectoral variety and common patterns across different typologies of KIBS	Original survey-based firm-level dataset: The case of Lombardy - a highly developed manufacturing area	When examining in more depth the variables that are associated with cluster membership, one finds that firm strategy is the most significant determinant, with size, customer location, and training also playing a role in defining cluster specificities.
(Hertog, 2000)	To make an analysis of the role played by knowledge-intensive business services (KIBS) in innovation. It presents a four-dimensional model of (services) innovation that point to the significance of such non-technological factors in innovation as new service concepts, client interfaces and service delivery system. The various roles of service firms in innovation processes are mapped out by identifying five basic service innovation patterns.	---	KIBS are seen to function as facilitator, carrier or source of innovation, and through their almost symbiotic relationship with client firms, some KIBS function as co-producers of innovation. In addition to discrete and tangible forms of knowledge exchange, process-oriented and intangible forms of knowledge flows are crucial in such relationships.
(Freel, 2006)	To draw broad comparisons between patterns of innovation expenditure and output, innovation networking, knowledge intensity and competition within KIBS and manufacturing firms. The principal interest of the paper is in identifying the factors associated with higher levels of innovativeness, within each sector, and the extent to which such “success” factors vary across sectors.	Estimation of the production functions takes the form of three ordered logit equations ‘Survey of Enterprise in Northern Britain’: 1,161 small firms (KIBS; N5563 and manufacturing firms; N5598). KIBS disaggregated as technology based KIBS (t-KIBS; N5264) and professional KIBS (p-KIBS; N5299).	The results of the analysis appear to offer support for some widely held beliefs about the relative roles of “softer” and “harder” sources of knowledge and technology within services and manufacturing.
(Koch and Stahlecker,	To analyse interrelationships between KIBS foundations and their respective innovation and production systems	Qualitative and conceptual in-depth	The analysis has shown that, and how, the regional economic and institutional structures influence the early

2006)	by performing qualitative and conceptual in-depth studies of three German metropolitan regions. The present contribution has mapped out some of the interrelationships between regional innovation systems and KIBS foundations in a qualitative and explorative way.	studies of three German metropolitan regions.	development of the KIBS sector. The main reasons for the observed different foundation patterns in the regions examined lie in the different endowment with (potential) incubator organizations providing knowledge, human capital, and opportunities for the foundation of KIBS as well as for their sustained development. Thus, especially in the early stages of the development of newly founded KIBS, geographical proximity to their suppliers and clients seems to play a crucial role. This fact can also be attributed to the prominent role of (tacit) knowledge in the examined sector.
(Miles, 2005)	To examine KIBS in the European Union, highlighting key similarities and differences in their development across Member States. KIBS are one of the fastest growing areas of the European economy, and are increasingly important contributors to the performance of the sectors who are their clients.	Statistics on KIBS in the European Union are examined. Scenario analysis is used to examine policy issues concerning KIBS. These are based on deskwork: group discussion would be a valuable complement to this approach.	KIBS are continuing to grow at rapid rates, and are experiencing qualitative change. The growth is associated with outsourcing, the internationalization of services, and the growth in demand for certain forms of knowledge. Many KIBS sectors are becoming more concentrated (though most KIBS sectors feature a higher share of small firms than does the economy as a whole).
(Simmie and Strambach, 2006)	To develop a theoretical position for understanding the role of services in innovation in post-industrial societies. The paper suggests a systematic theoretical approach to understanding the currently under-theorized role of services in general and KIBS in particular in innovation. It also points to the importance of the geography of specialized services.	This study develops an evolutionary and institutional approach to understanding the role of certain specialist services in innovation and illustrates how significant they are for the economies of large metropolitan areas in England and Germany.	The paper argues that the role of KIBS in innovation may be understood theoretically in terms of evolutionary and institutional economics. Urban economies are path dependent interactive learning systems that develop individually through time. They are increasingly characterized by networked production systems in which KIBS play a key role in the transfer of bespoke knowledge between actors both within and from outside individual cities. As a result, KIBS make a significant and place specific contribution to innovation in the cities where they are located.

Table 1.6 Top sources of citations in the field of KIBS

	<i>Total citations</i>	<i>Total articles</i>	<i>2013 Impact Factor</i>
Research Policy	592	9	2,598
Service Industries Journal	329	27	2,617
California Management Review	184	2	1,944
Journal of Evolutionary Economics	104	5	,675
Industry and Innovation	62	7	1,116
Technovation	46	2	2,704
International Journal of Technology Management	41	8	,492
Regional Studies	39	6	1,756
Industrial Marketing Management	36	4	1,897
Journal of Economic Geography	26	3	2,821
Journal of Knowledge Management	25	4	1,257
Journal of International Marketing	23	1	2,000
Service Business	20	6	,878
Organizational Studies	19	1	2,504
Knowledge Management Research & Practice	16	3	,683
Tijdschrift Voor Economische En Sociale Geografies	14	2	1,012
Journal OF Business & Industrial Marketing	13	3	,907
Human Relations	11	1	1,867
International Small Business Journal	11	1	1,397
Economia Política	7	5	,533

Table 1.7 Clusters resulting from the most cited sources (number of citations in brackets)

<i>Cluster 1 - Economics, Geography & Environmental studies</i>	<i>Cluster 2 - Engineering, operations research & Management Studies</i>
Regional Studies (112)	Research Policy (450)
Industry and Innovation (72)	Service Industries Journal (187)
Economics of Innovation and new technology (62)	Technovation (72)
Industrial and Corporate Change (62)	R&D Management (39)
European Planning Studies (56)	International Journal of Technology Management (22)
Urban Studies (51)	
Journal of Economic Geography (49)	
American Economic Review (47)	
<i>Cluster 3 - Business</i>	<i>Cluster 4 - Management</i>
Industrial Marketing Management (109)	Strategic Management Journal (259)
Journal of Marketing (92)	Academic of Management Review (112)
California Management Review (66)	Academic of Management Journal (93)
Harvard Business Review (73)	Organization Studies (40)
Journal of Business Research (70)	Management International Review (24)
Journal of Business & Ind. Marketing (27)	Journal of International Management (11)
Journal of International Marketing (17)	
<i>Cluster 5 - Strategy, Management, Operations, Information & Library Science</i>	
Management Decision (54)	
Foresight (30)	
Journal of Knowledge Management (50)	

Regarding authorship, the results show that 275 authors^{vi} are responsible for the 140 articles included in the sample. It is interesting to note that the authors with more publications are: Doloreux, D. (8 publications) and Miozzo, M. (6 publications), followed by Santos-Vijande ML; Landry, R.; Amara, N.; Grimshaw, D.; Shearmur, R. and Balaz, V. (all with 4 publications, each one). It's also important to highlight that one can find 112 different first authors in the sample, from 92 different institutions and 30 different countries.

Table 1.8 shows the 50 most frequently cited authors, as well as the number of citations per author and the number of articles published by author^{vii}. As can be seen, 38 of this authors have at least 10 citations and the most cited authors are Muller, E. (215 citations), Hipp, C. (172 citations) and Bettencourt, LA (165 citations). The authors with higher numbers of articles published are Doloreux, D. (5 articles), Bader, MA (4 articles) and Santos-Vijande, L. (4 articles).

Following the overall analysis of the 140 articles, Figure 1.6 shows the co-citations of authors considering the 38 authors who were cited at least 10 times. These 38 authors were grouped into clusters as shown in Table 1.9.

Table 1.8 Top-cited authors in the field of KIBS (first author)

<i>Authors</i>	<i>Total citations</i>	<i>Total articles</i>	<i>Authors</i>	<i>Total citations</i>	<i>Total articles</i>
Muller, E	215	1	Consoli, Davide	17	1
Hipp, C	172	1	Tseng, Chun-Yao	17	1
Bettencourt, LA	165	1	Hoyler, Michael	16	1
Amara, Nabil	84	3	Ofarrell, PN	16	1
Miozzo, Marcela	64	2	Tomlinson, M	16	1
Toivonen, Marja	63	1	Bader, Martin A.	14	1
Antonelli, C	54	1	Balaz, V	13	4
Aslesen, Heidi Wiig	37	2	Mas-Verdu, Francisco	13	1
Yam, Richard C. M	34	1	Ramsey, Elaine	13	2
Doloreux, David	33	5	Santos-Vijande, ML	12	4
Andersson, Martin	32	2	Bettiol, Marco	11	2
Klerkx, Laurens	32	1	Koch, Andreas	11	1
Larsen, JN	32	1	Najafi-Tavani, Zhale	10	3
Abreu, Maria	30	1	Bengtsson, Lars	9	1
Grimshaw, Damian	30	2	Koschatzky, Knut	9	1
Wood, P	30	1	Manning, Stephan	9	1
Aarikka-Stenroos, Le	28	1	Toivonen, M	9	1
Miles, I	28	1	Javalgi, Rajshekhar	8	1
Wong, PK	27	1	Musolesi, Antonio	8	1
Corrocher, Nicoletta	26	3	Pardos, Eva	8	1
De Marchi, Valentina	26	2	Zaefarian, Ghasem	8	2
Murray, Janet Y	23	1	Camuffo, Arnaldo	7	1
Hauknes, Johan	22	1	Kaepylae, Jonna	7	1
Shearmur, Richard	20	1	Viljamaa, Anmari	7	1
Skjolsvik, Tale	19	1	Chiaroni, Davide	6	1

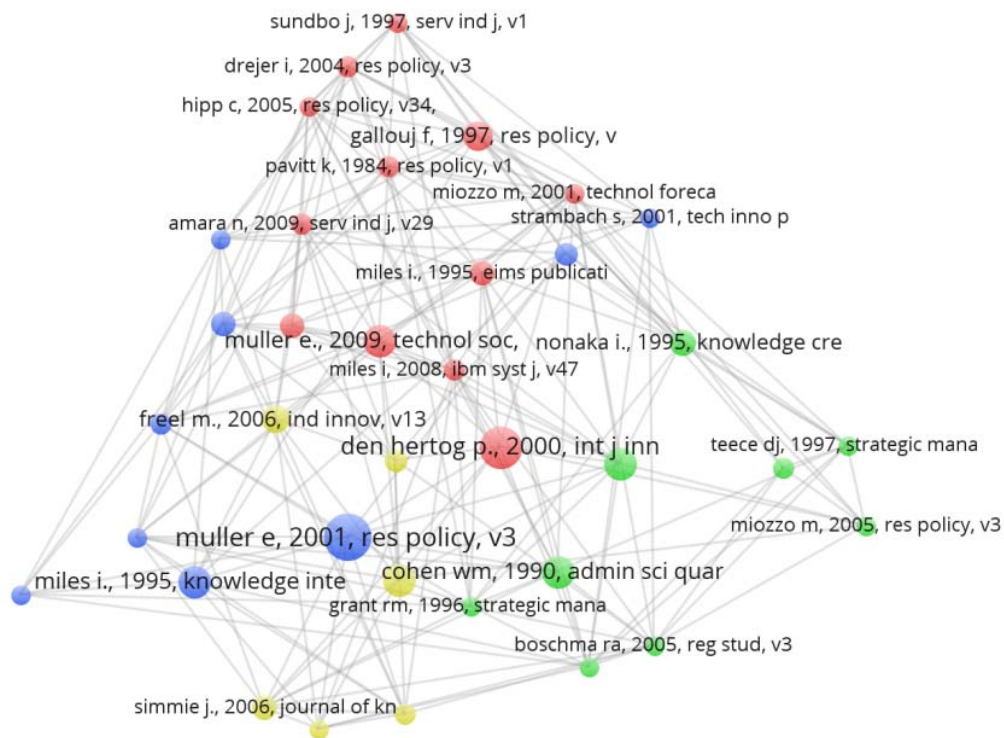


Figure 1.6 Network of co-cited authors in the 140 articles and respective clusters

Affiliation and collaboration networks

Concerning to affiliation and collaboration networks it's possible to find 156 institutions, from 34 countries that underlie the 140 articles included in the sample of this research.

Table 1.9 Clusters of most cited authors (number of citations in brackets)

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Den Hertog, P (49)	Bettencourt, LA (29)	Muller, E (74)	Miles, I (28)
Miles, I (29)	Cohen, WM (28)	Miles, I (29)	Freel, M. (20)
Muller, E (28)	Nonaka, I (19)	Tether, BS (16)	Simmie, J (17)
Amara, N (13)	Barney, J (13)	Windrum, P (12)	Corrocher (15)
Drejer, I (13)	Boschma, RA (11)	Czarnitzdi, D (11)	Koch, A (12)
Pavitt, K (13)	Miozzo, M (11)	Wong, PK (11)	Aslesen, HW (10)
Hipp, C (11)	Zahra, SA (11)	Bessant, J (10)	
Sundbo, J (11)	Grant, RM (10)	Strambach, S (10)	
Miozzo, M (10)	Teece, DJ (10)		

The institutions with more researchers publishing in this field are located in Europe (mainly England, Italy and Spain) or Canada, although authors almost from all continents (excluding Africa) were included in the sample. The institutions top five ranking includes University of Manchester (England), University of Padua (Italy), University of Ottawa (Canada), University

of Laval (Canada) and University of Oviedo (Spain). Some of these institutions present the greatest number of co-authorships (Table 1.10).

As it can be seen, most of the paired of institutions term of co-authorship are geographically near, for instance, University of Leeds and University of Manchester, with 4 co-authored publications. Notwithstanding, one should also mention the international co-authorship: University of Manchester (England), Suffolk University (USA) and Bocconi University (Italy) with 2 co-authored papers.

Word networks

Aiming to increase our understanding of the subjects discussed in the publications of KIBS field, a lexical analysis of the words that can be more frequently found in the bibliographic database was conducted, considering the title and abstracts of the 140 papers included in the sample, which allowed to generate a “cloud words” (Figure 1.7) formed by the words that occurred more frequently in those texts (Table 1.11). Title and abstracts of all papers were exported to the French site TreeCloud.org that generates a “tree of words”, where the words are grouped as clouds concerning their semantic proximity within the text. The result show three main groups of words, one of them related to studies and activities of the firms, manufacturing, services and KIBS, highlighting innovation and knowledge. A second group refers to management strategies and business performance, with particular emphasis in external activities as the relationships and clients. The last group focuses on the results and technology uses and also in the growth and development of the sector and the economy.

Table 1.10 Top institutions with co-authored publications in the field of KIBS

<i>Institution 1</i>	<i>Number of Articles</i>	<i>Institution 2</i>
University of Leeds (England)	4	University of Manchester (England)
Bocconi University (Italy)	2	Insubria University (Italy)
University of Oviedo (Spain)	2	University Autonoma of Madrid (Spain)
University of Oviedo (Spain)	2	University of Extremadura (Spain)
University of Laval (Canada)	2	University of Quebec (Canada)
University of Ottawa (Canada)	2	University of Quebec (Canada)
Seinäjäski Univ. of Applied Sciences (Finland)	2	Lappeenranta Univ. of Technology (Finland)
<i>Institution 1</i>	<i>Institution 2</i>	<i>Institution 3</i>
Suffolk University (USA) (2 articles)	Bocconi University (Italy)	University of Manchester (England)

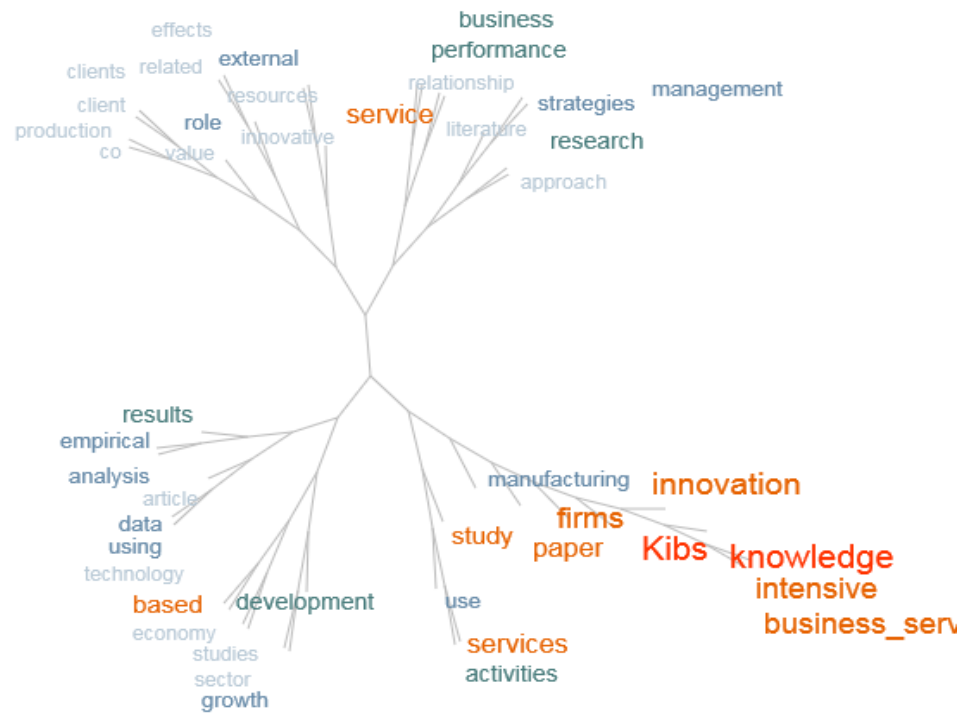


Figure 1.7 Word Network

Table 1.11 Count higher frequencies of words

Word	Word Count	Word	Word Count
Knowledge	443	External	44
KIBS	343	Empirical	44
Innovation	290	Use/using	43/39
Service/services	116/108	Growth	42
Firms	212	Data	39
Intensive	197	Innovative	38
Business_services	187	Clients	37
Paper	113	Approach	37
Based	85	Literature	36
Study	75	Relationship	35
Performance	72	Value	35
Results	70	Resources	34
Research	67	Studies	34
Business	66	Effects	34
Development,	55	Client	33
Activities	55	Technology	33
Management	50	Production	33
Manufacturing	48	Sector	32
Analysis	46	Economy	32
Strategies	46	Article	32
Role	45	Related	32

Based on the bibliometric study presented so that, there seems to be evidence that KIBS research is extremely relevant, since the number of papers and researchers is not, yet, very

high. In addition, in Portugal this field of research displays a very limited representation, with only there are just four papers published in Web of Science (the first one was published in 2012).

Conclusions and perspectives for research

Increasingly researches attached importance to the field of KIBS, which was an emerging research field. This paper used the complex network analysis of bibliometric analysis to study the KIBS field, in order to depict the intellectual structure of KIBS, highlighting the maturation of the field. The study also provides information about scientific journals, authors, affiliations and countries of the existing literature, in a coherence effort.

The paper used the Web of Science database, for the period between 1994 and 2014. We used the query terms “KIBS”, “Knowledge Intensive Business Services” and “Knowledge-Intensive Business Services” in the bibliographic field “Topic” to search related publications, and we found 140 papers, after redefine document types (using only articles), research domain (Social Sciences) and research areas (business economics).

The study considered keywords, authors, sources and other subject categories of an article as actors to establish the keyword co-occurrence network, authors’ collaboration, source network and the subject category co-occurrence network. The linkage of the keywords in the keyword co-occurrence network indicates that both appeared in one paper, and the same for the authors, which means they cooperated in one paper, at least. Similar to the linkage of sources or to other subject categories.

Despite the noticeable increase in the last decades, KIBS research is still an emerging theoretical field. The division of KIBS into four clusters brought coherence to its analysis. These clusters reflect the key dimensions that allow a better understanding about the conceptual definition of KIBS, the interaction with other firms and its role in the economy. This study aimed to find the most important keywords, researchers, scientific journals, subject categories and the development process of hot topics in the field of KIBS. After identifying how the topic is defined in the international literature and the progress achieved in the research field, in a first moment, and evaluating/measuring the research productivity, key authors and scientific journals with the highest impact on this research field, and the networks of association between the respective institutions and countries of origin, some characteristics of these networks were analysed. It allowed us to identify topics and dimensions which are related to KIBS in order to support future research.

In the subject category co-occurrence network, the hot categories were plus Business and Economics (according to our redefinition), Strategy, Operation Research and Management Studies, Geography and Environmental studies, Engineering and Information and Library

Science. As one can see, KIBS research is applied in many areas, therefore researchers could do more empirical analysis in other industries except for IT services, communication, and computer services. It may be creative to apply KIBS theory to some different areas, for instance, an emerging area in the literature is the tourism sector.

With respect to keywords, we found that the relationship between the studies became more and more close. As the academics in the service innovation field, gradually turned into a research system (Zhu and Guan, 2013). According to the authors, some hot topics were focused on for a long time, such as customer orientation and telecommunication, and others were changeable with years, market or information process over the period 2004-2005, globalization and collaboration over the period 2006-2007, then the focus were to innovation process and service innovation model over the period 2008-2009, and shifted into internet and network effects over the period 2010-2011. This study searched for analyse the research situation, and found the research focus of the field of innovation and knowledge. Few of the papers on the sample used subject category to establish networks and interaction between KIBS and the client. These findings can be useful to give directions to future research.

In our research, we found that, geographically, the highest number of publications on KIBS field, in leading international journals, is found in Europe (especially, England, Italy and Spain), and followed by Canada, USA and Asian countries (with special emphasis on China). For instance, we did not find any publication of African researchers and only one article by Latin American researchers (from Brazil). Co-authoring relationships from different institutions in one country were found but rarely international co-authorships. Only two articles in international co-authorship, we highlight University of Manchester (England), Bocconi University (Italy) and Suffolk University (USA). Manchester University (England) is the institutions with more co-authorship relationships, with other four publications with researchers from University of Leeds (England). It seems to be possible to conclude that internationalization is a still weak feature in KIBS research. In addition, as the collaboration between KIBS and other firms brings recognized benefits to the latter (Wong and He, 2005) as well as for the whole economy (Shi et al., 2014), it would also be beneficial to take this collaborative research to an international level. Furthermore, internationalization is a topic that seems to gain prominence in the literature on KIBS (Doloreux and Laperriere, 2014). In the light of these results, internationalization will be a dimension to be explored in future investigations.

This study uses only the ISI Web of Science database (so we did not consider other important databases) and involves articles published in journals exclusively allocated to the categories of business and economics. Despite its limitations, this study is one of the first attempts to systematically map the research on KIBS using bibliometric tools. Several different bibliometric methods can be used to analyse the same sample and compare the results of

different means, as well as studying literature in different periods or using different databases to find different research focuses.

The analysis of 140 scientific articles contributes to the literature on KIBS, and the structure form on the analysis provides a solid basis for how to conceptualize KIBS in future research.

Notes

- i “VOSviewer can (for example) be used to construct maps of authors or journals based on cocitation data or to construct maps of keywords based on co-occurrence data. The program offers a viewer that allows bibliometric maps to be examined in full detail. VOSviewer can display a map in various different ways, each emphasizing a different aspect of the map. It has functionality for zooming, scrolling, and searching, which facilitates the detailed examination of a map. The viewing capabilities of VOSviewer are especially useful for maps containing at least a moderately large number of items (e.g., at least 100 items). Most computer programs that are used for bibliometric mapping do not display such maps in a satisfactory way” (van Eck and Waltman, 2010, p. 524).
- ii CitNetExplorer is a software tool for visualizing and analysing citation networks of scientific publications. The tool allows citation networks to be imported directly from the Web of Science database. Citation networks can be explored interactively, for instance by drilling down into a network and by identifying clusters of closely related publications.
- iii The academic community usually recognizes ISI journals as “certified journals”, and the ones bearing a prominent role in scientific knowledge diffusion.
- iv Last updated on May 6, 2015.
- v Impact factor is a quantitative measure citation-based of the importance and significance of a scientific journal GARFIELD, E. (1979) Is citation analysis a legitimate evaluation tool? *Scientometrics*, 1, 359-375. Considering impact factor as a gross approximation of the reputation and overall scientific standing of academic journals in which articles have been published, we included 2013 impact factor of journals referred.
- vi Although there is a potential danger for mistakes arising from changes in the authors’ names.
- vii It refers to the first author of the paper.

References

- AARIKKA-STENROOS, L. & JAAKKOLA, E. (2012) Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. *Industrial Marketing Management*, 41, 15-26.
- AARIKKA-STENROOS, L. & JAAKKOLA, E. (2012) Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. *Industrial Marketing Management*, 41, 15-26.
- ABREU, M., GRINEVICH, V., KITSON, M. & SAVONA, M. (2010) Policies to enhance the 'hidden innovation' in services: evidence and lessons from the UK. *SERVICE INDUSTRIES JOURNAL*, 30, 99-118.
- AMARA, N., LANDRY, R. & DOLOREUX, D. (2009) Patterns of innovation in knowledge-intensive business services. *SERVICE INDUSTRIES JOURNAL*, 29, 407-430.
- AMARA, N., LANDRY, R. & TRAORE, N. (2008) Managing the protection of innovations in knowledge-intensive business services. *Research Policy*, 37, 1530-1547.
- ANDERSSON, M. & HELLERSTEDT, K. (2009) Location Attributes and Start-ups in Knowledge-Intensive Business Services. *Industry and Innovation*, 16, 103-121.
- ANTONELLI, C. (1998) Localized technological change, new information technology and the knowledge-based economy: The European evidence. *Journal of Evolutionary Economics*, 8, 177-198.
- ASLESEN, H. W. & ISAKSEN, A. (2007) Knowledge intensive business services and urban industrial development. *SERVICE INDUSTRIES JOURNAL*, 27, 321-338.
- BADER, M. A. (2008) Managing intellectual property in the financial services industry sector: Learning from Swiss Re. *Technovation*, 28, 196-207.
- BENGTTSSON, L. & DABHILKAR, M. (2009) Manufacturing outsourcing and its effect on plant performance-lessons for KIBS outsourcing. *Journal of Evolutionary Economics*, 19, 231-257.
- BESSANT, J. & RUSH, H. (1995) Building bridges for innovation: the role of consultants in technology transfer. *Research Policy*, 24, 97-114.
- BETTENCOURT, L. A., OSTROM, A. L., BROWN, S. W. & ROUNDTREE, R. I. (2002) Client co-production in knowledge-intensive business services. *California Management Review*, 44, 100-+.
- CONSOLI, D. & ELCHE-HORTELANO, D. (2010) Variety in the knowledge base of Knowledge Intensive Business Services. *Research Policy*, 39, 1303-1310.
- CORROCHER, N., CUSMANO, L. & MORRISON, A. (2009) Modes of innovation in knowledge-intensive business services evidence from Lombardy. *Journal of Evolutionary Economics*, 19, 173-196.
- DE MARCHI, V. (2012) Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms. *Research Policy*, 41, 614-623.
- DOLOREUX, D. & MATTSSON, H. (2008) To What Extent do Sectors "Socialize" Innovation Differently? Mapping Cooperative Linkages in Knowledge-Intensive Industries in the Ottawa Region. *Industry and Innovation*, 15, 351-370.
- DOLOREUX, D. & SHEARMUR, R. (2012) Collaboration, information and the geography of innovation in knowledge intensive business services. *JOURNAL OF ECONOMIC GEOGRAPHY*, 12, 79-105.
- DREJER, I. (2004) Identifying innovation in surveys of services: a Schumpeterian perspective. *Research Policy*, 33, 551-562.
- FREEL, M. (2006) Patterns of Technological Innovation in Knowledge Intensive Business Services. *Industry and Innovation*, 13, 335-358.
- GALLOUJ, F. Z. & WEINSTEIN, O. (1997) Innovation in services. *Research Policy*, 26, 537-556.
- GARFIELD, E. (1979) Is citation analysis a legitimate evaluation tool? *Scientometrics*, 1, 359-375.
- GRIMSHAW, D. & MIOZZO, M. (2006) Institutional effects on the IT outsourcing market: Analysing clients, suppliers and staff transfer in Germany and the UK. *Organization Studies*, 27, 1229-1259.
- GRIMSHAW, D. & MIOZZO, M. (2009) New human resource management practices in knowledge-intensive business services firms: The case of outsourcing with staff transfer. *Human Relations*, 62, 1521-1550.

- HAKANEN, T. (2014) Co-creating integrated solutions within business networks: The KAM team as knowledge integrator. *Industrial Marketing Management*, 43, 1195-1203.
- HAUKNES, J. & KNELL, M. (2009) Embodied knowledge and sectoral linkages: An input-output approach to the interaction of high- and low-tech industries. *Research Policy*, 38, 459-469.
- HERTOG, P. D. (2000) KNOWLEDGE-INTENSIVE BUSINESS SERVICES AS CO-PRODUCERS OF INNOVATION. *International Journal of Innovation Management*, 04, 491-528.
- HIPP, C. & GRUPP, H. (2005) Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies. *Research Policy*, 34, 517-535.
- HOYLER, M., FREYTAG, T. & MAGER, C. (2008) Connecting Rhine-Main: The production of multi-scalar polycentricities through knowledge-intensive business services. *Regional Studies*, 42, 1095-1111.
- KLERKX, L. & LEEUWIS, C. (2008) Balancing multiple interests: Embedding innovation intermediation in the agricultural knowledge infrastructure. *Technovation*, 28, 364-378.
- KOCH, A. & STAHLERCKER, T. (2006) Regional innovation systems and the foundation of knowledge intensive business services. A comparative study in Bremen, Munich, and Stuttgart, Germany. *European Planning Studies*, 14, 123-145.
- KOCH, A. & STROTMANN, H. (2006) Impact of functional integration and spatial proximity on the post-entry performance of knowledge intensive business service firms. *International Small Business Journal*, 24, 610-634.
- KOSCHATZKY, K. & STAHLERCKER, T. (2010) The emergence of new modes of RD services in Germany. *SERVICE INDUSTRIES JOURNAL*, 30, 685-700.
- LARSEN, J. N. (2001) Knowledge, human resources and social practice: The knowledge-intensive business service firm as a distributed knowledge system. *SERVICE INDUSTRIES JOURNAL*, 21, 81-102.
- MANNING, S., RICART, J. E., RIQUE, M. S. R. & LEWIN, A. Y. (2010) From blind spots to hotspots: How knowledge services clusters develop and attract foreign investment. *Journal of International Management*, 16, 369-382.
- MAS-VERDÚ, F., WENSLEY, A., ALBA, M. & GARCIA ALVAREZ-COQUE, J. M. (2011) How much does KIBS contribute to the generation and diffusion of innovation? *SERVICE BUSINESS*, 5, 195-212.
- MILES, I. (2005) Knowledge intensive business services: prospects and policies. *Foresight*, 7, 39-63.
- MILES, I. (2008) Patterns of innovation in service industries. *Ibm Systems Journal*, 47, 115-128.
- MILES, I., ANDERSEN, B., BODEN, M. & HOWELLS, J. (2000) Service production and intellectual property. *International Journal of Technology Management*, 20, 95-115.
- MILES, I., KATRINOS, N., FLANAGAN, K., BILDERBEEK, R., DEN HERTO, P. & HUNTINK, W. (1995) Knowledge-intensive business services - Users, carriers and sources of innovation. *EIMS Publication No 15, EIMS, Luxembourg*.
- MIOZZO, M. & GRIMSHAW, D. (2005) Modularity and innovation in knowledge-intensive business services: IT outsourcing in Germany and the UK. *Research Policy*, 34, 1419-1439.
- MIOZZO, M. & SOETE, L. (2001) Internationalization of services: a technological perspective *Technological Forecasting and Social Change* 67, 159-185.
- MULLER, E. & ZENKER, A. (2001) Business services as actors of knowledge transformation: the role of KIBS in regional and national innovation systems. *Research Policy*, 30, 1501-1516.
- MURRAY, J. Y., KOTABE, M. & WESTJOHN, S. A. (2009) Global Sourcing Strategy and Performance of Knowledge-Intensive Business Services: A Two-Stage Strategic Fit Model. *Journal of International Marketing*, 17, 90-105.
- NAJAFI-TAVANI, Z., GIROUD, A. & ANDERSSON, U. (2014) The interplay of networking activities and internal knowledge actions for subsidiary influence within MNCs. *Journal of World Business*, 49, 122-131.
- NONAKA, I. & TAKEUCHI, H. (Eds.) (1995) *The Knowledge-creating company*, New York, Oxford University Press.

- OFARRELL, P. N. & MOFFAT, L. A. R. (1995) BUSINESS SERVICES AND THEIR IMPACT UPON CLIENT PERFORMANCE - AN EXPLORATORY INTERREGIONAL ANALYSIS. *Regional Studies*, 29, 111-124.
- PAVITT, K. (1984) Sectoral patterns of technical change: Towards a taxonomy and a theory. *Research Policy*, 13, 343-373.
- PLAZA, B., GALVEZ-GALVEZ, C. & GONZALEZ-FLORES, A. (2011) Orchestrating innovation networks in e-tourism: A case study. *African Journal of Business Management*, 5, 464-480.
- RAMOS-RODRÍGUEZ, A.-R. & RUÍZ-NAVARRO, J. (2004) Changes in the intellectual structure of strategic management research: a bibliometric study of the Strategic Management Journal, 1980-2000. *Strategic Management Journal*, 25, 981-1004.
- RAMSEY, E., IBBOTSON, P., BELL, J. & MCCOLE, P. (2005) Internet-based business among knowledge intensive business services: Some Irish regional evidence. *SERVICE INDUSTRIES JOURNAL*, 25, 525-545.
- SHEARMUR, R. & DOLOREUX, D. (2009) Place, Space and Distance: Towards a Geography of Knowledge-Intensive Business Services Innovation. *Industry and Innovation*, 16, 79-102.
- SIMMIE, J. & STRAMBACH, S. (2006) The contribution of KIBS to innovation in cities: an evolutionary and institutional perspective. *Journal of Knowledge Management*, 10, 26-40.
- SKJOLSVIK, T., LOWENDAHL, B. R., KVALSHAUGEN, R. & FOSSTENLOKKEN, S. M. (2007) Choosing to learn and learning to choose: Strategies for client co-production and knowledge development. *California Management Review*, 49, 110-+.
- SMITH, L. (1981) Citation analysis. *Library Trends*, 30, 83-106.
- STAHL, M. J., LEAP, T. L. & WEI, Z. Z. (1988) Publication In Leading Management Journals as a Measure of Institutional Research Productivity. *Academy of Management Journal*, 31, 707-720.
- STRAMBACH, S. (1994) KNOWLEDGE-INTENSIVE BUSINESS SERVICES IN THE RHINE-NECKAR AREA. *Tijdschrift Voor Economische En Sociale Geografie*, 85, 354-365.
- TETHER, B. S. & HIPPEL, C. (2002) Knowledge Intensive, Technical and Other Services: Patterns of Competitiveness and Innovation Compared. *Technology Analysis & Strategic Management*, 14, 163-182.
- TOIVONEN, M. & TUOMINEN, T. (2009) Emergence of innovations in services. *SERVICE INDUSTRIES JOURNAL*, 29, 887-902.
- TOMLINSON, M. (1999) The learning economy and embodied knowledge flows in Great Britain. *Journal of Evolutionary Economics*, 9, 431-451.
- TSENG, C. Y., PAI, D. C. & HUNG, C. H. (2011) Knowledge absorptive capacity and innovation performance in KIBS. *Journal of Knowledge Management*, 15, 971-983.
- VAN ECK, N. & WALTMAN, L. (2010) Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84, 523-538.
- WALLIN, M. W. (2012) The bibliometric structure of spin-off literature. *Innovation*, 14, 162-177.
- WINDRUN, P. & TOMLINSON, M. (1999) Knowledge-intensive services and internal competitiveness: a four country comparison. *Technology Analysis and Strategic Management* 11, 391-408.
- WONG, P. K. & HE, Z. L. (2005) A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms. *SERVICE INDUSTRIES JOURNAL*, 25, 23-42.
- WOOD, P. (2005) A service-informed approach to regional innovation - or adaptation? *SERVICE INDUSTRIES JOURNAL*, 25, 429-445.
- YAM, R. C. M., LO, W., TANG, E. P. Y. & LAU, A. K. W. (2011) Analysis of sources of innovation, technological innovation capabilities, and performance: An empirical study of Hong Kong manufacturing industries. *Research Policy*, 40, 391-402.
- ZHU, W. & GUAN, J. (2013) A bibliometric study of service innovation research: based on complex network analysis. *Scientometrics*, 94, 1195-1216.
- ZITT, M. & BASSECOULARD, E. (1994) Development of a method for detection and trend analysis of research fronts built by lexical or cocitation analysis. *Scientometrics*, 30, 333-351.

CHAPTER 3

KIBS´ key dimensions: a qualitative study on innovation, knowledge, networks, location and internationalisation²

ABSTRACT

This paper aims to encourage the discussion as well as to promote a better understanding of the relationships between the key dimensions in the Portuguese knowledge intensive business services (KIBS) (namely, innovation, knowledge, networks, location, and internationalization). The motivation for this research is based on the objective to reach a deeper understanding of the relationships between KIBS and other firms, especially with their clients, analysing the effects on innovation and internationalization processes, taking into account knowledge, networks and location. The current study follows a qualitative methodology approach, applying semi-structured interviews to chief executive officers (CEOs) of the Portuguese KIBS firms and specialized academics on KIBS and innovation. The results suggest that KIBS play an important role in transferring knowledge, thus contributing, in different forms, to the processes of firms´ innovation and internationalization. The results obtained are important for firms involved in networks regarding technology as well as the creation of new products/services or new markets.

Keywords: Innovation, Knowledge, Internationalization, Location, Networks, KIBS.

1. INTRODUCTION

Over the last two decades, knowledge Intensive Business Services (KIBS) received much attention from academics, policy-makers and others involved with business strategies. Some authors´ research has focused on understanding the potential implications of KIBS on innovation as well as on the competitiveness of both firms and economies (e.g., Abecassis-Moedas, Ben Mahmoud-Jouini, Dell´Era, Manceau & Verganti, 2012; Borodako, Berbeka &

² This paper was submitted and presented at the Regional HELIX Conference 2016 - International Conference on Regional Triple Helix Dynamics.

Rudnicki, 2014, Corrocher & Cusmano, 2014). However, none of previous studies, to our knowledge, have examined the interface between innovation, knowledge, networks, location and internationalisation in the context of the Knowledge Intensive Business Services sector. Authors like Marques, Marques, Leal & Cardoso (forthcoming) have tried to better understand the relationships between, and possible effects of, knowledge, innovation, internationalization, and performance in the Portuguese footwear industry. Research on KIBS (Pina & Tether, 2016) has, hitherto, emphasised how they are distinctive from other firms, and especially product-based manufactures and operational services.

The selection of this industry was based on its prevalence in most developed economies. A strong characteristic of KIBS firms, given the nature of their business and the importance of knowledge on the society, is the impact that these firms have on the economic tissue.

The role of KIBS in innovation may be understood, theoretically, in terms of evolutionary and institutional economics (Simmie & Stramback, 2016). Urban economies are path dependent interactive learning systems that develop, individually, through time. They are increasingly characterized by networked production systems in which KIBS play a key role in the transfer of knowledge between actors. As a result, KIBS make a significant and place-specific contribution to innovation in cities where they are located.

This study aims to launch the debate and to promote a better understanding of the KIBS' dimensions to identify effective relationships between innovation, knowledge, networks, location and internationalisation. This paper follows a qualitative methodology approach, applying semi-structured interviews to six representative Portuguese KIBS' CEOs and four academic (national and international) specialists in KIBS and innovation.

This research contributes: (1) with knowledge to be shared within the academic community, to the extent that it adds on the research about the KIBS' influence on the innovation processes of the different stakeholders involved in business cooperation networks; and (2) to the management practice, allowing firms to acquire insights that may increase competitiveness and internationalisation.

This paper is organized as follows. The next section presents the theories that support the propositions regarding the possible relationships between KIBS and the five dimensions previously mentioned. In the subsequent section, some methodological features are discussed, and after the results are presented, the paper concludes with a reflection on the study's most important limitations, implications for management practice, and suggestions for future research.

2. LITERATURE REVIEW

The literature is unanimous in considering the ability to innovate as a key factor of competitiveness in the business world (Tidd, Bessant & Pavit, 2005; Marques & Monteiro-Barata, 2006). Since the beginning of the 80s, the research on innovation in services has become a topic with increasing interest to academics and politicians, in general (de Jong, Bruins, Dolfsma & Meijaard, 2003; Mention, 2011). It's increasingly recognized that business services are not merely innovations' passive recipients processed in the industry firms, by contrast, they innovate for themselves (Gallouj & Weinstein, 1997; Tether, 2003).

Within the services industry, the rapid growth of KIBS sector has shown a very important role in innovation processes (Den Hertog, 2000; Freel, 2006; Mas-Vérdu, Wensley, Alba & Álvarez-Coque, 2011). KIBS have been playing a dynamic role regarding innovation through the creation of "knowledge bridge" or "innovation bridges" between business and science (Miles et al, 1995; Czarnitzki & Spielkamp, 2003). Some studies focus on the role that KIBS play on innovation systems (Corrocher & Cusmano, 2014; Shi, Wu & Zhao, 2014), while the cooperation of KIBS with firms in other sectors increases the firm performance and the regions' wealth (Miles, 2000; Leiponen, 2005; Ferreira, Marques & Fernandes, 2012). Thus, KIBS play a role of facilitators of the innovation process in the economy, including other sectors than services. Besides that, some recent papers have shown the relevance of these firms into processes of entering new foreign markets (Doloreux & Lapierre, 2014, Di Maria, Bettiol, De Marchi & Grandinetti, 2012). At the same time, innovation has played an important role in internationalization and it is, often, the channel for firms to increase productivity (Altomonte, Aquilante, Békés & Ottaviano, 2013) and performance (Araújo, 2008). Some authors focus, also, on the role of spatial proximity (location) for sustaining the interaction between KIBS and clients (Aslesen & Isaksen, 2007; Doloreux & Shearmur, 2012).

The importance of KIBS in the modern economies, the relatively incipient research in the academia and, the fact that KIBS play a fundamental role in innovation and competitiveness of economies, justify the need to explore the extent to which KIBS contribute for the acceleration of knowledge both internally and within business networks.

Based on the reviewed literature, the following propositions were defined in Table 1.

Table 1. Propositions and theoretical foundation

Propositions	Theoretical foundation
P1: Location has a direct impact on networks	Koschatzky, 1999; Keeble & Nachum, 2002
P2: Networks enhances knowledge	Kogut, 2000; Liu & Uzunidis, 2016
P3: Location has a direct impact on knowledge	Keeble & Nachum, 2002
P4: Networks enhances innovation	Koschatzky, 1999; Muller & Zenker, 2001
P5: Location has an indirect impact on innovation through networks	Koschatzky, 1999; Koch & Stahlecker, 2006
P6: Knowledge has a direct impact on innovation	Bettencourt et al, 2002; Wood, 2002
P7: Location as an indirect impact on innovation through knowledge	Muller & Zenker, 2001; Muller & Doloreux, 2009
P8: Networks enhances internationalization	Doloreux & Lapierrre, 2014
P9: Location has an indirect impact on internationalization through networks	Wood, 2002, 2005
P10: Knowledge has a direct impact on internationalization	Brennan & Garvey, 2009; Shearmur, Doloreux & Laperrière, 2015; Marques et al (2015)
P11: Location has as an indirect impact on internationalization through knowledge	Wood, 2002
P12: Innovation enhances internationalization	Shearmur et al., 2015; Marques et al (2015)

3. METHODOLOGY

3.1. Sample and data collection

The present study was based on a model that assumes positive relationships between the dimensions of innovation, knowledge, internationalization, networks, and location. Information was collected using semi-structured personalized interviews with six CEOs of firms in the Portuguese KIBS sector and four academic experts in KIBS and innovation. The academic specialists were selected based on their research experience and h-index of the publications (i.e. indexed in Thomson Reuter's Web of Knowledge and Elsevier's Scopus, in the area of innovation, networks and internationalisation, especially in the KIBS sector). We opted for two international specialists and two national experts, to compare the data and to observe the possibility for different results.

The interviews took place in November/December 2015 and the KIBS firms selected for this qualitative study met some criteria: these firms are involved in processes of co-creation of innovation and internationalisation; and their CEO have showed availability to participate in the study when contacted. Some authors (Borodako et al, 2014, Hakanen, 2014) refer to the concept presented by Miles, et al (1995), who have distinguished KIBS as traditional professional KIBS (p-KIBS) and new technology-based services (t-KIBS). We were careful to choose three p-KIBS and three t-KIBS, with different locations: three in urban area (Lisboa, Porto and Braga) and three in rural area (Felgueiras and Ribeira de Pena), however, even the firms located in rural area, have also an office in the biggest cities to ensure client proximity.

The interview guide was developed taking into account the review of the literature performed. Based on the literature review and in a previous study using bibliometric analysis (Braga & Marques, 2016), that allowed identifying the key dimensions to explore, the interviews guide aims to meet the following goals: 1) to determine the importance that innovation and knowledge have in each of the selected KIBS; 2) to analyze the influence of KIBS on the innovation process of their clients; 3) to assess the importance of being a part of innovation networks; 4) to evaluate the impact of geographic proximity to the clients; and 5) to explore the influence of knowledge, networks and location on the KIBS internationalization process.

3.2. Content Analysis

Qualitative content analysis is one of many qualitative methods used to analyze textual data. Content analysis is described as a family of systematic, rule-guided techniques used to analyze the informational contents of textual data (Mayring, 2000). It can be referred to as “a generic form of data analysis in that it is comprised of a theoretical set of techniques that can be used in any qualitative inquiry in which the informational content of the data is relevant. Qualitative content analysis contrasts with methods that, rather than focusing on the informational content of the data, focus on theoretical perspectives (Forman & Damschroder, 2008). As a research method, it represents a systematic and objective form of describing and quantifying phenomena (Schreier, 2012). Additionally, qualitative content analysis focuses on reducing the content into manageable segments through the application of inductive and/or deductive codes, and reorganizing data to allow drawing and verifying conclusions (Miles & Huberman, 1994).



Both inductive and deductive content analysis processes involve three main phases: preparation, organization, and reporting results. In this research, deductive approach was used to analyse the respondents’ answers. After a transcription of the context of interviews and an initial analysis, some inferences were made according to the presence or absence of key components and/or characteristics of the text. The key excerpts from the content of the interviews were transcribed; the results of this process are summarised and presented in Tables 1 and 2. The ‘category’ column contains the five major themes of the interviews: 1) knowledge; 2) location; 3) networks; 4) innovation and 5) internationalization. The ‘aspect to be registered’ column shows parts of the text related to the specific characteristics about respective category and/or sub-category. In the ‘context’ column text fragments matching to the aspect to be registered were included. WordClouds software replicated word clouds in the content analysis. This graphic information, added some questions in the last column, is preceded by the standardization and uniformization of terms contained in the speech of the respondents.





For some authors, qualitative content analysis always requires counting words or categories to detect patterns in the data, then analyzing those patterns to understand what they mean (Morgan, 1993; Sandelowski, 2000).

4. RESULTS

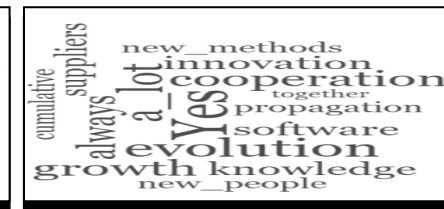
Within the six CEO's interviews, innovation shows as essential in the relationship with clients and in new markets. It seems to be unanimous that innovation allows adding value and the possibility to enter new markets. Innovation activities are seen as a joint operation between client and firm and knowledge is shared regular and timely. Moreover, cooperation between the firms is seen as fruitful and symbiotic, increasing the firm performance. The reference to internationalization in most dimensions emerges as a result of innovation process (see Table 2).

Table 2. Summary of interviews with CEOs

Category	Sub-category	Aspect to be registered	Aspect Context
Innovation	Technological	What is the role played by technological innovation and non-technological innovation in the firm?	<p>Innovation is seen as essential to access to new clients and markets. With regards to the distinction between technological and non-technological innovation, one of the respondents attributes the same importance to business, arguing that technology and innovations, in process, marketing, or even in communication are critical because it's the way to add value and to differentiate against competitors, therefore, can to retain clients.</p> 
	Non-technological	Do your firm participate in innovation activities of the clients? In what way?	<p>With respect to technological innovation, it is also seen as imperative for success. "In a technology based company, innovation is naturally present"; "we always introduce small innovations at the process level". With regards to non-technological innovation, the challenge is to adapt the practice of the size of the business, keeping it agile and simultaneously organized. In some cases this type of innovation is considered the most important: Non-technological innovation, "since the firm is essentially people". It's also important to mention that this type of innovation is developed primarily by the company, using in some cases the partners and providers.</p> <p>Almost all respondents answered affirmatively to the participation of their firms in innovation activities by their clients. Innovation activities are seen as a joint goal of client and firm. The projects are the result of an identified need (client) that is based on a prospective improvement in processes or working models and depend on the condition, predisposition and clients' expectations in the marketplace. There are answers indicating that such participation is the firm's main strategy to create innovation and identifying opportunities.</p> 

Knowledge	Social and Institutional Knowledge (accountancy; management; consultancy)	Do you have a knowledge management strategy?	<p>Most respondents agree that there is a knowledge management strategy in their firms, paying particular attention to systematic upgrading of knowledge (through seminars and proactive and persistent search for new solutions to offer clients). Other respondent answered negatively to this question and it has not been outlined any strategy for dealing with knowledge, and knowledge is 'managed' spontaneously and informally.</p> <div style="display: flex; justify-content: space-around;">   </div>
	Technical Knowledge (computer R&D; engineering services)	Do you share knowledge with clients? And another firms? In what way?	<p>According to the answers of CEOs, knowledge is shared with clients' regular and timely manner. ("There are employees assigned to look for what was published in the "Diário da República", advances that came out in Portugal 2020, that is all useful information that will circulate").</p> <div style="display: flex; justify-content: space-around;">   </div> <p>This knowledge is shared with clients as part of presentations and notifications of new concepts involving the simplification of processes and new working methods, which clients can benefit. Firms also share knowledge with other entities/firms when engaged in joint projects. But some CEOs responded there are few entities with whom they share knowledge, and it has happened only in special cases, as the case of suppliers, which often end up becoming clients too. In this process of knowledge sharing all involved stand to gain in terms of learning. ("Learn always. This is an invaluable source of information. With this involvement, there is always some transfer of knowledge and technology...").</p>

Networks	Cooperation	What kind of innovation networks the firm has established?	<p>Innovation networks are essentially established under the form of partnerships with research institutions and suppliers' entities and, in some cases, wish to strengthen these links more broadly through a networking at national level.</p> <p>This networking philosophy and cooperation for innovation gets to be valued in such a way that sometimes competitors also assume the role of partners. However, in other interviews, it was declined that firms have been established innovation networks.</p>
	Universities	Do your firm cooperate with higher education institutions?	<p>Respondents' state that their firms cooperate mainly with regional/national firms of the same group and with universities, although, there is an awareness of the growing need for international cooperation networks ("It must have networks, both national, as well as international").</p>
Location	Urban	The proximity of other firms, in particular client, is that important? Why?	<p>Such cooperation with international organizations may allow finding more comprehensive market solutions and also contributes to policies (strategic options that agencies and international institutions have to take). Cooperation with universities is viewed with particular importance to one of the interviewees, giving emphasis to the importance of sharing knowledge and building partnerships adapted to client demand.</p> <p>CEO's also expressed that established cooperation with clients and other firms in particular, with a view to building products and integrated solutions to meet the expectations of clients and the strategic options of firm. Cooperation between the firms is seen as fruitful and symbiotic, increasing the performance of both parties.</p>
	Rural		













			<p>Physical proximity to clients is also considered as very important to the extent that it allows testing and validating solutions <i>in loco</i>. They also mentioned that the urban location is not only important to ensure proximity to clients and other firms, but also because it facilitates access to international networks and events relevant to the business.</p>	
<p>Internationalisation</p>	<p>European Union</p>	<p>What is the reason to start the firm's internationalisation process?</p>		<p>The diversification of the clients base, networking and accumulation of new knowledge were the main reasons given for CEO's to begin the process of internationalization, although, in some cases, it is an indirect presence in international markets, through the implementation of the products introduced by partners in international markets, or through joint projects with firms who have international presence.</p>
	<p>Rest of the world</p>	<p>Do your firm supports/ facilitates the internationalisation process of other firms? How?</p>	<p>Internationalization is also seen as a need to minimize the risks of relying only on the domestic market, although it is not considered an easy process to carry out ("Internationalization has difficulties, has specificities ...").</p> <p>CEO's state support to other entities and clients in the internationalization process ("Yes, by integrating the supply of specialized partners in areas where we are not present"). That support is done mainly by applications to European support and by providing knowledge and contacts to promote internationalization. It is also to provide firms with a set of tools that can help managing the risks of internationalization. There is concern in promoting the success of clients and partners and obtain the benefit of that.</p>	

Table 3 displays the summary of the comments of academic specialists on each of the categories.

Table 3. Summary of the interviews with academic specialists

Category	Sub-category	Aspect to be registered	Aspect Context
Innovation	Technological	Importance of the role of technological dimension in innovation	 <p>The technological knowledge is seen as a key component of innovation and entrepreneurial activities, but it also depends on the type of innovation that is sought ("there seems to be no special role because it depends on the type of innovation - if its technological innovation it must be closely connected with the technology"). One of the experts interviewed also attached great importance to the non-technological dimension of innovation: "There are some other non-technological dimensions for innovation. Professional services could innovate and not necessary in technology way".</p>
	Non-technological	Importance of the role of non-technological dimension in innovation	
Knowledge	Social and Institutional Knowledge (e.g. accountancy; management consultancy)	The role of social and institutional knowledge dimension in innovation; And the relationship between social and institutional knowledge and innovation.	<p>Some experts argue that the social and institutional knowledge needs to be integrated with situational awareness and knowledge management. Moreover, one of the experts argue that this knowledge can, sometimes, be enhanced to some areas ("... seems to me quite restrictive especially regarding management consultancy which is concerned with a broad range of knowledge which is not only social and institutional"). Only one of the experts addressed the topic of innovation in concrete: «This aspect is strictly connected with the innovation transfer that is allowed by the different types of the KIBS firms. The relations are usually based on the experience collected by the partners and fulfil it nature in the area of social and institutional knowledge». The remaining settled in just highlight their role in institutional change, specifically in creating dynamics (learning), access, distribution and use of knowledge.</p> 

Category	Sub-category	Aspect to be registered	Aspect Context
	Technical Knowledge (e.g. computer R&D; engineering services)	The role of technical knowledge dimension in innovation; The relationship between technical knowledge and innovation.	<p>When asked about the role of technological knowledge dimension on innovation and on the relationship between technological knowledge and innovation, experts emphasised how the technological knowledge can help building more efficient institutions for sustainable development and innovation. This kind of knowledge was particularly important for firms in more technical areas related to R&D and research centers. This dimension of knowledge is also seen as highly specific and difficult to acquire in a short time, since it is based on a consolidated combination of theory and practice.</p>  <p>A word cloud containing terms such as: research_centers, business_partners, knowledge_system, effective_institutions, sustainable_development, hard_to_acquire, efficiency, development, knowledge, R&D, innovation, and effectiveness.</p>
Networks	Universities	Importance of the role of the universities in networks	<p>Specialists praised the importance of transferring knowledge and technology between universities and firms, to the extent that the research work and market knowledge are the starting point for performing a work in a profitable network. One interviewee evokes the literature to justify his point of view: "The literature identifies various ways of processing the knowledge transfer: the proximity and geographic concentration of companies, research centres and related industries - spillovers theory».</p>  <p>A word cloud containing terms such as: geographical_concentration, technologies, market, research, transference, researchers, industry, university_industry, geographical, techniques, and geographical_proximity.</p>
	Cooperation	Importance of the firms cooperation in networks	<p>This dimension is considered essential to enhance and facilitate communication in the context of entrepreneurship, in that it creates opportunities for knowledge transfer and knowledge.</p> <p>There are also found indications that point to the heterogeneity of firms at the cultural level and of entrepreneurship, which translates into different levels of cooperation and involvement in network.</p>  <p>A word cloud containing terms such as: cooperation, differences, communication, fundamental, entrepreneurship, opportunities, differences_entrepreneurship, cultural_differences, involvement, research, level, and facilitator.</p>

Category	Sub-category	Aspect to be registered	Aspect Context	
Location	Urban	Importance of the role of urban dimension in location	<p>The great advantage of urban location is based on the quality of national and international links with other relevant institutions. This takes into account the geographical distribution and concentration for the performance and innovation. However, some specialists focused on enhancing the urban characteristic of some firms given their frequent location in urban and metropolitan areas.</p> <p>("KIBS are usually located in clusters and mostly on urban area. Urban dimension is a key aspect of understanding activity of KIBS firms and allow to connect these firms ").</p>	 <p>A word cloud centered around 'location'. Other prominent words include 'geographical', 'distribution', 'concentration', 'metropolitan_areas', 'international_connects', 'connection', 'areas', 'rural', 'clusters', 'particulars', 'nature', 'urban_areas', and 'urban_characteristics'.</p>
	Rural	Importance of the role of rural dimension in location	<p>In what concerns of the role of the rural dimension in location, only two respondents had expressed their opinions: "Diverse political entities need to take on a greater awareness and understanding of how entrepreneurial activities emerge out of specific rural contexts. Entrepreneurial support policies and attempts to accurately target such resources need to take into consideration, and rural areas need support policies in order to promote KIBS located in these areas"; "In contrast to urban factor we can say that rural location can be important only in case of key attribute of such services. This location can play smaller importance in case of location-independent services - mostly IT. Of course many (if not all) services can be offered today and delivered online, but rural location can be specific place for work (to locate the KIBS firm)."</p>	
International i-sation	European Union	Importance of European markets to the firms	<p>International markets are viewed with great importance by the experts, particularly in identifying opportunities. There are markets in Europe and in the rest of the world at different stages of evolution, with different levels of sophistication, and these circumstances may be capitalized in business opportunities and entrepreneurship. One of the experts interviewed identifies different internationalization profiles, and some companies operate more globally, and others follow their customers in the internationalization process.</p>	 <p>A word cloud centered around 'internationalization'. Other prominent words include 'business', 'opportunities', 'Rest_of_the_world', 'markets', 'entrepreneurship', 'sophistication', 'evolution', and 'Europe'.</p>
	Rest of the world	Importance of rest of the world markets to the firms		

The analysis of the interviews (CEO and academic specialists), highlight the following points: (1) The defined categories, and the relations between them, were confirmed as very important in the literature and practice management firms in the KIBS sector; (2) The sub-categories defined were considered important, except rural locations. The location of the firm is considered a critical factor for CEO's, although, CEO's and academic experts referred the importance of the proximity to urban centers. According to academic specialists, location in rural areas has a smaller importance in case of location-independent services - mostly IT. One may also highlight that (i) Both technological and non-technological innovations are essential to get into new markets, although, while academic researchers see technological knowledge as a key component of innovation, Portuguese KIBS recognize larger importance to non-technological innovation based on the argument that "the firm is essentially people" and could innovate not necessary in technology way; (ii) Social and institutional knowledge, and technical knowledge, are important dimensions of innovation, however academic researchers consider very restrictive and, in their perspective, it needs to be integrated with situational awareness and knowledge management; (iii) cooperation with firms and universities are considered strictly important to create opportunities for both knowledge and technology transfer and innovation. Cooperation between firms is seen as fruitful and symbiotic, increasing the performance of both parties. Nonetheless, CEO's refer to the awareness of the engaging in international cooperation networks; (iv) urban location is not only important to ensure proximity to clients and other firms, but also to facilitate access to international networks; (v) Internationalization emerges as a permanent component in the innovation strategies for KIBS if the clients are willing to establish themselves in the global market and it happens, mainly due to the diversification of client portfolio, networking and accumulation of new knowledge.

5. CONCEPTUAL RESEARCH MODEL PROPOSED

Based on the literature review and the findings of the qualitative analysis, we propose the research conceptual model below (see Figure 1), to be tested in a subsequent study, based on quantitative data to be collected from Portuguese KIBS firms.

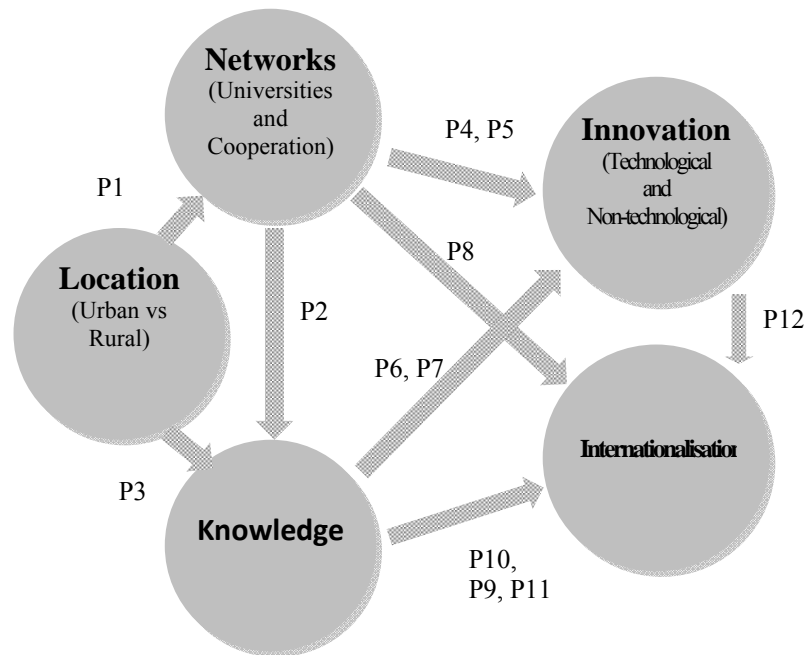


Figure 1. Research conceptual model proposed

Based on the interviewees (CEOs and academic researchers), the qualitative methodological approach allows obtaining results, which will be analyzed in future research that will adopted a quantitative methodology approach. Considering that the results of this research are dependent on a specific context and participants, any generalization or extrapolation to other organizational contexts is not possible. Obviously, this is a methodological limitation that can be overcome broadening of the quantitative database in order to test the proposed conceptual model as well as research hypotheses.

6.FINAL CONSIDERATION AND SUGGESTIONS FOR FUTURE RESEARCH

The main purpose of this research is to encourage discussion and to promote a better understanding of the KIBS' dimensions to identify effective relationships between innovation, knowledge, networks, location and internationalisation of Portuguese firms in this sector.

The results of this qualitative research support our objective, encouraging the discussion about the importance of KIBS and their role on innovation and internationalization, taking into account the CEOs' perspectives of (practice) and academics (theoretical). The results obtained allow supporting the relationships between the selected key dimension (innovation, knowledge, network, location and internationalisation) –proposed on the literature review.

Therefore, the results of this study indicate that high levels of cooperation with another firms and universities, urban location and social, institutional and technical knowledge of KIBS, favor both firms' innovation and entry into new foreign markets - internationalisation. These results are according with others like Fernandes and Ferreira (2013); Pinto, Fernandez-Esquinas and Uyarra (2013) and Abecassis-Moedas (2012). Furthermore, our research suggests that high levels of innovation promote internationalisation such the study of Rodriguez and Nieto (2012).

These findings inspired a theoretical research model, by identifying the key dimensions, sub-dimensions and possible relationships between them, to be tested subsequently, through a quantitative methodological approach. Therefore, the future research will validate the measurement instrument, to be collected from Portuguese KIBS (P-KIBS and T-KIBS). This will be done using a structural equation model (SEM) and multigroups model will be used to test the P-KIBS and T-KIBS, as well as urban location versus rural location.

A limitation of this study is related to the strong dependence on the context of analysis and of the data collection. Therefore, the results need be understood in light of the data, as well as the subjective and qualitative aspects, regarding the structure adopted for the conducted interviews.

In terms of future research, it may be suggested: 1) qualitative studies, expanding the database in order to test the sub-categories and variables presented in this study and the conceptual model of research proposed; 2) studies across the same sector, in different countries to generalise the results, and to identify the main differences or similarities; 3) studies with different stakeholders, namely clients, suppliers or universities to test the results' robustness; 4) quantitative studies using e.g. structural equation modelling; 5) combination and comparison of different methodological approaches and/or contexts.

ACKNOWLEDGEMENTS

This research is supported by the FEDER component of the European Structural and Investment Funds, through the Operational Competitiveness and Internationalisation Programme's (COMPETE 2020) Project No. 006971 (UID/SOC/04011) and the Portuguese Foundation for Science and Technology's (Fundação para a Ciência e a Tecnologia) UID/SOC/04011/2013 Project.

REFERENCES

- Abecassis-Moedas, C., Ben Mahmoud-Jouini, S., Dell’Era, C., Manceau, D. & Verganti, R. (2012). Key Resources and Internationalization Modes of Creative Knowledge-Intensive Business Services: The Case of Design Consultancies. *Creativity and Innovation Management*, 21, 315-331.
- Altomonte, C., Aquilante, T., Békés, G. & Ottaviano, G.I.P. (2013). Internationalization and innovation of firms: evidence and policy. *Economic Policy*, 28(76), 663-700.
- Aslesen, H.W. & Isaksen, A. (2007). Knowledge intensive business services and urban industrial development. *Service Industries Journal*, 27, 321-338.
- Araújo, J.F. (2008). The impact of internationalization on firm's performance - a qualitative study of Portuguese SMEs. Dissertação de Mestrado, Lisboa: Instituto Superior de Ciências do Trabalho e da Empresa.
- Bettencourt L.A., Ostrom A.L., Brown S.W. & Roundtree R.I. (2002). Client co-production in knowledge-intensive business services. *California Management Review*, 44, 100-28.
- Borodako, K., Berbeka, J. & Rudnicki, M. (2014). The potential of local KIBS companies as a determinant of tourism development in Krakow. *Tourism Economics*, 20, 1337-1348.
- Braga, A.M. & Marques, C.S. (2016). Knowledge Intensive Business Services Research: a bibliometric study of leading international journal (1994-2014). In J. Ferreira, M. Raposo, C. Fernandes & M. Dejardin (Eds.), *Knowledge Intensive Business Services and Regional Competitiveness* (pp. 11-47). New York, Routledge.
- Brennan, L. & Garvey, D. (2009). The role of knowledge in internationalization. *Research in International Business and Finance*, 23(2), 120-133.
- Czamitzki, D. & Spielkamp, A. (2003). Business Services in Germany: Bridges for Innovation. *Service Industries Journal*, 23(2), 1-30.
- Corrocher, N. & Cusmano, L. (2014). The 'KIBS Engine' of Regional Innovation Systems: Empirical Evidence from European Regions. *Regional Studies*, 48(7), 1212-1226.
- De Jong, J., Bruins, A., Dolfsma, W. & Meijaard, J. (2003). Innovation in service firms explored: what, how and why? *EIM, Business and Policy Research*.
- Den Hertog, P. (2000). Knowledge-intensive Business Services as co-producers of Innovation. *International Journal of Innovation Management*, 4(4), 491-528.
- Di Maria, E., Bettiol, M., De Marchi, V. & Grandinetti, R. (2012). Developing and Managing Distant Markets: The Case of KIBS. *Economia Politica*, 29, 361-379.
- Doloreux, D. & Laperriere, A. (2014). Internationalisation and innovation in the knowledge-intensive business services. *Service Business*, 8, 635-657.
- Doloreux, D. & Shearmur, R. (2012). Collaboration, information and the geography of innovation in knowledge intensive business services. *Journal of Economic Geography*, 12, 79-105.
- Fernandes, C. e Ferreira, J. (2013). Knowledge spillovers: cooperation between universities and KIBS. *R&D Management*, 43 (5), 461-472.
- Ferreira, J., Marques, C.S. & Fernandes, C. (2012). Contribution of location theories for Regional Development: an empirical study applied to technology-based firms. *International Journal of Innovation and Regional Development*, 4(5), 414 - 429.
- Freel, M. (2006). Patterns of Technological Innovation in Knowledge-Intensive Business Services. *Industry and Innovation*, 13(3), 335-358.
- Forman, J. & Damschroder, L. (2008). Qualitative Content Analysis. *Empirical Methods for Bioethics: A Primer Advances in Bioethics*, 11, 39-62: Elsevier Ltd.
- Gallouj, F. & Weinstein, O. (1997). Innovation in services. *Research Policy*, 26, 537-556.
- Hakanen, T. (2014). Co-creating integrated solutions within business networks: The KAM team as knowledge integrator. *Industrial Marketing Management*, 43, 1195-1203.
- Keeble D, Nachum L. (2002). Why do business service firms cluster? Small consultancies, clustering and decentralization in London and southern England. *Transactions of the Institute of British Geographers*, 27(1), 67-90.
- Koch, A. & Stahlecker, T. (2006). Regional innovation system and the foundation of knowledge intensive business services. A comparative study in Bremen, Munich, and Stuttgart, Germany. *European planning studies*, 14, 123-45.
- Kogut, B. (2000). The network as knowledge: generative rules and the emergence of structure. *Strategic Management Journal*, 21, 405-425.
- Koschatzky K. (1999). Innovation networks of industry and business-related services - relations between innovation intensity of firms and regional inter-firm cooperation. *European Planning Studies*, 7(6), 737-58.
- Leiponen, A. (2005). Organization of Knowledge and Innovation: The Case of Finnish Business Services. *Industry and Innovation*, 12(2), 185-203.

- Liu, Z. & Uzunidis, D. (2016). Globalization of R&D. Accumulation of Knowledge and Network Innovation: the Evolution of the Firm's Boundaries. *Journal of the Knowledge Economy*, 1-17.
- Marques, C.S.; Marques, C.P.; Leal, C.T. & Cardoso, A.R. (forthcoming). Knowledge, innovation, internationalisation and performance: insights from the Portuguese footwear industry. *Int. J. of Entrepreneurship and Small Business*.
- Marques, C. S., Leal, C., Marques, C. P. and Cardoso, A. R. (2015) 'Strategic knowledge management, innovation and performance: A qualitative study of the footwear industry', *Journal of the Knowledge Economy*, 1-17. Doi: 10.1007/s13132-015-0249-4.
- Marques, C.S. & Monteiro-Barata, J. (2006). Determinants of the Innovation Process: An Empirical Test for the Portuguese Manufacturing Industry. *Management Research*, 4(2), 111-124.
- Mas-Vérdu F., Wensley, A., Alba, M. & Álvarez-Coque J. (2011). How much does KIBS contribute to the generation and diffusion of innovation? *Service Business*, 5(3), 195-212.
- Mayring, P. (2000), Qualitative content analysis. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 1(2), Art. 20. Available at <http://nbn-resolving.de/urn:nbn:de:0114-fqs0002204>.
- Mention, A.L. (2011). Co-operation and co-opetition as open innovation practices in the service sector: Which influence on innovation novelty? *Technovation*, 31(1), 44-53.
- Miles, I. (2000). Services innovation: coming of age in the knowledge based economy. *International Journal of Innovation Management*, 4(4), 371-389.
- Miles, I., Kastrinon, N., Flanagan, K., Bilderbeek, R., den Hertog, P., Huntink, W. & Bouman, M. (1995). Knowledge intensive Business services. Users and sources of Innovation. Brussels: European Commission.
- Miles, M.B. & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Morgan, D. (1993). Qualitative Content Analysis: A Guide to Paths Not Taken. *Qualitative Health Research* 3(1):112-21
- Muller, E. & Doloreux, D. (2009). What we should know about knowledge-intensive business services. *Technology in Society*, 31(1), 64-72.
- Muller, E. & Zenker, A. (2001). Business services as actors of knowledge transformation: the role of KIBS in regional and national innovation systems. *Research Policy*, 30(9), 1501-16.
- Pina, K. & Tether B.S. (2016), Towards understanding variety in knowledge intensive business services by distinguishing their knowledge bases. *Research policy*, 45, 101-413.
- Pinto, H., Fernandez-Esquinas, M. & Uyarra, E. (2013). Universities and Knowledge-Intensive Business Services (KIBS) as Sources of Knowledge for Innovative Firms in Peripheral Regions, *Regional Studies*, DOI: 10.1080/00343404.2013.857396.
- Rodríguez, A. & Nieto M. J. (2012) The internationalization of knowledge-intensive business services: the effect of collaboration and the mediating role of innovation. *The Service Industries Journal*, 32 (7), 1057-1075, DOI: 10.1080/02642069.2012.662493.
- Sandelowski, M. (2000). Whatever happened to qualitative description. *Research in Nursing & Health*, 23 (4), 334-340.
- Schreier, M. (2012). *Qualitative content analysis in practice*. Thousand Oaks, CA: Sage.
- Simmie, J. & Stramback, S. (2016). The Contribution of KIBS to Innovation in Cities: An Evolutionary and Institutional Perspective. *Journal of knowledge management*, 10(5), 26-40.
- Shearmur, R.; Doloreux, D. & Laperrière, A. (2015). Is the degree of internationalization associated with the use of knowledge intensive services or with innovation? *International Business Review*, 24(3), 457-465.
- Shi, X., Wu, Y. & Zhao, D. (2014). Knowledge intensive business services and their impact on innovation in China. *Service Business*, 8(4), 479-498.
- Tether, B. (2003). The Sources and Aims of Innovation in services: variety between and within sectors. *Economics of innovation and new technology*, 12(6), 481-505.
- Tidd, J.; Bessant, J. & Pavitt, K. (2005). *Managing Innovation: Integrating Technological, Market and Organizational Change*. England: John Wiley & Sons.
- Wood, P. (2005). Service-informed approach to regional innovation - or adaptation? *Service Industries journal*, 25(4), 429-45.
- Wood, P. (2002). Knowledge-intensive services and urban innovativeness. *Urban Studies*, 39(5/6), 993-1

CHAPTER 4

Exploring the relationships between KIBS and innovation: a quantitative analyse in Portuguese firms³

ABSTRACT

This paper is based on the results of a study in which a qualitative methodology was selected with the aim to explore the effects of knowledge, cooperation and internationalisation on co-creation of innovation, applying questionnaires to CEO's of KIBS' firms in Portugal. The study used a quantitative approach, based on a sample extracted from the Survey database to the Scientific and Technological Potential, with KIBS activity in 2014/2015. Upon completion of data collection, systematization of data was done through factor analysis and multiple linear regression that allowed to draw conclusions about the objectives proposed.

Our results show that knowledge codifications and proactive strategies of internationalisation have a positive influence in the co-creation of non-technological innovation with clients, and when KIBS cooperate with HEIs there is a positive impact in co-creation of technological innovation. This research contributes: (1) with knowledge to be shared within the academic community, to the extent that it adds on the research on the KIBS influence on the innovation processes of the different stakeholders involved in business cooperation networks and internationalisation; (2) to the management practice, allowing firms to gain insights that may increase their productivity levels; and (3) with relevant national public policy proposals for adjusting and improving this sector.

Keywords: innovation, knowledge, cooperation, internationalisation, co-creation, clients, HEIs; KIBS;

1. Introduction

Knowledge Intensive Business Services (KIBS) refers to services involving economic activities which are expected to result in the creation, accumulation or dissemination of knowledge. In

³ This paper was submitted and presented at Theory and Applications in the Knowledge Economy - TAKE 2016 - The International Scientific Conference devoted to the Multidisciplinary Study of the Knowledge Economy.

addition, KIBS are key players in innovation systems, particularly in advanced regions where manufacturing competitiveness largely depends on knowledge contents provided by highly specialized suppliers. Over the last 20 years, some authors (*e.g.*, Abecassis-Moedas et al, 2012; Muller & Doloreux, 2009; Simmie & Strambach, 2006) focused their research on understanding the potential implications of KIBS on innovation processes and on the competitiveness of both firms and economies. Pina and Tether (2016) argument that KIBS are increasingly recognized as being amongst the most dynamic sectors of advanced economies, not only achieving high rates of innovation but also helping their clients to innovate. According to several authors (*e.g.*, den Hertog, 2000; Santos & Spring, 2015), when focusing on the role of KIBS services in client innovation, KIBS are seen to function as facilitator, carrier or source of innovation, and through their, almost symbiotic, relationship with client firms - some KIBS function as co-producers of innovation, not only through the cooperation with their clients but also with higher education institutions (HEI) and other organizations. Often KIBS act as transmitters of knowledge, contributing in different ways to the innovation processes of related firms (Bilderbeek et al., 1998; Haukness, 1998; Miles et al., 1995).

Besides that, some recent papers, have shown the relevance of these firms into processes of entering new foreign markets (Doloreux & Lapierre, 2014, Di Maria, Bettiol, De Marchi & Grandinetti, 2012). At the same time, innovation has played an important role in internationalisation and it is, often, the channel for firms to increase productivity (Altomonte, Aquilante, Békés & Ottaviano, 2013). While a growing amount of research emphasizes internationalisation, little academic research focuses on its consequences on innovation strategies and activities (Doloreux & Lapierre, 2014; Marques, Leal, Marques & Cardoso, 2015; Marques, Marques, Leal & Cardoso, *forthcoming*). The contribution of the present study lies in a better understanding of the association between distinct strategies of internationalisation, management knowledge, cooperation and co-creation of innovation.

In the present research, we aim to explore the effects of knowledge, cooperation and internationalisation on co-creation of innovation, applying questionnaires to CEO's of KIBS' firms in Portugal which were operating in 2014 and 2015. In addition, we wanted to contribute to management practice by offering firms a more complete knowledge of ways to increase competitiveness, particularly in relation to both KIBS and business clients from any activity sector, and provide some suggestions and improvements for national adjustment policies.

This paper is structured as follows. The next section examines theories supporting hypotheses that involve the possible relationships between co-creation of innovation, knowledge, cooperation and internationalisation. After discussing some methodological considerations, the results are presented, and the chapter concludes with a reflection on the study's most important limitations and implications for management practice, as well as suggestions for future avenues of research.

2. Conceptual framework

2.1 Co-creation of innovation

KIBS are part of a category of service activities that are often highly innovative in its own right, as well as facilitating innovation in other organisations. Den Hertog (2000) suggests that KIBS function as facilitators, carriers or sources of innovation, and, through their almost symbiotic relationship with client firms, some KIBS function as co-producers of innovation (den Hertog, 2000; Mas-Vérdu, 2011; Muller & Doloreux, 2009).

According to Flikkema et al. (2007), innovations can be classified as technological when they apply to products/services or processes or as non-technological innovations when referring to organisational and marketing aspects. Johnson et al. (2003) point out that, traditionally, innovation studies have focused much more on technological rather than non-technological innovation, and service and organisational innovation have been relatively neglected. Technological innovation, as part of innovation activities, was one of the first approaches used in innovation activities. Schumpeter (1934) distinguishes between five types of innovation. Two varieties exist in technological innovations (i.e. the introduction of new products and of new processes), while the remaining are connected to non-technological innovation (i.e. opening new markets, developing new sources of raw materials and creating new organisational structures).

The production of services is often, according to den Hertog (2000), the result of a joint effort of the service provider and client. In this co-production process, the quality of the resulting service product largely depends on the quality of interactions and communication between the service provider and client. This author suggests that analyses of the role of KIBS in innovation processes bring to the focus the ways in which knowledge is produced and used in the economy, as well as the role of KIBS in these processes. The cited author further argues that, in addition to discrete and tangible forms of knowledge exchange, process-oriented and intangible forms of knowledge flows are crucial in these relationships.

2.2 Knowledge

According to the literature, KIBS play a role in facilitating innovation by interfacing between the generic knowledge available in the economy and the tacit knowledge located within firms (Kubota, 2009).

Hansen et al. (1999) differentiate between two types of knowledge management: personalisation and codification. According to the cited authors, personalisation focuses on dialogues between individuals, while codification extracts knowledge from the individuals who develop and reutilises such knowledge to achieve various purposes. Thus, for some authors (López-Nicolás &

Meroño-Cerdán, 2011; Wu & Lin, 2009), organisations have to find a good balance between system strategies for codification and those strategies that concentrate more directly on human factors through personalisation. In this context, researchers suggest that personalisation, which focuses on tacit knowledge, is more valuable when firms seek to reinforce competitiveness than codification is, especially when the latter concentrates on explicit knowledge (Storey & Kahn, 2010).

According to Capasso et al. (2005), the past decade has seen an increase in the literature focusing on generating processes that share, identify and transfer knowledge within and between firms. Lanza (2005) reinforces Dyer and Nobeoka's (2000) finding that the development of new knowledge - along with the concurrent partners - has increasingly been undertaken in order to obtain a competitive advantage through improved product quality and innovation, despite the great difficulty and risk that these tasks entail. Lanza (2005) adds that this knowledge development process consists of two related phases: sharing and creating. Thus, competing businesses' knowledge sharing with partners is a key step in effective knowledge creation activities that allow firms to compete successfully in the market. KIBS act as transmitters of knowledge, contributing in different ways to the innovation processes of related firms (Bilderbeek et al., 1998; Haukness, 1998; Miles et al., 1995). Several researchers go further and underline the role of KIBS as co-producers of innovation by creating or sharing knowledge (Bettencourt et al., 2002; den Hertog, 2000; Wong & He, 2005). Therefore, the following hypothesis was developed for the present study:

H1: Knowledge has a positive influence in co-creation of innovation.

2.3 Cooperation

According to Lanza (2005), when firms cooperate, they can share and/or create knowledge. This results in a favourable output for the firms involved, either in the form of technology or new products/services, in other words, some form of innovation.

According to Hipp et al. (2012), service activities are characterised by pronounced cooperation with external agents in the development of innovative activities. KIBS are more likely to introduce organisational innovations within their production systems, and these services tend to require collaboration with external agents in innovation processes to a greater extent than most sectors do. This is particularly true when considering cooperation with clients, customers, competitors or higher education institutions (HEIs).

Networks can assume a large variety of forms. These differences can be seen from contrasting perspectives and can be related to different issues. The first distinction centres on the

relationships of firms to other organisations in their value chain, resulting in vertical or horizontal networks (Nalebuff & Brandenburger, 1996). In other ways, firms' involvement with each other may also be different in terms of the formality of ties. Within this dimension, relationships can be informal agreements or co-operative arrangements. Regarding the types of relationships between actors, Conway (2000) proposes two different forms of networks: (1) informal or social networks are those based on social relations created within businesses; and, (2) formal networks are those that happen between firms as formal organisations. Blundel and Smith (2001) also studied business networking and found four different approaches: (1) industrial districts and spatial clusters; (2) supply chain networks; (3) entrepreneurial networks; and (3) innovation networks.

Space has a particular role to play in co-operative relationships. Networks can be developed between firms that are geographically concentrated or distant from each other. When firms and HEI share the same geographical location, face-to-face interaction is easier, so more trust is to be expected. It is also more likely that business relationships, because of more frequent face-to-face interaction, become personal relationships and those weak ties become strong ties.

Cooperation ventures can vary in regard to their goals. Nevertheless, this does not mean that networks have to embody just one aim, as they can involve multi-purpose cooperation. In some cases, cooperation is regarded as just a locus for innovation. In this sense, firms and HEI join together in order to innovate. However, firms may be willing to cooperate in diverse aspects of business and embody these purposes in long-term relationships.

As a result of these findings, the following hypothesis was defined for the present study:

H2: Cooperation has a positive influence in co-creation of innovation.

2.4 Internationalisation

The internationalisation of KIBS raises challenges given their specificities such as knowledge intensity, the importance of customer interaction and intimacy in service delivery (Abecassis-Moedas et al., 2013).

Firms at early stages of internationalisation may find difficulties to absorb knowledge from foreign markets sources, as their primary sources of knowledge are internal staff and clients. Product and process innovations are the dominant types of innovation developed by these firms, most likely due to the fact that they must adapt themselves to new markets. Comparatively, firms with greater internationalisation experience identified in the study of Doloreux and Lapierre (2014) as those with a greater percentage of foreign sales were more likely to develop

new strategies to better exploit and diffuse their service supply in different international markets. This is reflected by the fact that these firms introduced more frequently strategic and managerial innovations on the market than firms with lower international activity.

These findings provide support to the arguments that suggest firms which develop international activities tend to engage more in different innovation-related activities (Harris and Li 2008; Moreira et al. 2013; Ripolles Melia` et al. 2010). As a result of these findings, the following hypothesis was defined for the present study:

H3: Strategies of internationalisation have a positive influence in co-creation of innovation.

Based on the literature review, a conceptual model of research was proposed, as shown in Figure 1 below.

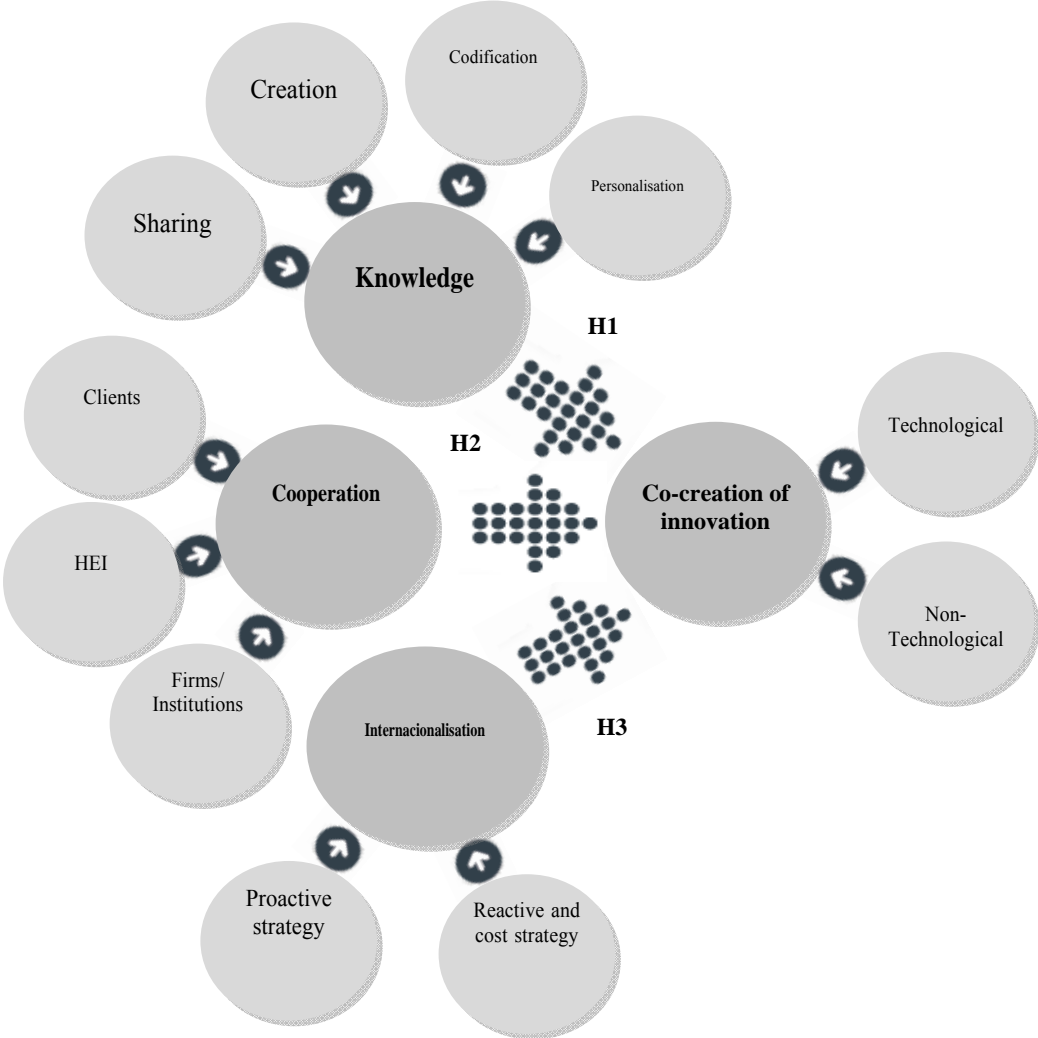


Figure 1: conceptual model of research

3. Methodology

In this paper we used quantitative methodology, applying questionnaires to CEO's of KIBS' firms in Portugal, in a sample of firms that were in operation in 2014 and 2015.

With this research we aim to explore the effects of knowledge, cooperation and internationalisation on co-creation of innovation. These constructs were validated using confirmatory factor analysis, studying the reliability of a questionnaire, previously validated through interviews with CEOs and academic experts to describe the structural relationships between the variables.

This study corresponds to the third phase of a research, based on the results of phase 2 - a study in which a qualitative methodology was selected, applying semi-structured interviews to six Portuguese KIBS' CEOs and four academics (national and international) specialists in KIBS and innovation, in order to validate the questionnaire that resulted from the literature review on the dimensions and its operation, and with the aim of evaluating the relationship between KIBS and their clients, and the consequences for their innovation processes (technological and non-technological).

3.1 Data-source and procedures

In order to test the proposed research model and research hypotheses, data were collected via a structured questionnaire distributed online to 397 firms that were listed as in operation and contactable in the database of the *Inquérito ao Potencial Científico e Tecnológico Nacional* (Survey of National Scientific and Technological Potential). This survey is conducted every year throughout Portugal. The surveyed firms were selected from the last reported year (2012) based on their claim to have carried out research and development (R&D) activities and integrated four sectors: businesses, government institutions, HEIs and private non-profit organisations. The data collection took place from May to December 2015. Valid questionnaires were obtained from 58 firms (approximately a 15% of response rate).

3.2 Measures and sample

In order to operationalise the variables, we conducted a further literature review and adapted scales validated in previous studies. The questionnaire included questions selected from fourth instruments: Community Innovation Survey - CIS2012, Fernandes (2011), Hashi and Stojčić (2013) and López-Nicolás and Meroño-Cerdán (2011).

The dataset used in this study consists of 58 KIBS firms (table 1) and 64 variables concerning co-creation of innovation, cooperation, knowledge and internationalisation. Data were collected from Portuguese KIBS chief executive officers (CEOs) between June and December 2015.

Table 1: Research characteristics

Industry/Sector	Services - KIBS
Population	KIBS with R&D activities
Sample	397 firms
respondents	58 CEO's of KIBS firms
Type of Firms	35 t-KIBS 24 p- KIBS
Dimension (N.º of employees in the firm_2014)	Média: 84.4 Mediana: 8 Desvio padrão: 493,7 Máximo: 3600 Mínimo:1
Location	Lisboa: 17% Porto: 11,8% Aveiro: 6,8% Braga: 3,4% Catelo Branco: 3.4% Other (1 firm/local): 57,6%
Questions	Closed answer
Data collection method	Questionnaire sent by email
Statistical methods	Factor analysis and multiple linear regressions

The 64 variables were grouped into six sections of items in the questionnaire, for which some descriptive statistics are provided in Tables 2, 3, 4 and 5 below. All the items were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Answers concerning questions about co-creation of innovation, made up of nine five-point items, display means between 2.07 (non-technological innovation) and 2.88 (technological innovation), with a standard deviation of around one. Answers for questions about knowledge, covered by 15 items, display means between 2.96 (knowledge sharing processes) and 4.26 (personalisation), with a standard deviation of around two. Answers concerning the 29 items about cooperation (i.e. HEIs, clients and other firms/institutions) show means between 2.13 (cooperation with HEIs) and 4.04 (cooperation with clients), with a standard deviation of around one. Answers concerning the 11 items about strategies of internationalisation (i.e. proactive strategies and reactive and cost strategies) result in means between 1.80 (proximity to sources of raw materials) and 3.68 (firm's growth needs), with a standard deviation of around 1.2.

In this study, we did a factor analysis of several management concepts: co-creation of innovation, cooperation, knowledge and internationalisation, as well as linear regression. The

objective of the factorial analysis was to reduce the initial number of variables while keeping their common characteristics. Linear regression was performed in order to estimate the contribution of different factors to co-creation of technological and non-technological innovation. All the statistical analyses presented were performed using *IBM SPSS 22.0*.

4 Results

In this section, we describe the results of the aforementioned factor analysis and linear regression to allow the presentation and discussion of the findings. Using the principal components analysis (PCA) method, the variables concerned with innovation clients were reduced from nine variables to only two components (see Table 2).

We started by checking if PCA was an adequate method by using *Bartlett's sphericity test*, *Kaiser-Meyer-Olkin* (KMO) statistics and anti-image. Next, we computed the principal components, loadings and communalities. The decision on the number of components to retain was a compromise between maximising the explained initial dataset variability and reducing the initial number of variables. In order to express the common variability between the initial variables, rotation was performed and the factors obtained.

The KMO statistic is 0.778. Therefore, since $0.7 < 0.756 < 0.8$, we concluded that there is an average adequacy of the PCA because about 80% of the correlations are significant. When the *Bartlett's test*, in which the null hypothesis is the identity correlation matrix, displays a p -value of approximately $0 < 0.05$, then the null hypothesis can be rejected, and it is possible to conclude that the correlations between the involved variables are sufficiently high. Therefore, we concluded that running a PCA was adequate in this context.

According to the *Kaiser* criterion, when a correlation matrix is used, all components corresponding to eigenvalues smaller than one should be excluded. Applying this criterion, the first two components were extracted; as these explained a total of 58.9% of the variance in the original data: 29.8% is related with the first factor and 29.1% with the second factor. The remaining components were excluded for having eigenvalues smaller than one.

After performing a *Varimax* rotation, the relationships between the principal components and the original variables became clearer and more explainable. The rotated component matrix, is presented in Table 2.

Since all factorial scores are approximately equal or greater than 0.5, no items were eliminated from the analysis. The *Cronbach's* alfa estimates the internal consistency of factors (i.e. reliability). The alpha for the first factor is approximately 0.8, which indicates high reliability,

according to Hair et al. (2014). The alpha for the second factor is 0.803, which also indicates high reliability.

Table 2: Component and item statistics - co-creation of innovation

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Technological innovation ($\alpha = 0.779$)			2.590		
External acquisition of R&D	0.807	0.836	0.572	2.59	1.487
Acquisition of software and equipment	0.492	0.769	0.391	2.88	1.377
Acquisition of knowledge from another organisation	0.673	0.735	0.501	2.41	1.312
Training in innovation activities	0.760	0.788	0.629	2.62	1.282
Introduction of innovation in the market	0.747	0.842	0.692	2.45	1.340
Non-technological innovation ($\alpha = 0.803$)			2.147		
Design	0.777	0.647	0.550	2.34	1.207
Other non-technological innovation (except design and market)	0.848	0.749	0.780	2.09	1.097
New European markets	0.660	0.783	0.501	2.07	1.168
New non-European markets	0.770	0.860	0.660	2.09	1.113

Using the PCA method, the variables concerned with knowledge were reduced from 15 variables to four components. Using the same criteria as in the previous analysis, the first four components were extracted, which explained a total of 64.4% of the variance in the original data, with 19.7% related to the first factor, 17.3% to the second, 14.6% to the third and 12.8% to the fourth factor. The remaining components were excluded for having eigenvalues smaller than one. The KMO statistic is approximately 0.7, and the *p*-value for *Bartlett's* test shows that the correlation matrix is significantly different from the identity matrix. Therefore, a factorial analysis could be performed. We performed a Varimax rotation and suppressed coefficients with an absolute value below 0.35, obtaining the scores presented in Table 3. Since all factorial scores are greater than 0.5, no items were eliminated from the analysis, and we considered the factor with the highest score value from each item. The Cronbach's alpha for the first factor is greater than 0.8, which indicates high reliability. The other factors' alphas are approximate to 0.7, which indicates medium reliability.

Table 3: Component and item statistics - knowledge

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Personalisation ($\alpha = 0.820$)				3.936	
Receives advice from supervisor	0.913	0.679	0.781	4.15	0.841
Carries out informal meetings to share knowledge	0.832	0.730	0.712	3.91	1.181
Enjoys a close relationship with a mentor who facilitates the transfer of knowledge	0.672	0.839	0.621	3.68	1.156
Shares knowledge easily with co-workers	0.600	0.750	0.584	4.26	0.880
Creates knowledge through cooperation with customers	0.551	0.611	0.428	3.68	0.976
Codification ($\alpha = 0.715$)				3.264	
Shares experiences with other firms	0,727	0.740	0.476	3.15	1.099
Establishes protocols about how to share knowledge inside the firm	0,678	0.684	0.534	3.32	1.384
Establishes protocols about how to share knowledge outside the firm	0,624	0.568	0.554	3.11	1.396
Shares knowledge through manuals and internal documents	0,623	0.738	0.405	3.53	1.012
Takes minutes of meetings to document results of projects and working groups	0,566	0.590	0.413	3.21	1.291
Knowledge creation and acquisition ($\alpha = 0.700$)				3.591	
Creates firm priorities and builds up knowledge and dissemination	0,809	0.736	0.644	3.83	1.014
Learns from other organisations	0,803	0.658	0.524	3.53	0.868
Acquires knowledge easily through manuals and documents	0,538	0.780	0.404	3.42	0.989
Knowledge sharing ($\alpha = 0.681$)				3.255	
Shares knowledge with clients	0,816	0.531	0.519	3.55	1.030
Shares knowledge with staff and other firms	0,748	0.554	0.519	2.96	0.940

Using the PCA method, the variables concerned with cooperation were reduced from 29 variables to three components. The first three components were extracted; as these explained a total of 71.6% of the variance in the original data. The remaining components were excluded for having eigenvalues smaller than one. The KMO statistic is approximately 0.71, and the p -value for *Bartlett's* test shows the correlation matrix is significantly different from the identity matrix, so a factorial analysis could be performed. We, then, performed a *Varimax* rotation and suppressed coefficients with an absolute value below 0.35, obtaining the scores presented in Table 4. Since all factorial scores are approximately equal or greater than 0.5, no items were eliminated from the analysis, and we considered the factor with the highest score value from each item. The *Cronbach's alphas* for the three factors are greater than 0.89, which indicates high reliability.

Table 4: Component and item statistics – cooperation

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Cooperation with clients ($\alpha = 0.913$)				3.418	
Reduces overall costs	0.832	0.708	0.791	2.98	1.378
Learns with a cooperation partner	0.809	0.677	0.694	3.40	1.107
Shares technology and knowledge	0.795	0.693	0.754	3.52	1.111
Suggests ideas for improving products (goods/services) or processes	0.786	0.677	0.717	4.04	1.009
Elevates operational efficiency	0.782	0.646	0.722	3.52	1.313
Develops new products and/or processes	0.763	0.739	0.715	3.86	1.143
Develops new concepts	0.739	0.582	0.653	3.56	1.280
Generates formal and informal exchanges of people and ideas	0.703	0.557	0.692	3.30	1.199
Expands market share in geographical area of operation	0.579	0.787	0.555	3.72	1.341
Shares R&D costs	0.558	0.803	0.555	2.28	1.089
Cooperation with HEIs ($\alpha = 0.892$)				2.757	
Shares technology and knowledge	0.867	0.596	0.782	3.04	1.351
Develops new concepts	0.802	0.601	0.722	2.98	1.327
Develops new products and/or processes	0.786	0.592	0.687	3.17	1.291
Learns with a cooperation partner	0.733	0.513	0.676	3.09	1.248
Generates formal and informal exchanges of people and ideas	0.725	0.585	0.647	3.06	1.389
Shares R&D costs	0.715	0.678	0.602	2.13	1.115
Increases operational efficiency	0.683	0.609	0.681	2.79	1.334
Expands market share in geographical area of operation	0.650	0.562	0.627	2.26	1.113
Reduces overall costs	0.452	0.521	0.411	2.30	1.121
Cooperation with other organisations ($\alpha = 0.938$)				3.067	
Suggests ideas for improving products (goods/services) or processes	0.848	0.622	0.799	3.64	1.317
Generates formal and informal exchanges of people and ideas	0.830	0.712	0.820	3.13	1.236
Increases operational efficiency	0.819	0.534	0.788	3.18	1.302
Expands market share in geographical area of operation	0.788	0.702	0.674	3.29	1.254
Shares technology and knowledge	0.784	0.772	0.762	3.07	1.232
Learns with a cooperation partner	0.773	0.804	0.762	3.27	1.268
Develops new products and/or processes	0.766	0.720	0.743	3.29	1.424
Develops new concepts	0.750	0.718	0.775	2.91	1.411
Reduces overall costs	0.736	0.542	0.665	2.58	1.215
Shares R&D costs	0.709	0.813	0.729	2.31	1.145

Using the PCA method, the variables concerned with strategies of internationalisation were reduced from 11 variables to only two components. The first two components were extracted; as

these explained a total of 70.5% of the variance in the original data: the first factor explained 47,4% and the second one 23,1% The remaining components were excluded for having eigenvalues smaller than one. The KMO statistic is approximately 0.76, and the p -value for *Bartlett's* test shows the correlation matrix is significantly different from the identity matrix, so a factorial analysis could be performed. We then performed a *Varimax* rotation and suppressed coefficients with an absolute value below 0.35, obtaining the scores presented in Table 3. Since all factorial scores are approximately equal or greater than 0.5, no items were eliminated from the analysis, and we considered the factor with the highest score value from each item. The *Cronbach's alphas* for the two factors are greater than 0.8, which indicates high reliability.

Table 5: Component and item statistics - internationalisation

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Proactive strategies ($\alpha = 0.924$)				3.308	
Scale economies achievement	0.874	0.793	0.819	3.24	1.445
Risk diversification	0.868	0.804	0.817	3.20	1.364
Exploration of own skills	0.860	0.839	0.825	3.39	1.262
Firm's growth needs	0.831	0.713	0.804	3.68	1.491
Improve margins and profitability	0.807	0.800	0.790	3.44	1.285
Internationalization arises from innovation processes	0.805	0.929	0.770	3.32	1.386
Strangulation of domestic market	0.724	0.731	0.646	3.37	1.280
Monitoring of important clients	0.611	0.671	0.491	2.83	1.395
Reactive and costs strategies ($\alpha = 0.807$)				2.057	
Proximity to sources of raw materials	0.877	0.668	0.762	1.80	0.954
Cheap labour demand	0.846	0.633	0.741	1.83	0.919
Reaction to performance competition	0.618	0.628	0.570	2.54	1.416

By analysing the correlation matrix and the significance level of 10%, we were able to observe a significant positive correlation between 'cooperation with clients' and 'knowledge sharing', 'cooperation with HEIs' and 'knowledge creation' and 'co-creation of technological innovation' and 'cooperation with HEIs'. 'Proactive Strategies' of internationalisation have a positive correlation with 'personalization', 'cooperation with clients' and 'co-creation of non-technological innovation'. 'Reactive and Cost Strategies' of internationalisation have a positive correlation with 'cooperation with clients' and 'co-creation of non-technological innovation. However, we found a negative correlation between 'cooperation with HEIs' and 'knowledge sharing'. These correlations suggest that HEIs may be drivers of knowledge creation, but clients may also be a source of new knowledge (see Table 6).

Table 6: Correlation matrix

	K1	K2	K3	K4	CO1	CO2	CO3	InC1	InC2	Int1	Int2
Personalisation (K1)	1										
Codification (K2)	0.000	1									
Knowledge creation (K3)	0.000	0.000	1								
Knowledge sharing (K4)	0.000	0.000	0.000	1							
Cooperation with other firms/institutions (CO1)	-0.204	-0.180	-0.012	0.006	1						
Cooperation with clients (CO2)	0.152	-0.012	0.269	0.516**	0.000	1					
Cooperation with HEIs (CO3)	-0.035	0.203	0.312*	-0.317*	0.000	0.000	1				
Co-creation of technological innovation (InC1)	0.242	-0.022	0.243	-0.063	0.058	0.232	0.411**	1			
Co-creation of non-technological innovation (InC2)	0.101	0.220	-0.019	-0.009	0.114	0.247	0.101	0.000	1		
Proactive Strategies (Int1)	0.407**	-0.017	0.136	0.078	-0.237	0.413**	-0.084	0.010	0.351*	1	
Reactive and Cost Strategies (Int2)	-0.257	0.074	0.089	-0.210	-0.011	0.443**	0.297	0.283	0.337*	0	1

We also examined these relationships using two linear regressions with the dependent variables ‘co-creation of technological innovation’ and ‘co-creation of non-technological innovation’ and the dependent variables of factors related with knowledge, cooperation and internationalisation (results in Table 7). This procedure was implemented using the ‘Enter’ method to introduce variables, but the *Wald test* of parameters significance showed non-significant *p*-values, so a *stepwise* method was performed using *Akaike* information criterion to insert or remove independent variables. The best linear model, according to this criterion, is:

$$\begin{aligned}
 \text{Co-creation of innovation (technological; non-technological)} &= \beta_0 + \\
 &\beta_1 * \text{knowledge (codification+ personalisation+ creation+ sharing)} + \\
 &\beta_2 * \text{cooperation with (clients + HEIs + other organisations)} + \\
 &\beta_3 * \text{Internationalization (proactive strategies + reactive and cost strategies)}
 \end{aligned}$$

Table 7: Standardized coefficients of linear regressions. Depend variable: Co-creation of innovation (technological and non-technological)

	Co-creation of technological innovation	Co-creation of non-technological innovation
Codification	-	0.414*
Cooperation with HEIs	0.430*	-
Proactive strategies	-	0.380*
R	0.430	0.550
R Square	0.185	0.302
Adjusted R Square	0.163	0.264

* $p < 0,01$.

ANOVA Tests were performed for the linear models and significant levels were obtained (i.e., $p=0.006$ for technological innovation and $p=0.002$ for non- technological innovation)

These results show that ‘cooperation with HEIs’ explains approximately 18% of ‘clients’ technological innovation’ variance. The regression coefficient is 0.43, which means that, when ‘cooperation with HEIs’ increases one unit ‘co-creation of technological innovation’ increases about 43%. In addition, ‘codification’ and ‘proactive strategies’ explained approximately 30% of ‘co-creation of non-technological innovation’ variance. The regression coefficient of knowledge ‘codification’ is 0.414, which means that, when ‘codification’ increases one unit, ‘co-creation of non-technological innovation’ increases about 41%, and when ‘proactive strategies’ increases one unit, ‘co-creation of non-technological innovation’ increases about 38%.

5 Conclusions

This study focused on an analysis of the relationships between knowledge, cooperation, internationalisation and co-creation of innovation (between KIBS and clients, HEIs and other firms/institutions). As described above in the conceptual framework section, this study was based on an assumption made by several authors (e.g. den Hertog, 2000; Muller & Doloreux, 2009) that KIBS function are co-producers of innovation in an almost symbiotic relationship with client firms, HEIs and other firms/institutions.

A quantitative research methodology was used to test hypotheses based on a literature review and a research model that describes the relationships between knowledge, cooperation, internationalisation and co-creation of innovation for Portuguese KIBS with others organisations. The most important results of this study show that, given the current context of KIBS, the co-creation of innovation of these firms is greatly influenced by cooperation with HEIs (i.e. co-creation of technological innovation) and codification of knowledge and proactive strategies of internationalisation (i.e. co-creation of non-technological innovation). We also found that a significant positive correlation exists both between ‘cooperation with clients’ and ‘knowledge

sharing' and between 'cooperation with HEIs' and 'knowledge creation'. These results clearly influence the co-creation of technological innovation, which confirmed H1 and H2. However, the results also reveal a negative correlation between 'cooperation with HEIs' and 'knowledge sharing'. These correlations indicate that HEIs could be drivers of knowledge creation when demanded by KIBS; as a clear difficulty IES in sharing knowledge with KIBS persists. 'Proactive strategies of internationalisation' have a positive correlation with 'personalisation', 'cooperation with clients' and 'co-creation of non-technological innovation' and 'reactive and cost strategies of internationalisation' have a positive correlation with 'cooperation with clients' and 'co-creation of non-technological innovation', which confirm H3.

This research contributes to the study of KIBS in three ways. First, the results provide a deeper understanding, to be shared within the academic community, of KIBS' influence on the innovation processes of different stockholders involved in business cooperation networks, as well as the process of co-creation in the field of innovation. Second, the present results have practical implications for management practices in terms of decision-making processes in innovation, specifically regarding the strategic management of knowledge, cooperation networks and strategies of internationalisation which allows firms to gain insights that may increase their productivity levels. Last, policy initiatives must be differentiated according to the different strategies of internationalisation, and, therefore, generalisation on the support to innovation and internationalisation of KIBS firms should be discouraged.

In future paths of research, the sample could be increased so that the results can provide a clearer empirical view of how the variables included here relate and interact with other variables. Other causal links and explanations are plausible. For example, a positive correlation may exist between knowledge, cooperation and co-creation of innovation and strategies of internationalisation. In addition, a panel study of KIBS CEOs could be conducted to determine the depth of the present results. Finally, this study could be replicated in different countries using comparative analysis. These improvements and updates would strengthen our understanding of the co-creation of innovation, which can be incorporated within different strategies and interventions in the innovation processes of KIBS and other organisations. For instance, research on these other organisations (i.e. clients, HEIs and other firms/institutions) could allow analysing more thoroughly the influence of KIBS on these organisations' innovation processes.

Acknowledgments: This research is supported by the FEDER component of the European Structural and Investment Funds, through the Operational Competitiveness and Internationalisation Programme's (COMPETE 2020) Project No. 006971 (UID/SOC/04011) and the Portuguese Foundation for Science and Technology's (Fundação para a Ciência e a Tecnologia) UID/SOC/04011/2013 Project.

References

- Abecassis-Moedas, C.; Ben Mahmoud-Jouini, S.; Dell'era, C., Manceau, D. & Verganti, R. (2012). Key Resources and Internationalization Modes of Creative Knowledge-Intensive Business Services: The Case of Design Consultancies. *Creativity and Innovation Management*, 21, 315-331.
- Altomonte, C.; Aquilante, T.; Békés, G. & Ottaviano G. I.P. (2013). Internationalization and innovation of firms: evidence and policy. *Economic Policy*, 28(76), 663-700.
- Bettencourt, L., Ostrom, A., Brown, S., & Roundtree, R. (2002). Client co-production in knowledge-intensive business services. *California Management Review*, 44(4), 100-128.
- Biderbeek, R., den Hertog, P., & Chehab, N. (1998). Management van vernieuwing in diensten. Verslag van een workshop voor ondernemers op 22 april 1998 [Management of innovation in services. Report of a workshop with entrepreneurs]. Dialogic/TNO Strategy Technology and Policy, Utrecht /Apeldoorn.
- Blundel, R. & Smith, D. (2001). *Business Network Report*. Small Business Service, London.
- Capasso, A.; Dagnino G., & Lanza, A. (Eds) (2005). Introduction: strategic capabilities and knowledge transfer within and between organizations, pp. 1 - 13 (Variety in the knowledge base of Knowledge Intensive Business Services. *Research Policy*, 39, 1303-1310.
- Conway, S. (2000). *Social network mapping and the analysis of informal organisation*. Working paper RP024, Aston Business School, Aston University, Birmingham.
- den Hertog, P. (2000). Knowledge-intensive business services as co-producers of innovation. *International Journal of Innovation Management*, Vol.4, No.4, 491-528.
- Di Maria, E., Bettiol, M., De Marchi, V. & Grandinetti, R. (2012) Developing and Managing Distant Markets: The Case of KIBS. *Economia Politica*, 29, 361-379.
- Dyer, J.H. & Nobeoka, K. (2000). Creating and managing a high-performance knowledge-sharing network: the Toyota case. *Strategic Management Journal*, 21, 99-126
- Doloreux, D. & Laperriere, A. (2014). Internationalisation and innovation in the knowledge-intensive business services. *Service Business*, 8, 635-657.
- Fernandes, C., Ferreira, J, & Marques, C.S. (2011). *Knowledge Intensive Business Services (KIBS) in Portugal: Location and Innovative Capacity*, Doctoral thesis, Universidade da Beira Interior, Covilhã, Portugal.
- Flikkema, M., Jansen, P., & Van Der Sluis, L. (2007). Identifying neo-Schumpeterian innovation in service firms: a conceptual essay with a novel classification. *Economics of Innovation and New Technology*, 16(7), 541-558.
- Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2014). *Multivariate Data Analysis* (7th ed.). Pearson Education: Harrow
- Hansen, M., Nohria, N. and Tierney, T. (1999) 'What's your strategy for managing knowledge?', *Harvard Business Review*, 77(2), 106-116.
- Harris, R. & Li, Q.C. (2008). Evaluating the contribution of exporting to UK productivity growth: some microeconomic evidence. *World Econ*, 31(2), 212-235
- Hashi, I. & Stojčić, N. (2013). The impact of innovation activities on firm performance using a multi-stage model: Evidence from the community innovation survey 4. *Research Policy*, 42(2), 353-366.
- Hauknes, J. (1998). *Services in innovation innovation in services* (Step report, n.13). Oslo, Norway.
- Hipp, C., Gallego, J., & Rubalcaba, L. (2012). Shaping innovation in European knowledge intensive services. *Second Conference of the International Network of Business and Management Journals* (INBAM), 20-22 March of 2012, València (Spain).

- Johnson, B., Edquist, C., & Lundvall B. (2003). *Economic Development and the National*. Rio de Janeiro. http://www.globelicsacademy.net/pdf/BengtAkeLundvall_2.pdf
- Kubota, L. (2009). As KIBS e a inovação tecnológica das firmas de serviços. *Economia e Sociedade, Campinas*, 18(2), 349-369.
- Lanza, A. (2005). Managing heterogeneity, alloative balance, and behavioural and tenhology concerns in competitive and cooperative inter-firm relationships. In Capasso, A.; Dagnino, G. & Lanza, A. (Eds), *Strategic Capabilities and Knowledge Transfer Within and Between Organizations - New Perspectives from Acquisition, Networks, Learning and Evolution* (pp. 17-34). Cheltenham: Edward Elgar.
- López-Nicolás, C. & Meroño-Cerdán, A. (2011). Strategic knowledge management, innovation and performance, *International journal of information management*, 31(6), 502-509.
- Lusch, R., Vargo, S., & Tanniru, M. (2010). Service, value networks and learning. *Journal of the Academy of Marketing Science*, 38(1), 19-31.
- Marques, C.S.; Leal, C.; Marques, C.P. & Cardoso, A.R. (2015). Strategic knowledge management, innovation and performance: A qualitative study of the footwear industry. *Journal of the Knowledge Economy*, 1-17. Doi: 10.1007/s13132-015-0249-4.
- Marques, C.S.; Marques, C.P.; Leal, C.T. & Cardoso, A.R. (forthcoming). Knowledge, innovation, internationalisation and performance: insights from the Portuguese footwear industry. *Int. J. of Entrepreneurship and Small Business*.
- Mas-Vérdu F., Wensley, A., Alba, M., & Álvarez-Coque J. (2011). How much does KIBS contribute to the generation and diffusion of innovation? *Service Business*, 5(3), 195-212, DOI: 10.1007/s11628-011-0110-1.
- Miles, I. Kastrinon, N. Flanagan, K. Bilderbeek, R. den Hertog, P., Huntink, W., & Bouman, M. (1995). *Knowledge Intensive Business Services. Users and Sources of Innovation*. Brussels: European Commission.
- Moreira, M.R.A.; Maia, M.A.S.; Sousa, P.S.A. & Meneses, R.F. (2013). Factors influencing the internationalisation of services firms: the case of design engineering and architecture consulting firms. In Cunha, J., Snene, M. & Novoa, H. (eds), *Exploring services science* (pp. 246-262). London: Springer.
- Muller, E. & Doloreux, D. (2009). What we should know about knowledge-intensive business services. *Technology in Society*, 31(1), 64-72.
- Nalebuff, B. J., & Brandenburger, A. M. (1996). "Co-opetição". Rio de Janeiro: Rocco, 28-35.
- Pina, K., & Tether, B. S. (2016). Towards understanding variety in knowledge intensive business services by distinguishing their knowledge bases. *Research Policy*, 45(2), 401-413.
- Ripolles Melia`, M.; Blesa, A. & Dobon, S.R. (2010). The influence of innovation orientation on the internationalisation of SMEs in the service sector. *Serv Ind Journal*, 30(5), 777-791.
- Santos, J. B. & Spring, M. (2015). Are knowledge intensive business services really co-produced? Overcoming lack of customer participation in KIBS. *Industrial Marketing Management*, 50, 85-96.
- Simmie, J. & Strambach, S. (2006). The contribution of KIBS to innovation in cities: an evolutionary and institutional perspective. *Journal of Knowledge Management*, 10(5), 26-40.
- Storey, C. & Hahn, K. (2010). The role of knowledge management strategies and task knowledge in stimulating service innovation, *Journal of Service Research*, 13(4), 397-410.
- Wong, P. & He, Z.-L. (2005). A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms. *The Service Industries Journal*, 25(1), 23-42.
- Wu, I. and Lin, H. (2009) 'A strategy-based process for implementing knowledge management: An integrative view and empirical study', *Journal of American Society for Information and Technology*, 60(4), 789-802.

CHAPTER 5

INTERNATIONALISATION STRATEGY OF KIBS: THE EFFECT OF KNOWLEDGE, COOPERATION AND INNOVATION⁴

ABSTRACT

This paper is based on the results of a questionnaire applied to chief executive officers of KIBS' firms in Portugal. The aim of this research is to explore the effects of knowledge, cooperation and innovation in their internationalization strategy. The study used a quantitative approach, based on a sample extracted from the Survey database to the Scientific and Technological Potential, with KIBS activity in 2014/2015. Upon completion of data collection, systematization of data was done through factor analysis and multiple linear regression that allowed to draw conclusions about the objectives proposed. On the one hand, our results show that knowledge personalization has a positive influence in proactive strategies of internationalization, such as, external innovation and new organization methods. When KIBS cooperate with clients a positive impact in reactive and cost strategies of the internationalization can be verified. On the other hand, reactive and cost strategies of internationalization are negatively influenced by knowledge personalization, knowledge sharing and internal innovation. This study contributes: (1) to increase academic knowledge about this subject; (2) to the management practice, allowing firms to gain insights that may develop their proactive strategies of internationalization; (3) to reinforce the need for adjustment of public policies to encourage the development and strengthening of proactivity of this sector with regard to internationalization.

Keywords: Internationalization strategy, Innovation, Knowledge, Cooperation, KIBS.

⁴ This paper was submitted and presented at the Regional HELIX Conference 2016 - International Conference on Regional Triple Helix Dynamics and submitted to the Journal of Knowledge Economy (Springer - Index in SCOPUS), "Geography & Entrepreneurship Managing Growth and Change"

1. Introduction

Knowledge Intensive Business Services (KIBS) refer to services involving economic activities, which are expected to result in the creation, accumulation or dissemination of knowledge. In addition, KIBS are key players in innovation systems, particularly in advanced regions where manufacturing competitiveness largely depends on knowledge contents provided by highly specialized suppliers. Over the last 20 years, authors (e.g., Abecassis-Moedas et al. 2012; Muller and Doloreux 2009; Simmie and Strambach 2006) focused their research on understanding the potential implications of KIBS on innovation processes and on the competitiveness of both firms and economies. Pina and Tether (2016) argue that KIBS are increasingly recognized as being among the most dynamic sectors of advanced economies, not only achieving high rates of innovation but also helping their clients to innovate. According to other authors (e.g., den Hertog 2000; Santos and Spring 2015), when focusing on the role of KIBS services in client innovation, KIBS are seen to function as facilitators, carriers or source of innovation, and through their, almost symbiotic, relationship with client firms - some KIBS function as co-producers of innovation, not only through the cooperation with their clients but also with higher education institutions (HEI) and other organizations. Often KIBS act as transmitters of knowledge, contributing in different ways to the innovation processes of related firms (Haukness 1998; Miles et al. 1995).

Besides that, some recent papers have shown the relevance of these firms into processes of entering new foreign markets (Di Maria et al. 2012; Doloreux and Lapierre 2014). At the same time, innovation has played an important role in internationalisation (Rodriguez and Nieto 2012; Rodriguez and Nieto 2010) and it is, often, the channel for firms to increase productivity (Altomonte et al. 2013). While a growing amount of research emphasizes internationalisation, little academic research focuses on its consequences on innovation strategies and activities (Doloreux and Lapierre 2014; Marques et al. 2016; Marques et al. forthcoming). The value of the present study lies in a better understanding of the association between distinct strategies of internationalisation, management knowledge, cooperation and innovation in KIBS firms.

In the present research, we aim to explore the effects of knowledge, cooperation and innovation on internationalisation, applying questionnaires to CEO's of Portuguese KIBS' firms. In addition, we aim to contribute to management practices by offering firms a deeper knowledge of forms to increase competitiveness, particularly in relation to both KIBS and business clients from any activity sector, and to provide some suggestions and improvements for national adjustment policies.

This study used a quantitative approach, based on a sample extracted from the Survey database to the Scientific and Technological Potential, with KIBS activity in 2014/2015. Upon completion of data collection, systematization of data was done through the use of factor analysis and

multiple linear regression that allowed to draw conclusions about the goals we proposed us to achieve.

This paper is structured as follows. The next section examines theories supporting the hypotheses that involve the possible relationships between internationalisation, knowledge, cooperation and innovation. After discussing some methodological considerations, the results are presented, and the chapter concludes with a reflection on the study's most important limitations and implications for management practice, as well as suggestions for future avenues of research.

2. Theoretical background and hypotheses

2.1 Internationalisation

The internationalization of KIBS raises challenges in spite of their specificities such as knowledge intensity, the importance of customer interaction and intimacy in service delivery (Abecassis-Moedas et al. 2013).

Firms beginning to internationalise may struggle to absorb knowledge from sources from foreign markets, as their primary sources of knowledge are internal staff and clients. Product and process innovations are the dominant types of innovations developed by these firms, most likely due to the fact that they must adapt themselves to new markets. Comparatively, firms with greater internationalisation experience (as identified in the study of Doloreux and Lapierre 2014) as those with a greater share of foreign sales were more likely to develop new strategies to better exploit and diffuse their service offering in different international markets. This is reflected by the fact that these firms introduced more frequently strategic and managerial innovations on the market than firms with lower international activity.

In general, the motivations of firms to internationalize can be grouped in two types: proactive and reactive motivations (Czinkota et al 2004). Proactive motivations represent stimuli to attempt strategic change. Reactive motivations influence firms that are responsive to environmental changes and adjust to them by changing their activities over time. In other words, proactive firms go international because they want to, while reactive ones go international because they have to.

The choice of the knowledge management strategies and processes (López-Nicolás and Meroño-Cerdán 2011; Lanza 2005), cooperation partners (Fernandes and Ferreira, 2013; Walsh et al, 2016) and innovation sources (Cassiman and Veugelers 2006; Poot et al 2009) can influence the internationalization strategies.

2.2. Knowledge

According to the literature, KIBS play a role in facilitating innovation by interfacing between the generic knowledge available in the economy and the tacit knowledge located within firms (Kubota 2009).

Hansen et al. (1999) differentiate between two types of knowledge management: personalisation and codification. According to the quoted authors, personalisation focuses on dialogues between individuals, while codification extracts knowledge from the individuals who develop it and reutilises this knowledge to achieve various purposes. Thus, for some authors (López-Nicolás and Meroño-Cerdán 2011; Wu and Lin 2009), organisations have to find a good balance between system strategies for codification and those strategies that concentrate more directly on human factors through personalisation. In this context, researchers suggest that personalisation, which focuses on tacit knowledge, is more valuable when firms seek to reinforce competitiveness and codification is, especially valuable when the latter concentrates on explicit knowledge (Storey and Kahn 2010).

According to Capasso et al. (2005), the past decade has seen an increase in the literature focusing on generating processes that share, identify and transfer knowledge within and between firms. Lanza (2005) reinforces Dyer and Nobeoka's (2000) finding that the development of new knowledge - along with the concurrent partners - has increasingly been undertaken in order to obtain a competitive advantage through improved product quality and innovation, despite the great difficulty and risk that these tasks entail. Lanza (2005) adds that this knowledge development process consists of two related phases: sharing and creating. Thus, competing businesses' knowledge sharing with partners is a key step for effective knowledge creation activities that allow firms to compete successfully in the market.

Knowledge and learning were also found to have a fundamental impact on internationalising firms as they must assimilate and exploit newly acquired knowledge to compete and grow in markets of which they have little to no prior knowledge (Autio et al. 2000).

Therefore, the following hypothesis was developed for the present study:

H1: Knowledge has a positive influence in internationalisation.

2.3 Cooperation

Innovation processes are of systemic and interactive in nature. Firms therefore hardly ever innovate on their own but rather in cooperation with various agents. External sources of innovation such as clients, suppliers, competitors and universities can be considered the main elements of a firm's search strategy. Previous studies have recognised the strategic importance

of a wide range of knowledge sources for driving innovation (Sofka and Grimpe 2010; Greco et al. 2016), and for achieving not only product but also process innovations (Huang and Rice 2012). Fernandes and Ferreira (2013) also conclude that geographic proximity does influence cooperation between KIBS firms and higher education institutions (HEI) and, in turn, this cooperation influences the capacity to undertake and generate innovation.

The complex nature of the innovation process makes it increasingly necessary for firms to cooperate with other organisations in order to carry through their research and development initiatives. Therefore, the more intensely the firms interacts with these external agents through cooperation agreements, the more likely it is to learn about new opportunities.

Previous research suggests that a firm can improve its innovation performance by interacting with different partners. Tomlinson (2010) finds that inter-firm collaboration with suppliers, buyers and competitors drives product and process innovation. Belderbos et al. (2004) find that R&D cooperation has a positive effect on innovative performance (financial and non-financial, like conquest of new markets), although the impact varies according to the type of partner. In this sense, Walsh et al (2016) argue that heterogeneous collaborations (i.e., university-industry) increase the quality of inventions while vertical collaborations (i.e., collaborations with suppliers or customers) increases commercialization rates of inventions.

Within this dimension, relationships can be informal agreements or co-operative arrangements. Regarding the types of relationships between actors, Conway (2000) proposes two different forms of networks: (1) informal or social networks are those based on social relations created within businesses; and, (2) formal networks are those that happen between firms as formal organisations. Blundel and Smith (2001) also studied business networking and found four different approaches: (1) industrial districts and spatial clusters; (2) supply chain networks; (3) entrepreneurial networks; and (4) innovation networks.

Cooperation ventures can vary according to their goals. Nevertheless, this does not mean that networks have to embody just one aim, as they can involve multi-purpose cooperation. In some cases, cooperation is regarded as just a locus for innovation. In this sense, firms and HEI join together in order to innovate.

As some studies reveals (Rodriguez and Nieto 2010; Rodriguez and Nieto 2012), collaboration between firms and innovation are both relevant for the internationalization of KIBS. Various authors (Keeble et al 1998; Welch 1992) argue that alliances allow firms to ease or accelerate the internationalization process by providing them with access to partners' resources and capabilities that they need for international operations

According Rodriguez and Nieto (2010) a positive relationship between cooperation, innovation and internationalisation of KIBS is also found. Thus, the results confirm the relevance of innovation for internationalisation. KIBS that establish collaborative relationships gain easier find access to international markets easier and improve their innovation capability. Thus, cooperation is found to be both directly and indirectly related with internationalisation in KIBS.

As a result of these findings, the following hypothesis was defined for the present study:

H2: Cooperation has a positive influence in internationalisation.

2.4 Innovation

KIBS are part a category of service activities that is often highly innovative, as well as facilitating innovation in other organisations. Den Hertog (2000) suggests that KIBS function as facilitators, carriers or sources of innovation, and, through their almost symbiotic relationship with client firms, some KIBS function as co-producers of innovation (den Hertog 2000; Mas-Vérdu 2011; Muller and Doloreux 2009). According to Flikkema et al. (2007), innovations can be classified as technological when they apply to products/services or processes or as non-technological innovations when referring to organisational and marketing aspects. Johnson et al. (2003) point out that, traditionally, studies of innovation have focused much more on technological rather than non-technological innovation, and service and organisational innovation has been relatively neglected. Technological innovation, as a part of innovation activities, was one of the first approaches used in innovation activities. Schumpeter (1934) distinguishes between five types of innovation. Two varieties exist in technological innovations (i.e. the introduction of new products and of new processes), while the remaining three are connected to non-technological innovation (i.e. opening new markets, developing new sources of raw materials and creating new organisational structures).

The production of services is often, according to den Hertog (2000), the result of a joint effort of the service provider and client. In this co-production process, the quality of the resulting service product largely depends on the quality of interactions and communication between the service provider and client. This author suggests that analyses of the role of KIBS in innovation processes, on the ways in which knowledge is produced and used in the economy, as well as the role of KIBS in these processes. The cited author further argues that, in addition to discrete and tangible forms of knowledge exchange, process-oriented and intangible forms of knowledge flows are crucial in these relationships.

More innovative firms can better compete and thus become more internationalised. Internationalisation implies innovation (Boermans and Roelfsma 2015), not only because innovations allow firms to enter new markets (van Beveren and Vandebussche 2010) but also

because internationalisation facilitates access to inputs that are not available in domestic markets (Salomon and Shaver 2005).

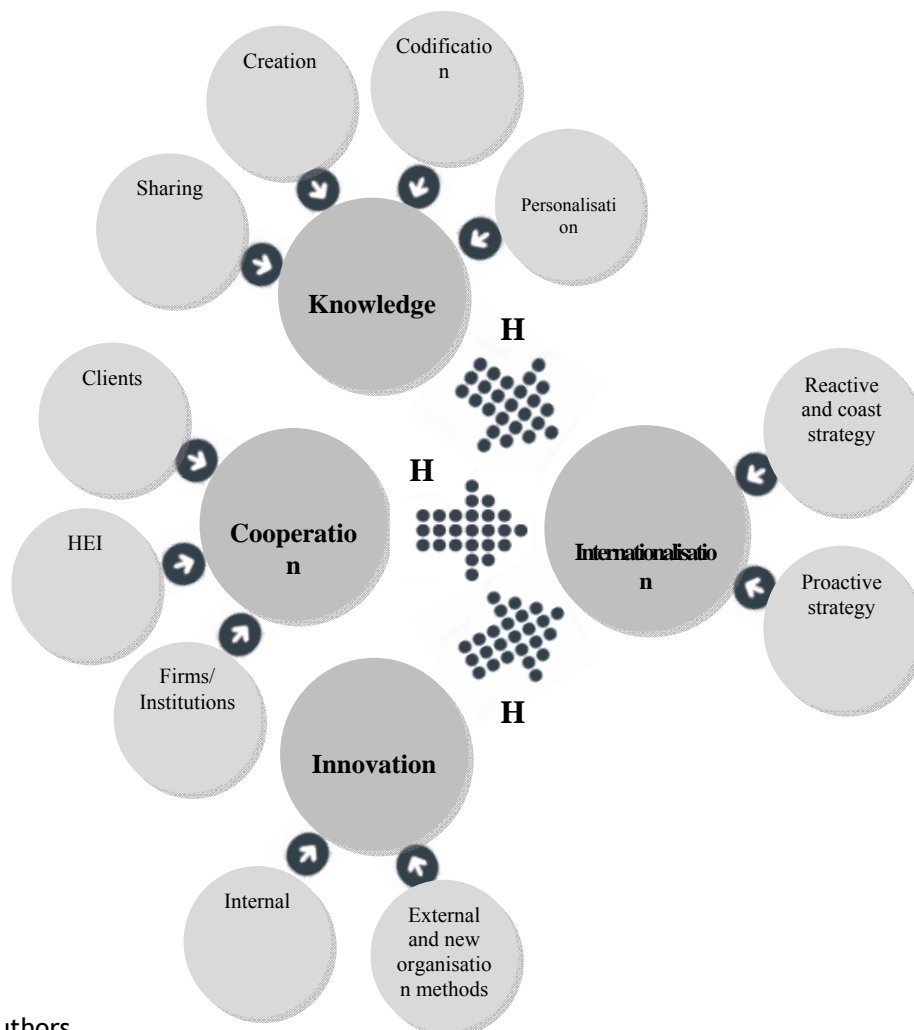
The relationship between innovation and export has often been researched from the perspective that innovation precedes foreign market entry, and that exports are positively associated with knowledge accumulation and innovation activities (Leon-Ledesma 2005; DiPietro and Anoruo 2006).

Past research has also demonstrated that innovation is directly linked to internationalisation (Moreira et al. 2013; Ripolles Melià et al. 2010).

On the basis of the above evidence, we propose the following hypothesis:

H3: Innovation has a positive influence in internationalisation.

Based on the literature review, a conceptual model of research was proposed, as shown in Figure 1 below.



Source: Authors.

Figure 1: Conceptual model of research

3. Methodological Strategy

In this study we used a quantitative methodology, applying questionnaires to CEO's of KIBS' firms in Portugal, in a sample of firms that were in operation in 2014 and 2015. With this research we aim to explore the effects of knowledge, cooperation and innovation on internationalisation. These constructs were validated using confirmatory factor analysis, studying the reliability of a questionnaire, previously validated through interviews with CEOs and academic experts (national and international), specialists in KIBS and innovation, to describe the structural relationships between the variables.

3.1 Data-source and procedures

In order to test the proposed research model and research hypotheses, data was collected via a structured questionnaire distributed online to 397 firms that were listed as in operation and contact was available in the database of the *Inquérito ao Potencial Científico e Tecnológico Nacional* (Survey of National Scientific and Technological Potential). This survey is conducted every year throughout Portugal. The surveyed firms were selected from the last reported year (i.e. 2012) based on their claim to have carried out research and development (R&D) activities and integrated four sectors: businesses, government institutions, HEIs and private non-profit organisations. The data collection took place from May to December 2015. Valid questionnaires were obtained from 58 firms (approximately 15% response rate).

3.2 Measures and sample

In order to refine operationalise the variables, we conducted a further literature review and adapted scales validated in previous studies. The survey included questions selected from fourth instruments: Community Innovation Survey - CIS2012, Fernandes (2011), Hashi and Stojčić (2013) and López-Nicolás and Meroño-Cerdán (2011) (see Table 1).

Table 1: Theoretical foundations of scales used

Variables	Dimensions and items	Theoretical foundation
Internationalization	11 items divided into 2 dimensions: <ul style="list-style-type: none"> • Proactive strategies - 8 items • Reactive and cost strategies - 3 items 	CIS (2012)
Innovation	9 items divided into 2 dimensions: <ul style="list-style-type: none"> • Internal innovation - 4 item • External innovation and new organization methods - 5 item 	CIS (2012)
Knowledge	15 items divided into 4 dimensions: <ul style="list-style-type: none"> • Personalisation - 4 items • Codification - 4 items • Sharing - 4 items • Creation - 3 items 	López-Nicolás and Meroño-Cerdán (2011) CIS (2012)
Cooperation	29 items divided into 3 dimensions: <ul style="list-style-type: none"> • Clients - 10 items • HEI - 9 items • Others Firms/institutions - 10 items 	Fernandes (2011) CIS (2012)

The dataset used in this study consists of 58 KIBS firms and included 64 variables concerning strategies of internationalisation, cooperation, knowledge and innovation. Data were collected from Portuguese KIBS chief executive officers (CEOs). The 64 variables were grouped into six sections of items in the questionnaire, for which some descriptive statistics are provided in Tables 2, 3, 4 and 5 below. All the items were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Questions about strategies of internationalisation, refer to nine five-points items, show means between 3.3 (proactive strategies) and 2.06 (Reactive and costs strategies), with a standard deviation of approximately, two 1.2. Relies about knowledge, covered by 15 items, display means between 2.96 (knowledge sharing processes) and 4.26 (personalisation), with a standard deviation of approximately, two. Answers concerning the 29 items about cooperation (i.e. HEIs, clients and other firms/institutions) have means between 2.13 (cooperation with HEIs) and 4.04 (cooperation with clients), with a standard deviation of around one. Answers concerning the 9 items about innovation (i.e. internal and external innovation) have means between 3.7 (internal innovation) and 3.1 (External innovation and new organization methods), with a standard deviation of around 1.1.

In this study, we did a factor analysis of the scales used to measure: internationalization, knowledge, cooperation and innovation, as well as a multiple linear regression. The objective of the factorial analysis was to reduce the initial number of variables while keeping their common characteristics. Linear regression was performed in order to estimate the contribution of different factors to co-creation of technological and non-technological innovation. All the statistical analyses presented were performed using IBM SPSS 22.0.

4 RESULTS

4.1 Principal Components Analysis

In this section, we describe the results of the above-mentioned factor analysis and linear regression to allow the presentation and discussion of the findings.

For all dimensions under study we started by confirming if PCA was an adequate method by using Bartlett's sphericity test, Kaiser-Meyer-Olkin (KMO) statistics and anti-image. Subsequently, we computed the principal components, loadings and communalities. The decision on the number of components to retain was a compromise between maximising the explained initial dataset variability and reducing the initial number of variables. In order to express the common variability between the initial variables, rotation was performed and the factors obtained.

Using the Principal Components Analysis (PCA) method, the variables concerned with 'Strategies of internationalisation' were reduced from 11 variables to only two components (see Table 2). The KMO statistic is 0.76. Therefore, since $0.7 < 0.756 < 0.8$, we concluded that there is an average adequacy of the PCA because about 80% of the correlations are significant (Hair et al. 2014). When the Bartlett's test, in which the null hypothesis is the identity correlation matrix, has a p -value of approximately $0 < 0.05$, then the null hypothesis can be rejected, and it is possible to conclude that the correlations between the involved variables are sufficiently high. Therefore, we concluded that running a PCA was adequate in this context.

According to the Kaiser criterion, when a correlation matrix is used, all components corresponding to eigenvalues smaller than one should be excluded. Applying this criterion, the first two components were extracted; as these explained a total of 70.5% of the total variance in the original data: 47.4% is related with the first factor and 23.1% with the second one. The remaining components were excluded for having eigenvalues smaller than one.

Table 2: Component and item statistics - Strategies of Internationalisation

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Proactive strategies ($\alpha = 0.924$)				3.308	
Scale economies achievement	0.874	0.793	0.819	3.24	1.445
Risk diversification	0.868	0.804	0.817	3.20	1.364
Exploration of own skills	0.860	0.839	0.825	3.39	1.262
Firm's growth needs	0.831	0.713	0.804	3.68	1.491
Improve margins and profitability	0.807	0.800	0.790	3.44	1.285
Internationalization arises from innovation processes	0.805	0.929	0.770	3.32	1.386
Strangulation of domestic market	0.724	0.731	0.646	3.37	1.280
Monitoring of important clients	0.611	0.671	0.491	2.83	1.395
Reactive and costs strategies ($\alpha = 0.807$)				2.057	
Proximity to sources of raw materials	0.877	0.668	0.762	1.80	0.954
Cheap labour demand	0.846	0.633	0.741	1.83	0.919
Reaction to performance competition	0.618	0.628	0.570	2.54	1.416

Using the PCA method, the variables related to 'Knowledge' were reduced from 15 variables to four components (see Table 3). Using the same criterion as in the previous analysis, the first four components were extracted, which explained a total of 64.4% of the total variance in the original data, with 19.7% related with the first factor, 17.3% to the second, 14.6% to the third and 12.8% with the fourth factor. The remaining components were excluded for having eigenvalues smaller than one. The KMO statistic is approximately 0.7, and the p -value for Bartlett's test shows that the correlation matrix is significantly different from the identity matrix. Therefore, a factorial analysis could be performed. We performed a Varimax rotation and suppressed coefficients with an absolute value below 0.35, obtaining the scores presented in Table 3. Since all factorial scores are greater than 0.5, no items were eliminated from the analysis, and we considered the factor with the highest score value from each item. The Cronbach's alpha for the first factor is greater than 0.8, which indicates high reliability. The other factors' alphas are close to 0.7, which indicates medium reliability (see Hair et al., 2014).

Table 3: Component and item statistics - Knowledge

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Personalisation ($\alpha = 0.820$)				3.93	6
Receives advice from supervisor	0.913	0.679	0.781	4.15	0.841
Carries out informal meetings to share knowledge	0.832	0.730	0.712	3.91	1.181
Enjoys a close relationship with a mentor who facilitates the transfer of knowledge	0.672	0.839	0.621	3.68	1.156
Shares knowledge easily with co-workers	0.600	0.750	0.584	4.26	0.880
Creates knowledge through cooperation with customers	0.551	0.611	0.428	3.68	0.976
Codification ($\alpha = 0.715$)				3.264	
Shares experiences with other firms	0,727	0.740	0.476	3.15	1.099
Establishes protocols about how to share knowledge inside the firm	0,678	0.684	0.534	3.32	1.384
Establishes protocols about how to share knowledge outside the firm	0,624	0.568	0.554	3.11	1.396
Shares knowledge through manuals and internal documents	0,623	0.738	0.405	3.53	1.012
Takes minutes of meetings to document results of projects and working groups	0,566	0.590	0.413	3.21	1.291
Knowledge creation and acquisition ($\alpha = 0.700$)				3.591	
Creates firm priorities and builds up knowledge and dissemination	0,809	0.736	0.644	3.83	1.014
Learns from other organisations	0,803	0.658	0.524	3.53	0.868
Acquires knowledge easily through manuals and documents	0,538	0.780	0.404	3.42	0.989
Knowledge sharing ($\alpha = 0.681$)				3.255	
Shares knowledge with clients	0,816	0.531	0.519	3.55	1.030
Shares knowledge with staff and other firms	0,748	0.554	0.519	2.96	0.940

Using the PCA method, the variables concerned with 'Cooperation' were reduced from 29 variables to only three components (see Table 4). The first three components were extracted; as these explained a total of 71.6% of the total variance in the original data. The remaining components were excluded for having eigenvalues smaller than one. The KMO statistic is approximately 0.71, and the p -value for Bartlett's test shows the correlation matrix is significantly different from the identity matrix, so a factorial analysis could be performed. We then performed a Varimax rotation and suppressed coefficients with an absolute value below 0.35, obtaining the scores presented in Table 4. Since all factorial scores are approximately equal or greater than 0.5, no items were eliminated from the analysis, and we considered the factor with the highest score value from each item. The Cronbach's alphas for the three factors are greater than 0.89, which indicates high reliability (see Hair et al. 2014).

Table 4: Component and item statistics - Cooperation

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Cooperation with clients ($\alpha = 0.913$)				3.418	
Reduces overall costs	0.832	0.708	0.791	2.98	1.378
Learns with a cooperation partner	0.809	0.677	0.694	3.40	1.107
Shares technology and knowledge	0.795	0.693	0.754	3.52	1.111
Suggests ideas for improving products (goods/services) or processes	0.786	0.677	0.717	4.04	1.009
Elevates operational efficiency	0.782	0.646	0.722	3.52	1.313
Develops new products and/or processes	0.763	0.739	0.715	3.86	1.143
Develops new concepts	0.739	0.582	0.653	3.56	1.280
Generates formal and informal exchanges of people and ideas	0.703	0.557	0.692	3.30	1.199
Expands market share in geographical area of operation	0.579	0.787	0.555	3.72	1.341
Shares R&D costs	0.558	0.803	0.555	2.28	1.089
Cooperation with HEIs ($\alpha = 0.892$)				2.757	
Shares technology and knowledge	0.867	0.596	0.782	3.04	1.351
Develops new concepts	0.802	0.601	0.722	2.98	1.327
Develops new products and/or processes	0.786	0.592	0.687	3.17	1.291
Learns with a cooperation partner	0.733	0.513	0.676	3.09	1.248
Generates formal and informal exchanges of people and ideas	0.725	0.585	0.647	3.06	1.389
Shares R&D costs	0.715	0.678	0.602	2.13	1.115
Increases operational efficiency	0.683	0.609	0.681	2.79	1.334
Expands market share in geographical area of operation	0.650	0.562	0.627	2.26	1.113
Reduces overall costs	0.452	0.521	0.411	2.30	1.121
Cooperation with other organisations ($\alpha = 0.938$)				3.067	
Suggests ideas for improving products (goods/services) or processes	0.848	0.622	0.799	3.64	1.317
Generates formal and informal exchanges of people and ideas	0.830	0.712	0.820	3.13	1.236
Increases operational efficiency	0.819	0.534	0.788	3.18	1.302
Expands market share in geographical area of operation	0.788	0.702	0.674	3.29	1.254
Shares technology and knowledge	0.784	0.772	0.762	3.07	1.232
Learns with a cooperation partner	0.773	0.804	0.762	3.27	1.268
Develops new products and/or processes	0.766	0.720	0.743	3.29	1.424
Develops new concepts	0.750	0.718	0.775	2.91	1.411
Reduces overall costs	0.736	0.542	0.665	2.58	1.215
Shares R&D costs	0.709	0.813	0.729	2.31	1.145

Using the PCA method, the variables related to ‘Innovation’ were reduced from nine variables to only two components (see Table 5). The first two components were extracted; as these explained a total of 59.7% of the total variance in the original data: the first factor explained 30.2% and the second one 29.5%. The remaining components were excluded for having eigenvalues smaller than one. The KMO statistic is approximately 0.659, and the p -value for Bartlett’s test shows that the correlation matrix is significantly different from the identity matrix, so a factorial analysis could be performed. We then performed a Varimax rotation and suppressed coefficients with an absolute value below 0.35, obtaining the scores presented in Table 5. Since all factorial scores are approximately equal or greater than 0.5, no items were eliminated from the analysis, and we considered the factor with the highest score value from each item. The Cronbach’s alpha for the first factor is greater than 0.8, which indicates high reliability. The second factor’s alpha is close to 0.8, which indicates medium reliability (see Hair et al., 2014).

Table 5: Component and item statistics - Innovation

Component/Item	Component loading	Sample adequacy	Item-total correlation	Mean	Standard deviation
Internal innovation ($\alpha = 0.833$)				3.73	
				3	
New or significantly improved services launched on the market	0.842	0.713	0.744	3.86	1.137
Activities to support the processes of new or improved business	0.836	0.839	0.667	3.68	1.121
New or significantly improved processes launched in the market	0.779	0.793	0.636	3.80	1.095
New business practices in the organization of procedures	0.731	0.804	0.604	3.59	1.069
External innovation and new organization methods ($\alpha = 0.769$)				3.19	
				3	
New pricing policies for services	0.831	0.668	0.685	3.08	1.193
New techniques or media (Media) to the promotion of services	0.816	0.929	0.631	3.15	1.186
New methods of distribution/placement services or new sales channels	0.725	0.633	0.593	2.98	1.196
New methods of organization of responsibilities and decision-making	0.597	0.731	0.460	3.46	1.222
New methods of organizing external relations with other firms or public institutions	0.529	0.800	0.346	3.29	1.160

By analysing the correlation matrix (Table 6) and the significance level of 10%, we were able to observe a significant positive correlation between ‘cooperation with clients’ and ‘knowledge sharing’, ‘cooperation with HEIs’ and ‘knowledge creation’, ‘external innovation and new organisation methods’ and ‘Proactive Strategies’ of internationalization. ‘Proactive Strategies’ of internationalisation have a positive correlation with ‘personalization’ and ‘cooperation with

clients'. 'Reactive and Cost Strategies' of internationalisation have a positive correlation with 'cooperation with clients'. However, we found a negative correlation between 'cooperation with HEIs' and 'knowledge sharing'. This result reinforces the idea that higher education institutions still assume a passive role in knowledge sharing.

Table 6: Correlation Matrix

	K1	K2	K3	K4	CO1	CO2	CO3	Int1	Int2	In1	In2
Personalisation (K1)	1										
Codification (K2)	0.000	1									
Knowledge creation (K3)	0.000	0.000	1								
Knowledge sharing (K4)	0.000	0.000	0.000	1							
Cooperation with other firms/institutions (CO1)	-0.204	-0.180	-0.012	0.006	1						
Cooperation with clients (CO2)	0.152	-0.012	0.269	0.516**	0.000	1					
Cooperation with HEIs (CO3)	-0.035	0.203	0.312*	-0.317*	0.000	0.000	1				
Proactive Strategies (Int1)	0.407**	-0.017	0.136	0.078	-0.237	0.413**	-0.084	1			
Reactive and Cost Strategies (Int2)	-0.257	0.074	0.089	-0.210	-0.011	0.443**	0.297	0.000	1		
Internal Innovation (In1)	0.189	0.058	0.207	-0.063	-0.092	0.227	0.156	0.240	0.127	1	
External and new organization methods (In2)	0.250	0.031	0.019	0.062	0.035	0.224	0.063	0.398**	0.131	0.000	1

4.2 Multivariate regression analysis

We also examined the previously tested relationships using two linear regressions with the dependent variables 'Proactive strategies' and 'Reactive and coast strategies' and the dependent variables of factors related with knowledge, cooperation and innovation (results in Table 7).

Assumptions of Multiple Linear Regression are: normality of the dependent variables, no multicollinearity and homoscedasticity.

The p-values for Kolmogorov-Smirnov and Shapiro-Wilks tests of normality are greater than 5%, then we cannot consider normality cannot be considered.

The variable 'Proactive strategies' displays a Skewness Statistic -0,624 with standard error 0,369 and consequently Skewness coefficient $G = -1,690 > -1,9$ and Kurtosis Statistic -0,284 with standard error 0,724 and consequently Kurtosis coefficient $K = -0,392 > -1,9$.

The variable 'Reactive and costs strategies' shows a Skewness Statistic 0,225 with standard error 0,369 and consequently Skewness coefficient $G=0,608 < 1,9$ and Kurtosis Statistic -1,733 with standard error 0,724 and consequently Kurtosis coefficient $K=-2,392$ which is not much less than -1,9.

Then independent variables have symmetric and mesokurtic distributions and consequently can be considered approximately normal.

In Table 6: Correlation matrix we can see that many correlation coefficients among all independent variables are smaller than 0.08. We can test the multiple linear regression model for autocorrelation with the Durbin-Watson test. Durbin-Watson statistics in the first regression is 1,701 and in the second 2,077. Values of $1.5 < d < 2.5$ show that there is no auto-correlation in the multiple linear regression data.

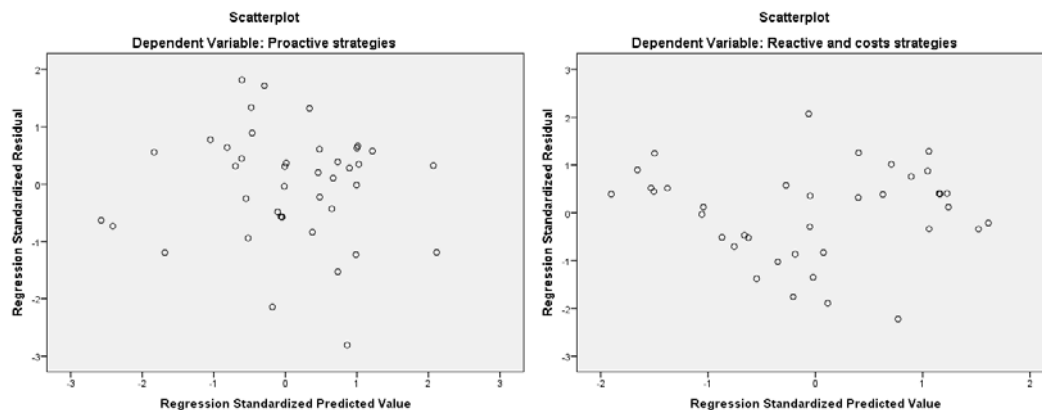


Figure 2: Scatterplots

The last assumption the multiple linear regression analysis makes is homoscedasticity. We can see in Figure 2: Scatterplots shows a random distribution of points around zero, then homoscedasticity is verified.

The adequacy of the linear models depends of their residuals. They must be white noise, i.e., must have a normal distribution with zero mean and constant variance and the residuals must be independent. Using the Kolmogorov-Smirnov and Shapiro-Wilk normality tests are obtained with high p-values then a normal distribution of residuals, in the two regressions, can be assumed. Homoscedasticity was observed above as well as residuals independence thought Durbin-Watson's results.

The linear regression was implemented using the 'Enter' method to introduce variables, but the Wald test of parameters significance showed non-significant p-values, so a stepwise method was

performed using Akaike information criterion to insert or remove independent variables. The initial tested linear model, is:

$$\text{Internationalization (proactive strategies + reactive and cost strategies)} = \beta_0 + \beta_1 * \text{knowledge (codification+ personalisation+ creation+ sharing)} + \beta_2 * \text{cooperation with (clients + HEIs + other organisations)} + \beta_3 * \text{innovation (internal; external)}$$

The best linear model, according to this criterion, is the one that have the coefficients presented in the table 7.

Table 7: Standardized coefficients of linear regressions. Depend variable: internationalization.

	Proactive strategies	Reactive and cost strategies
Personalisation	0.360*	-0.357*
Cooperation with Clients	--	0.893***
Knowledge sharing	--	-0.650***
External innovation and new organization methods	0.365*	--
Internal Innovation	--	-0.293*
R	0.546	0.824
R Square	0.298	0.679
Adjusted R Square	0.259	0.641

* p < 0,05; ***p<0.000

Table 7 shows two multivariate linear regression models for internationalization (the first one for ‘Proactive strategies’ and the second one for ‘Reactive and cost strategies’). ANOVA Tests were performed for the linear models and significant levels were obtained (p=0.002 for ‘Proactive strategies’ and p=0.000 for ‘Reactive and cost strategies’).

These results show that Knowledge ‘personalization’ and ‘external innovation and new organization methods’ explains more than 29% of ‘Proactive strategies’ variance (confirmed H1 and H3). The regression coefficient of ‘Personalization’ is 0.36, which means that, when ‘Personalization’ increases 1%, ‘Proactive strategies’ increase, approximately, 36% and when ‘External innovation and new organization methods’ increases 1%, ‘Proactive strategies’ increases about 36,5%. In addition, ‘personalization’, ‘knowledge sharing’, ‘cooperation with clients’ and ‘internal innovation’ explained approximately 68% of ‘Reactive and cost strategies’ variance. The regression coefficient of knowledge ‘cooperation with clients’ is 0.893, which means that, when ‘cooperation with clients’ increases one unit, ‘Reactive and cost strategies’ increases about 89,3% (confirmed H2), but when ‘personalization’ increases 1%, ‘Reactive and cost strategies’ decreases about 35,7%, when ‘knowledge sharing’ increases 1%, ‘Reactive and

cost strategies' decreases about 65% and when 'internal innovation' increases 1%, 'Reactive and cost strategies' decreases about 29,3%.

5 CONCLUSIONS

This study focused on an analysis of the effects of knowledge, cooperation and innovation on internationalisation. As described above in the conceptual framework section, this study was based on one assumption made by several authors (e.g. Fernandez-Esquinas and Uyarra, 2013; Rodriguez and Nieto, 2012; Marques et al. *forthcoming*) that knowledge, cooperation and innovation have a positive impact in internationalization of firms, in the specific case of this study, which belong to the sector of KIBS.

A quantitative research methodology was used to test hypotheses based on a literature review and a research model that describes the relationships between internationalization, knowledge, cooperation, and innovation for Portuguese KIBS. On the one hand, our results show that knowledge personalisation has a positive influence in proactive strategies of internationalization, such as, external innovation and new organization methods. When KIBS cooperate with clients there is a positive impact in reactive and cost strategies of the internationalisation. On the other hand, reactive and cost strategies of internationalisation are negatively influenced by knowledge personalization, knowledge sharing and internal innovation.

This research contributes to the study of KIBS in three ways: (1) to increase academic knowledge about this subject; (2) to the management practice, allowing firms to gain insights that may develop their proactive strategies of internationalization, specifically regarding the strategic management of knowledge and implementing model of innovation management involving clients and HEIs; (3) to reinforce the need for adjustment of public policies to encourage the development and strengthening of proactivity of this sector with regard to internationalization and formal and informal networks..

In future paths of research, the sample could be increased so that the results can provide a clearer empirical view of how the variables included here relate and interact with other variables. Other causal links and explanations are plausible. For example, a positive correlation may exist between knowledge, cooperation, innovation and co-creation of innovation, and localization. Including location (rural versus urban), the size of firms, the different role of the actors of the development of local networks and the characteristics of this business sector entrepreneurs could also be interesting for further investigation. In addition, a panel study of KIBS CEOs could be conducted to determine the depth of the present results. Finally, this study could be replicated in different countries using comparative analysis. These improvements and updates would strengthen knowledge on the co-creation of innovation, which can be incorporated within different strategies and interventions in the innovation processes of KIBS and

other organisations. For instance, research on these other organisations (i.e. clients, HEIs and other firms/institutions) could analyse more thoroughly the influence of KIBS on these organisations' innovation processes.

References

- Abecassis-Moedas, C., Ben Mahmoud-Jouini, S., Dell'era, C., Manceau, D. and Verganti, R. (2012) 'Key Resources and Internationalization Modes of Creative Knowledge-Intensive Business Services: The Case of Design Consultancies'. *Creativity and Innovation Management*, Vol. 21, pp. 315-331.
- Altomonte, C., Aquilante, T., Békés, G. and Ottaviano G.I.P. (2013) 'Internationalization and innovation of firms: evidence and policy'. *Economic Policy*, Vol. 28, No. 76, pp. 663-700.
- Autio E, Sapienza H.J. and Almeida J.G. (2000) 'Effects of age at entry knowledge intensity and imitability on international growth', *Academy Management Journal*, Vol. 43, No. 5, pp. 909-924.
- Belderbos R., Carree, M. and Lokshin, B. (2004) "Cooperative R&D and firm Performance", *Research Policy*, Vol. 33, No. 10, pp 1477-1492.
- Blundel, R. and Smith, D. (2001). *Business Network Report*. Small Business Service, London.
- Boermans, M. and Roelfsma, H. (2015) 'The effects of internationalization on innovation: firm-level evidence for transition economies', *Open Economies Review*, Vol. 26, No. 2, pp.333-350.
- Capasso, A.; Dagnino G., and Lanza, A. (Eds) (2005) 'Introduction: strategic capabilities and knowledge transfer within and between organizations, pp. 1 - 13, Cheltenham, UK.
- Cassiman, B. and Veugelers, R. (2006) 'In Search of Complementarity in Innovation Strategy: Internal R&D and External Knowledge Acquisition', *Management Science*, Vol. 52, No. 1, pp. 68-82.
- Conway, S. (2000). *Social network mapping and the analysis of informal organisation*. Working paper RP024, Aston Business School, Aston University, Birmingham.
- Czinkota, M.R., Ronkainen, I.A. and Ortiz-Buonafina, M. (2004) *The export marketing imperative*, Australia, Thomson.
- den Hertog, P. (2000) 'Knowledge-intensive business services as co-producers of innovation', *International Journal of Innovation Management*, Vol. 4, No. 4, pp. 491-528.
- Di Maria, E., Bettiol, M., De Marchi, V. and Grandinetti, R. (2012) 'Developing and Managing Distant Markets: The Case of KIBS', *Economia Politica*, Vol. 29, pp. 361-379.
- DiPietro W.R. and Anoruo E (2006) 'Creativity innovation and export performance', *Journal of Policy Modeling*, Vol. 28, No. 2, pp.133-139.
- Dyer, J.H. and Nobeoka, K. (2000) 'Creating and managing a high-performance knowledge-sharing network: the Toyota case', *Strategic Management Journal*, Vol. 21, pp. 99-126.
- Doloreux, D. and Laperriere, A. (2014) 'Internationalisation and innovation in the knowledge-intensive business services', *Service Business*, Vol. 8, pp. 635-657.
- Fernandes, C., Ferreira, J, and Marques, C.S. (2011) *Knowledge Intensive Business Services (KIBS) in Portugal: Location and Innovative Capacity*, Doctoral thesis, Universidade da Beira Interior, Covilhã, Portugal.
- Fernandes, C., and Ferreira, J. (2013) 'Knowledge spillovers: cooperation between universities and KIBS', *R&D Management*, Vol. 45, No.5, pp: 461-472.
- Flikkema, M., Jansen, P., and Van Der Sluis, L. (2007) 'Identifying neo-Schumpeterian innovation in service firms: a conceptual essay with a novel classification', *Economics of Innovation and New Technology*, Vol. 16, No. 7, pp. 541-558.

- Greco, M., Grimaldi, M., and Cricelli, L. (2016) 'An analysis of the open innovation effect on firm performance', *European Management Journal*, Available online 12 March 2016 <http://www.sciencedirect.com/science/article/pii/S0263237316300147>.
- Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2014) *Multivariate Data Analysis* (7th ed.). Pearson Education: Harrow
- Hansen, M., Nohria, N. and Tierney, T. (1999) 'What's your strategy for managing knowledge?', *Harvard Business Review*, Vol. 77, No. 2, pp. 106-116.
- Hashi, I. and Stojčić, N. (2013) 'The impact of innovation activities on firm performance using a multi-stage model: Evidence from the community innovation survey 4'. *Research Policy*, Vol. 42, No. 2, pp. 353-366.
- Hauknes, J. (1998) *Services in innovation innovation in services* (Step report, n.13). Oslo, Norway.
- Huang, F. and Rice, J. (2012) 'Openness in product and process innovation', *International Journal of Innovation Management*, Vol. 16, No. 4, pp 1-24.
- Johnson, B., Edquist, C., and Lundvall B. (2003) *Economic Development and the National*. Rio de Janeiro. http://www.globelicsacademy.net/pdf/BengtAkeLundvall_2.pdf
- Keeble, D., Lawson, C., Smith, H.L., Moore, B., and Wilkinson, F. (1998) 'International processes, networking and local embeddedness in technology-intensive small firms'. *Small Business Economics*, Vol. 11, No. 4, pp. 327-342.
- Kubota, L. (2009) 'As KIBS e a inovação tecnológica das firmas de serviços', *Economia e Sociedade, Campinas*, Vol. 18, No. 2, pp. 349-369.
- Lanza, A. (2005) 'Managing heterogeneity, alloative balance, and behavioural and tenhology concerns in competitive and cooperative inter-firm relationships'. In Capasso, A.; Dagnino, G. and Lanza, A. (Eds), *Strategic Capabilities and Knowledge Transfer Within and Between Organizations - New Perspectives from Acquisition, Networks, Learning and Evolution* (pp. 17-34). Cheltenham: Edward Elgar.
- Leon-Ledesma MA (2005) 'Exports product differentiation and knowledge spillovers', *Open Economies Review*, Vol. 16, No. 4, pp. 363-379.
- López-Nicolás, C. and Meroño-Cerdán, A. (2011) 'Strategic knowledge management, innovation and performance', *International journal of information management*, Vol. 31, No. 6, pp. 502-509.
- Marques, C.S., Leal, C.; Marques, C.P. and Cardoso, A.R. (2016) 'Strategic knowledge management, innovation and performance: A qualitative study of the footwear industry', *Journal of the Knowledge Economy*, Vol. 7, No. 3, pp. 659-675.
- Marques, C.S., Marques, C.P.; Leal, C.T. and Cardoso, A.R. (*forthcoming*) 'Knowledge, innovation, internationalisation and performance: insights from the Portuguese footwear industry', *International Journal of Entrepreneurship and Small Business*.
- Mas-Vérdu F., Wensley, A., Alba, M., and Álvarez-Coque J. (2011) 'How much does KIBS contribute to the generation and diffusion of innovation?', *Service Business*, Vol. 5, No. 3, pp. 195-212.
- Miles, I. Kastrinon, N. Flanagan, K. Bilderbeek, R. den Hertog, P., Huntink, W., and Bouman, M. (1995) *Knowledge Intensive Business Services. Users and Sources of Innovation*. Brussels: European Commission.
- Moreira, M.R.A.; Maia, M.A.S.; Sousa, P.S.A. and Meneses, R.F. (2013) 'Factors influencing the internationalisation of services firms: the case of design engineering and architecture consulting firms'. In Cunha, J., Snene, M. and Novoa, H. (eds), *Exploring services science* (pp. 246-262). London: Springer.

- Muller, E. and Doloreux, D. (2009) 'What we should know about knowledge-intensive business services'. *Technology in Society*, Vol. 31, No. 1, pp. 64-72.
- Pina, K. and Tether, B.S. (2016) 'Towards understanding variety in knowledge intensive business services by distinguishing their knowledge bases'. *Research Policy*, Vol. 45, No. 2, pp. 401-413.
- Poot, T., Faems, D. and Vanhaverbeke, W. (2009) 'Toward a dynamic perspective on open innovation: a longitudinal assessment of the adoption of internal and external innovation strategies in the netherlands', *International Journal of Innovation Management*, Vol. 13, No.2, pp. 177-200.
- Ripolles Melià, M., Blesa, A. and Dobon, S.R. (2010) 'The influence of innovation orientation on the internationalisation of SMEs in the service sector', *Service Industries Journal*, Vol. 30, No. 5, pp. 777-791.
- Rodriguez, A. and Nieto M.J. (2012) 'The internationalization of knowledge-intensive business services: the effect of collaboration and the mediating role of innovation', *The Service Industries Journal*, Vol. 32, No. 7, pp. 1057-1075.
- Rodriguez, A. and Nieto M.J. (2010) 'Cooperation and innovation in the internationalization of knowledge-intensive business services'. In J. Pla-Barber and J. Alegre (Eds.), *Reshaping the boundaries of the firm in an era of global interdependence. Progress in international business research* (Vol. 5, pp. 247-270). Bingley, UK: Emerald Group Publishing.
- Salomon, R. and Shaver, J. (2005) 'Learning by exporting: new insights from examining firm innovation', *Journal of Economics & Management Strategy*, Vol. 14, No. 2, pp.431-460.
- Santos, J. B. and Spring, M. (2015) 'Are knowledge intensive business services really co-produced? Overcoming lack of customer participation in KIBS', *Industrial Marketing Management*, Vol. 50, pp. 85-96.
- Simmie, J. and Strambach, S. (2006) 'The contribution of KIBS to innovation in cities: an evolutionary and institutional perspective', *Journal of Knowledge Management*, Vol. 10, No. 5, pp. 26-40.
- Sofka, W. and Grimpe, C. (2010) 'Specialized search and innovation performance - evidence across Europe', *R&D Management*, Vol. 40, No. 3, pp 310-323.
- Storey, C. and Hahn, K. (2010) 'The role of knowledge management strategies and task knowledge in stimulating service innovation', *Journal of Service Research*, Vol. 13, No. 4, pp. 397-410.
- Tomlinson, P.R. (2010) 'Co-operative ties and innovation: some new evidence for UK manufacturing', *Research Policy*, Vol. 39, pp.762-775.
- van Beveren, I. and Vandenbussche, H. (2010) 'Product and process innovation and firms' decision to export', *Journal of Economic Policy Reform*, Vol. 13, No. 1, pp.3-24.
- Walsh, J.P, Lee, Y.N. and Nagaoka, S. (2016) 'Openness and innovation in the US: Collaboration form, idea generation and implementation', *Research Policy*, Vol. 45, No. 8, pp. 1660-1671.
- Welch, L.S. (1992) 'The use of alliances by small firms in achieving internationalization', *Scandinavian International Business*, Vol. 1, No. 2, pp. 21-37.
- Wu, I. and Lin, H. (2009) 'A strategy-based process for implementing knowledge management: An integrative view and empirical study', *Journal of American Society for Information and Technology*, Vol. 60, No. 4, pp. 789-802.

PART III

CHAPTER 6

Final considerations

In the introduction the general objectives of this research thesis were defined: (1) To map the scientific publications, intellectual structure and research trends related to the intensive business services in knowledge, in order to develop a description of the main characteristics of KIBS and to identify the theoretical approaches used in the analysis of this type of business (eg, creation, sharing and knowledge transfer focused on KIBS, cooperation and innovation networks, localization and internationalization strategies), and the different connections between each of the identified dimensions; (2) To propose a conceptual model of analysis to be tested empirically in subsequent quantitative studies; (3) To explore the effects and relationships established at the level of knowledge, cooperation and internationalization in the process of co-production innovation of KIBS firms; (4) To identify and to explore the effects of innovation, knowledge and cooperation in the internationalization of KIBS.

In Chapter 2 we mapped the scientific publications, intellectual structure and research trends related to the intensive business services in knowledge. Chapter 3 was based on a qualitative study through interviews with KIBS' CEOs and academic experts in order to define the dimensions and to propose a conceptual model to be tested in future studies. Chapter 4 includes research on the effects of the dimensions of knowledge, cooperation and internationalization in co-production innovation. In Chapter 5, the empirical study focused on the effects and the relationships established between the dimensions knowledge, cooperation and innovation with regards to internationalization strategies of KIBS.

This chapter presents the main findings resulting from the previous chapters, with special emphasis on the results that respond to the initially defined research questions, as well as the main constraints identified along the chapters' progress and new avenues for research.

1. Conclusions

In order to answer the five central questions of this investigation were carried out four empirical studies. In this section, a presentation of the answers to these central research questions is provided.

What are the main trends in KIBS research?

To address this issue the study "Knowledge Intensive Business Services Research: Bibliometric study of the leading international journals (1994-2014) concluded that KIBS can be divided into four clusters brought: (1) Innovation - concepts and process; (2) Knowledge - creation and sharing, co-production and transfer; (3) networks of innovation and cooperation; and (4) location and customer relationships. These reflect the key dimensions that allow a better understanding of the conceptual definition of KIBS, the interaction with other firms and their role in the economy.

The articles that play a greater role in the KIBS research field are: (1) Muller and Zenker (2001); (2) Hipp and Grupp (2005); (3) Bettencourt et al. (2002); (4) Tuominen and Toivonen (2009); (5) Miozzo and Grimshaw (2005); and (6) Antonelli (1998), based on the total number of citations. The network of co-occurrence of the categories resulted in the "hot" categories: Business and Economy (according to our redefinition), Strategy, Operations Research and Management Studies, Geography and Environmental Studies, Engineering and Information and Library Science. KIBS research is, thus, applied in many areas. The application of the KIBS theory is emerging in unexpected areas; for example, an emerging area in the literature is the tourism sector. With respect to the keywords, the relationship between studies has become increasingly closer. According to the literature, some "hot topics" were focused, for a long time, in the customer orientation and telecommunications, while others have been changing over the years, the market or the process of information over the period 2004-2005, globalization and collaboration over the period 2006-2007, then the focus directed to the process of innovation and services innovation models over the period 2008-2009, and moved to the Internet and network effects over the period 2010 -2011. This study sought to analyse the current situation focused in the field of innovation and knowledge. In addition a number of papers focused on networking and interaction between KIBS and client. Such insights can be helpful to point directions for future research. It also seems to be possible to conclude that internationalization is, yet, "weak" in KIBS research. Furthermore, as the cooperation between KIBS and other firms brings recognized benefits to the latter (Wong and He, 2005), as well as throughout the economy (Shi et al., 2014) it would also be beneficial to take this research in an internationally collaborative way. In addition, internationalization is a theme that seems to gain prominence in the literature on KIBS (Doloreux and Laperriere, 2014). In light of these results, internationalization was an exploited dimension in research and it can be, further, explored in future research.

What relations are established between the key dimensions in the Portuguese KIBS firms? How is the accumulated knowledge transferred for firms with which the KIBS relate?

The results of this qualitative study "KIBS' key dimensions: a qualitative study on innovation, knowledge, networks, location and internationalization", allowed encouraging the discussion about the importance of KIBS and its role in innovation and internationalization, taking into

account the perspectives of both CEOs (practice) and academic (theoretical). The results obtained support the relationship between the selected key dimensions (innovation, knowledge, network, localization and internationalization) - proposed in the literature review. Therefore, the results indicate that the high levels of cooperation with other firms and universities, the urban location, and social, institutional and technical knowledge of KIBS favour innovation inputs of both firms into new foreign markets - internationalization. These results are in line with other authors, as Fernandes and Ferreira (2013); Pinto, Fernandez-Esquinas and Uyarra (2013) and Abecassis-Coins (2012). Furthermore, our research suggests that high levels of innovation promote the internationalization, as the study of Rodriguez and Nieto (2012). These findings inspired a theoretical research model, identifying the main dimensions, sub-dimensions and possible relationships between them - later tested through a quantitative approach. Therefore, the subsequent investigation validated the measuring instrument, collected information from the CEOs of Portuguese KIBS (P-KIBS and T-KIBS).

What contributes to the co-production of innovation?

This study "Exploring the relationships between KIBS and innovation: a quantitative analyse in Portuguese Firms" focused on the analysis of the relationship between knowledge, cooperation, internationalization with the co-creation of innovation (between KIBS and clients, high educational institutions and other firms/institutions). This study was based on several authors (e.g. den Hertog, 2000; Müller & Doloreux, 2009), who argue that KIBS act as co-producers of innovation in, an almost symbiotic, relationship with client firms, higher education institutions and other firms/institutions. The most important results of this quantitative study show that, given the current context of KIBS, the co-creation of innovation of these firms is greatly influenced by cooperation with higher education institutions (i.e. co-creation of technological innovation) and codification of knowledge and proactive strategies of internationalization (i.e., co-creation of non-technological innovation). There is, also, a significant positive correlation between both "cooperation with clients" and "knowledge sharing" and between "cooperation with higher education institutions" and "knowledge creation". These results clearly influence the co-creation of technological innovation, which confirmed the hypothesis H1: knowledge has a positive influence on co-creating innovation; and H2: cooperation has a positive influence on co-creating innovation, initially formulated. However, the results also revealed a negative correlation between "cooperation with higher education institutions" and "knowledge sharing". These correlations indicate that the High education institutions (HEI) can be vehicles of knowledge creation, as requested by KIBS; It still remains a clear difficulty in sharing knowledge between HEIs and KIBS, the "pro-active internationalization strategies" show a positive correlation with the "personalization", "cooperation with clients and 'co-creation of non-technological innovation "as the" reactive strategies and internationalization costs "have a positive correlation with" cooperation with clients "and" co-creation of non-technological

innovation ", confirming H3 strategies internationalization have a positive influence on co-creating innovation.

This research contributes to the study of KIBS in three main aspects: (1) the results allow a more extensive a scientific knowledge about the influence of KIBS on innovation processes of different stakeholders involved in cooperation networks between firms, and the co-creation process in the field of innovation; (2) the results have practical implications for management practices in terms of decision-making processes in innovation, especially in relation to strategic knowledge management, networking and internationalization strategies, which enables firms to gain insights that can increase their levels of productivity and cooperation. Finally, policy initiatives should be differentiated according to the different internationalization strategies, and thus the widespread support for innovation and internationalization of KIBS firms should be discouraged.

What is the contribution of the key dimensions to the process of internationalization of KIBS?

The first quantitative study focused on the analysis of the effects of knowledge, cooperation and innovation in internationalization, based on various authors (eg Fernandez-Esquinas & Uyerra, 2013;. Rodriguez & Nieto, 2012) who argue that knowledge, cooperation and the innovation have a positive impact on the internationalization of firms in the specific case of this study - the KIBS sector. Our results show that personalization of knowledge has a positive influence on pro-active internationalization strategies, such as external innovation and new methods of organization. On the one hand, when KIBS cooperated with clients, there is a positive impact on reactive strategies and cost of internationalization; On the other hand, reactive and internationalization strategies costs are negatively impacted by customized knowledge, knowledge sharing and internal innovation.

This research contributes to the study of KIBS in three ways: (1) to increase academic knowledge on the subject; (2) to practice management, allowing firms to gain insights that can develop their proactive internationalization strategies regarding specifically the strategic management of knowledge and implementation of innovation management models involving clients and higher education institutions; (3) to reinforce the need for adjustment of public policies to encourage the development and strengthening of proactivity in this sector with regard to internationalization and formal and informal networks.

One of the distinguishing characteristics of these firms (KIBS) is that they rely on different types of inputs of inputs used by traditional industrial firms. Being the knowledge an intangible asset, KIBS face a problem-challenge of managing their resources, because there is a special process of knowledge sharing impressing specific features for the business. In addition to its importance in terms of creation and dissemination of knowledge, KIBS are strongly related to the process of innovation (table 1), which is a key catalyst for growth and economic development.

Table 1: Research proposal model results

	Co-creation of innovation		Internationalization	
	Technological	Non-technological	Proactive strategy	Reactive and cost strategy
Personalisation			+	-
Codification		+		
Knowledge sharing				-
Cooperation with clients				+
Cooperation with HEI	+			
Proactive strategies		+		
External innovation			+	
Internal innovation				-

Overall, with this research, we aim to contribute to an increase in theoretical knowledge to the academic community, to take another step in the investigation into the influence that KIBS play in the business innovation process. On the other hand, we aimed to contribute at the management practices level by offering firms the knowledge to enable them to increase competitiveness, both in relation to KIBS as for their clients, which may represent any sector of activity. Finally, it is expected that the study will provide important suggestions to the national adjustment and improvement of public policies towards this sector.

2. Limitations and future research

It is important now to explain the main limitations encountered throughout this investigation.

The first limitation, on the bibliometric study, relates to the use of a single database, Web of Science ISI, and in addition to include, only, articles published in journals exclusively assigned to categories of business and economics.

A limitation of the qualitative study is related to the strong dependence on the context analysis and data collection. Therefore, the results must be understood in the light of the data and the qualitative and subjective aspects need to be framed in the structure adopted for the interviews.

A key limitation relates to the reduced size of the sample. Collecting a larger sample would have benefited the research, however, the difficulty to access information on KIBS firms in activity that have innovated in recent years has resulted from a smaller number of firms that were involved in Research and Development in recent years. This limitation is related to definition of

the object of study. As stated by Lakatos and Marconi (1996), delimiting means deciding what is included in and out of the subject matter and consequently defining limits for research. In this study, the population would be too large, so, for practical reasons we had to limit the size of the sample. In view of this decision the sample became very small, relative to population, also explained by the closing of some firms in the sample or a change in their contact.

Another limitation is related to the relatively small response rate. The attempt to reduce the maximum number of questions included in the questionnaire in order to encourage respondents to fill up, has, to some extent, failed, as we are still aware that it was extensive, with many variables, related to selected key dimensions, which require more data. On the other hand, there were questions that remained unanswered in the questionnaires or were not answered consistently, which may, to a certain extent, biased the results of the study. One of the studies consisted of interviews; however, it would be convenient an increase in the number of interviews, to better understand the relationships established between the different dimensions, as they allow a deeper knowledge of the issues under research.

A final limitation relates to the fact that the dependent and independent variables were collected simultaneously, and from the same source.

Regarding the proposed suggestions for future research, these arise from the conducted research process where limitations were detected.

Our first suggestion is that other researchers apply measuring instruments suggested in this research to a larger sample, in order to use other (more robust) statistical methods, and with more interviews with CEOs and academic experts in the subject, allowing to make a qualitative assessment to KIBS that innovate. We also suggest that, in the future, different sources of secondary data is used in order to include different variables.

Another suggestion for future research involves a broader study to compare the main differences between the various types of KIBS reported in the literature, as well as between its distinctive location in Portugal (rural and urban) and other countries, in order to explore if there is a direct influence of corporate culture of the country on KIBS strategy. In this sense, further research on the reasons for the scarce level of investment, in Portugal, where the government plays a critical role as the main R & D investment promoter, could contrast with other countries.

Johnson et al. (2003) point out that, traditionally, studies on innovation have focused more on technological innovation than on non-technological innovations, and innovations in services and organizational have been relatively neglected.

In our perspective, there are still many questions to explore in relation to knowledge intensive business services. In this sense, we included more suggestions that may be developed in future

studies, particularly, if the decision to innovate and/or internationalize is proactive or reactive, i.e. if the firms felt the need to innovate and/or internationalise or if the firm anticipated or attended a detected opportunity; realise what mechanisms KIBS can use to be more present in the knowledge transfer process and in the co-production of innovation with its clients; and finally, to determine what type of strategies must be implemented at the decision to innovate and internationalize level.

At a later stage (in future investigations), we aim to select client firms, in which the innovation process KIBS studied influenced, in order to explore, from the client's perspective, the actual influence that these KIBS firms played on innovation and, thus, crossing data.

References

- Abecassis-Moedas, C., Ben Mahmoud-Jouini, S., Dell’Era, C., Manceau, D. & Verganti, R. (2012). Key Resources and Internationalization Modes of Creative Knowledge-Intensive Business Services: The Case of Design Consultancies. *Creativity and Innovation Management*, 21, 315-331.
- Amit, R. and Schoemaker, P.J. (1993). “Strategic assets and organizational rent”. *Strategic Management Journal*, 14 (1), 33-46.
- Antonelli, C. (1998). “Localizad technological change, new information technology and the knowledge and the knowledge-based economy: the European evidence”. *Journal of Evolutionary Economics*, v.8, 177-198.
- Bettencourt, L., Ostrom, A., Brown, S. and Roundtree, R. (2002). “Client Co-Production in Knowledge-Intensive Business Services”. *California Management Review*, 44 (4), 100-128.
- Biderbeek, R., den Hertog, P. and Chehab, N. (1998). “Management van vernieuwing in diensten”. Verslag van een workshop voor ondernemers op 22 april 1998 [Management of innovation in services. Report of a workshop with entrepreneurs]. Dialogic / TNO Strategy Technology and Policy, Utrecht / Apeldoorn.
- Capasso, A.; Dagnino G. and Lanza, A. (Eds) (2005). Introduction: Estrategic capabilities and knowledge transfer within and between organizations, pp. 1 - 13 (Variety in the knowledge base of Knowledge Intensive Business Services. *Research Policy* 39, 1303-1310.
- Cassel, C. and Symon, G. (2004). Essential Guide to Qualitative Methods in Organizational Research. Sage Publications.
- Consoli, D. and Elche-Hortelano, D. (2010) “Variety in the knowledge base of Knowledge Intensive Business Services”. *Research Policy* 39, 1303-1310.
- Corrocher, N ; Cusmano, L (2014) “The ‘KIBS Engine’ of Regional Innovation Systems: Empirical Evidence from European Regions, *Regional Studies*, 48 (7), pp 1212-1226. DOI: 10.1080/00343404.2012.731045.
- Czamitzki, D. and Spielkamp, A. (2003) “Business Services in Germany: Bridges for Innovation”. *Service Industries Journal*, 23 (2), pp 1-30. <http://dx.doi.org/10.1080/02642060412331300862>.
- de Jong, J., Bruins, A., Dolfsma, W. and Meijaard, J. (2003) “Innovation in service firms explored: what, how and why?” EIM, *Business and Policy Research*.
- den Hertog, P. (2000) “Knowledge-intensive Business Services as co-producers of Innovation”. *International Journal of Innovation Management*, 4 (4), 491-528.

- Doloreux, D. & Laperriere, A. (2014). Internationalisation and innovation in the knowledge-intensive business services. *Service Business*, 8, 635-657.
- Doloreux, D. and Muller, E. (2007) "The key dimensions of knowledge-intensive business services (KIBS) analysis. A decade of evolution", Working Paper Firms and Regions No. U1/2007, Fraunhofer-Institut für System-und Innovationsforschung-ISI, Karlsruhe.
- Eisenhardt, K.M. and J.A.Martim (2000) "Dynamic capabilities: What are they?" *Strategic Management Journal*, Special Issue 21 (10-11): 345-369.
- Eisenhardt, K.M. and F.M. Santos (2002), "Knowledge based view: a new theory of strategy? In A. Pettigrew, H. Thomas and R. Whittington (eds), *Handbook of Strategy and Management*, Thousand Oaks, CA: Sage.
- Ferreira, J; Marques, Carla S; Fernandes, C. (2012) "Contribution of location theories for Regional Development: an empirical study applied to technology-based firms", *International Journal of Innovation and Regional Development* 4 (5): 414 - 429.
- Freel, M. (2006) "Patterns of Technological Innovation in Knowledge-Intensive Business Services". *Industry and Innovation*, 13 (3): 335-358.
- Gallouj, F. and Weinstein, O. (1997) "Innovation in services". *Research Policy*, 26, 537-556.
- Gallouj, F. (2002) "Innovation in services and the attendant old and new myths". *Journal of Socio-economics*, 31 (2): 137-154.
- Gallouj, F., and P. Windrum (2009) "Services and services innovation". *Journal of Evolutionary Economics* 19: 141-148.
- Grant, R.M. (1996) "Toward a knowledge based theory of the firm". *Strategic Management Journal*, Winter Special Issue 17: 109-122.
- Grant, R.M. (2003) "The knowledge based view of the firm". In D.O. Faulkner and A. Campbell (eds), *The Oxford Handbook of Strategy*, New York: Oxford University Press.
- Gulati, R. (1999) "Network location and learning: the influence of network resources and firm capabilities on alliance formation", *Strategic Management Journal*, 20 (5): 397-420.
- Gulati, R., N. Nohria and A. Zaheer (2000) "Strategic network", *Strategic Management Journal*, Special Issue 21 (10-11): 203-215.
- Hansen, M. (2002) "Knowledge networks: explaining effective knowledge sharing in multiunit companies", *Organization Science*, 13: 232-48.
- Hauknes, J. (1998). *Services in innovation innovation in services* (Step report, n.13). Oslo, Norway.
- He, ZL and Wong, PK (2009) "Knowledge interaction with manufacturing clients and innovation of knowledge-intensive business services firms", *Innovation-Management Policy & Practice*, 11 (3): 264-278 DOI: 10.5172/impp.11.3.264.

- Hertog, P.D. (2000) Knowledge-Intensive Business Services as co-producers of innovation. *International Journal of Innovation Management*, 04, 491-528.
- Howells, J. (2000) "Innovation and Services: New Conceptual Frameworks", CRIC Discussion Paper 38 Manchester: University of Manchester.
- Howells, J.R.L. and Tether, B.S. (2004). Innovation in Services: Issues at Stake and Trends. Brussels, Luxembourg: European Commission.
- Johne, A. and Storey, C. (1998) "New service development: a review of the literature and annotated bibliography". *European Journal of Marketing*, 32 (3/4): 184-252.
- Johnson, B.; Edquist, C. and Lundvall B. (2003). Economic development and the national. Rio de Janeiro. http://www.globelicsacademy.net/pdf/BengtAkeLundvall_2.pdf
- Koch, A. and Stahlecker, T. (2006) "Regional Innovation Systems and Foundation of Knowledge Intensive Business Services". *European Planning Studies*, 14 (2): 123-146.
- Koch, A. and Strotmann, H. (2008) "The impact of functional integration and spatial proximity on the post-entry performances of Knowledge Intensive Business Service Firms". *International Small Business Journal*, 24 (6): 610-634.
- Kogut, B. and U. Zander (1992) "Knowledge of the firms, combinative capabilities, and the replication of technology", *Organization Science*, 3 (3): 383-397.
- Kox, H. (2002) Growth challenges for the Dutch business services industries: international comparison and policy issues. Hague: CPB Netherlands Bureau for Economic Policy Analysis.
- Kubota, L. (2009) "As KIBS e a inovação tecnológica das firmas de serviços". *Economia e Sociedade*, Campinas, v. 18, n.2 (36), 349-369, ago. 2009.
- Lakatos, E.M. & Marconi, M.A. (1996). Fundamentos de *metodologia científica*. (3.^a ed.). São Paulo: Editora Atlas.
- Lanza, A. (2005), "Managing heterogeneity, allocative balance, and behavioural and tenhology concerns in competitive and cooperative inter-firm relationships". In: A. Capasso; G. Dagnino & A. Lanza (Eds), Strategic Capabilities and Knowledge Transfer Within and Between Organizations - New perspectives from acquisition, networks, learning and evolution, pp. 17-34 (Cheltenham: Edward Elgar).
- Landry, R.; Amara, N. and Doloreux, D. (2012) "Knowledge-exchange strategies between KIBS firms and their clients", *Service Industries Journal*, 32 (2): 291-320. DOI: 10.1080/02642069.2010.529131.
- Leiponen, A. (2005) "Organization of Knowledge and Innovation: The Case of Finnish Business Services". *Industry and Innovation*, 12 (2): 185-203.

- Mas-Vérdu F., Wensley, A., Alba, M. and Álvarez-Coque J. (2011) "How much does KIBS contribute to the generation and diffusion of innovation?" *Service Business*, 5 (3): 195-212. DOI: 10.1007/s11628-011-0110-1.
- Mas-Tur, A and Soriano, DR (2014) "The level of innovation among young innovative companies: the impacts of knowledge-intensive services use, firm characteristics and the entrepreneur attributes" *Service Business*, 8 (1): 51-63. DOI: 10.1007/s11628-013-0186-x.
- Marques, C.S. and Monteiro-Barata, J. (2006) "Determinants of the Innovation Process: An Empirical Test for the Portuguese Manufacturing Industry". *Management Research*, 4 (2) (Spring): 111-124.
- Mention, A.L. (2011) "Co-operation and co-opetition as open innovation practices in the service sector: Which influence on innovation novelty?" *Technovation*, 31 (1): 44-53
- Miles, I. (2000) "Services innovation: coming of age in the knowledge based economy". *International Journal of Innovation Management*, 4 (4): 371-389.
- Miles, I. (2005) "Innovation in Services". In: J. Fagerberg; D.C. Mowery & R.R. Nelson (Eds), *The Oxford handbook of innovation*, pp. 433 - 458 (New York: Oxford University press)
- Miles, I. Kastrinon, N. Flanagan, K. Bilderbeek, R. den Hertog, P., Huntink, W. and Bouman, M. (1995) *Knowledge intensive Business services. Users and sources of Innovation*. Brussels: European Commission.
- Muller, E. (2001) *Innovation Interactions between Knowledge Intensive Business Services and Small and Medium-sized Enterprises*. New York: Physica-Verlag.
- Muller, E. & Doloreux, D. (2009). What we should know about knowledge-intensive business services. *Technology in Society*, 31(1), 64-72.
- Nonaka, I. and R. Toyama (2002) "A firm as a dialectical being: towards a dynamic theory of a firm", *Industrial and Corporate Change*, 11 (5): 995-1009.
- Pinto H., Fernandez-Esquinas M. and Uyarra E. (2015). Universities and knowledge-intensive business services (KIBS) as sources of knowledge for innovative firms in peripheral regions, *Regional Studies*, 49(11), 1873-1891.
- Porter-Liebeskind, J. (1996) "Knowledge, strategy and the theory of the firm", *Strategic Management Journal*, Winter Special Issue.
- Rodríguez, A. & Nieto M. J. (2012) The internationalization of knowledge-intensive business services: the effect of collaboration and the mediating role of innovation. *The Service Industries Journal*, 32 (7), 1057-1075, DOI: 10.1080/02642069.2012.662493.
- Scarso, E and Bolisani, E (2012) "Trust in knowledge exchanges between service providers and clients: a multiple case study of KIBS", *Knowledge Management Research & Practice*, 10 (1): 16-26. DOI: 10.1057/kmrp.2011.28.

- She, S. and Nagahira, A (2012) “The impact of KIBS on Japanese manufacturing corporations from the client-side point of view”, *International Journal of Technology Management*, 57 (4): 201-226 DOI: 10.1504/IJTM.2012.045536.
- Shearmur, R. and Doloreux, D. (2008) “Urban Hierarchy or Local Buzz? High-Order Producer Service and (or) Knowledge-Intensive Business Service Location in Canada, 1991-2001”, *The Professional Geographer*, 60 (3): 333 - 355.
- Shi, X; Wu, YR; Zhao (2014) “Knowledge intensive business services and their impact on innovation in China”, *Service Business*, 8 (4): 479-498 DOI: 10.1007/s11628-013-0202-1
- Skjolsvik, T; Lowendahl, BR; Kvalshaugen, R and Fosstenlokken, SM (2007) “Choosing to learn and learning to choose: Strategies for client co-production and knowledge development”, *California Management Review*, Vol. 49, N° 3, pp 110 -+
- Small, H. (1973) “Co-citation in the scientific literature: a new measure of the relationship between two documents”, *Journal of the American Society for Information Science*, 24 (4): 265-269
- Teece, D. J.; G.Pisano and Shuen, A. (1997) “Dynamic capabilities and strategic management”. *California Management Review*, 40 (3): 289-292.
- Tether, B. (2003) “The Sources and Aims of Innovation in services: variety between and within sectors”. *Economics of innovation and new technology*, 12 (6): 481-505.
- Tidd, J.; Bessant, J. and Pavitt, K. (2005) *Managing Innovation: Integrating Technological, Market and Organizational Change*. England: John Wiley & Sons.
- Toivonen, M. (2004). *Expertise as Business: Long- Term Development and Future Perspectives of Knowledge Intensive Business Services (KIBS)*. Doctoral Dissertation Series 2004/2, Helsinki University of Technology, Department of Industrial Engineering and Management.
- Wong, P.K. & He, Z.L. (2005) A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms. *Service Industries Journal*, 25, 23-42.

Annex 1 Summary of interview with academic specialists

Category	Sub-category	Aspects to be registered	Aspect context /relevance and type of relationship
KNOWLEDGE	SOCIAL AND INSTITUTIONAL KNOWLEDGE (e.g. accountancy; management consultancy)	- The role of social and institutional knowledge dimension in innovation; - The relationship between social and institutional knowledge and innovation.	
	TECHNICAL KNOWLEDGE (e.g. computer R&D; engineering services)	- The role of technical knowledge dimension in innovation; - The relationship between technical knowledge and innovation.	
LOCATION	URBAN	Importance of the role of urban dimension in location	
	RURAL	Importance of the role of rural dimension in location	
NETWORKS	UNIVERSITIES	Importance of the role of the universities in networks	
	COOPERATION	Importance of the firms cooperation in networks	
INNOVATION	TECHNOLOGICAL	Importance of the role of technological dimension in innovation	
	NON - TECHNOLOGICAL	Importance of the role of non-technological dimension in innovation	
INTERNATIONALIZATION	EUROPEAN UNION	Importance of European markets to the firms	
	REST OF THE WORLD	Importance of rest of the world markets to the firms	
PERFORMANCE	FINANCIAL	Importance of financial performance in overall organisational performance	
	NON-FINANCIAL	Importance of non-financial performance in overall organisational performance	

GUIÃO DE ENTREVISTA
“A INFLUÊNCIA DOS KIBS NA INOVAÇÃO DOS CLIENTES”

Esta entrevista aborda questões sobre os dados gerais da sua empresa e um conjunto de questões sobre atividades de inovação, conhecimento, integração em redes, fatores de localização e estratégias de internacionalização. As respostas são completamente confidenciais. Apenas se pretende conhecer a sua opinião.

É importante que responda a **todas as questões**.

Agradecemos a sua preciosa colaboração nesta investigação.

I – Caracterização da empresa

1. Apresentação da empresa

Nome da Empresa: _____

Número de Identificação de Pessoa Coletiva (NIPC): □□□□□□□□ (facultativo)

Atividade principal CAE: □□□□□ Descrição da CAE: _____

(Decreto -Lei n.º 381/2007 - Rev. 3)

Morada: _____

Código Postal: □□□□ - □□□ Município: _____

Telefone/Fax: _____ Endereço
eletrónico: _____

Website www. _____

2. Mercados Geográficos

2.1 Indique quais os **mercados geográficos** dos serviços prestados pela empresa, durante o período de **2012 a 2014**:

	Sim	Não
A. Mercado Local/regional, em Portugal	<input type="checkbox"/>	<input type="checkbox"/>
B. Mercado Nacional (em Portugal, para além do local/regional)	<input type="checkbox"/>	<input type="checkbox"/>
C. Outros Países da União Europeia (UE) ou países associados ⁵	<input type="checkbox"/>	<input type="checkbox"/>
D. Outros países	<input type="checkbox"/>	<input type="checkbox"/>

2.2 De entre os mercados geográficos assinalados, indique qual o que teve maior peso no volume de negócios da empresa durante o período de **2012 a 2014**? (Escolha a letra correspondente)

⁵ Inclui os seguintes países membros e associados da União Europeia (UE): Albânia, Alemanha, Áustria, Bélgica, Bósnia e Herzegovina, Bulgária, Chipre, Croácia, Dinamarca, Eslováquia, Eslovénia, Espanha, Estónia, Finlândia, França, Grécia, Hungria, Irlanda, Islândia, Itália, Kosovo, Letónia, Liechtenstein, Lituânia, Luxemburgo, Macedónia, Malta, Montenegro, Noruega, Países Baixos, Polónia, Reino Unido, República Checa, Roménia, Sérvia, Suécia, Suíça e Turquia

3. Informação económica e social da empresa:

3.1 Volume de Negócios (facultativo)

	2012	2013	2014
Menos de 50.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De 50.000€ a 100.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De 100.000€ a 200.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De 200.000€ a 300.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De 300.000€ a 400.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De 400.000€ a 500.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mais de 500.000€	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.2 Número médio de pessoas ao serviço na empresa em:

2012	2013	2014
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

3.3 Indique a percentagem aproximada de **peças ao serviço**⁶ na empresa com formação superior no período entre 2012 e 2014 (Incluir pessoas ao serviço com o grau de bacharelato, licenciatura, mestrado, doutoramento)

	2012	2013	2014
0%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1% a 4%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5% a 9%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10% a 24%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25% a 49%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50% a 74%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75% a 100%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Pessoa responsável pela resposta:

(Recomenda-se a nomeação de alguém ligado à Gestão de Topo da empresa, ou que mantendo-se na sua esfera de atuação, possua autonomia e autoridade suficientes para interpelar e recolher informação junto a vários setores/áreas funcionais da empresa)

4.1 Função na empresa/Cargo: _____

4.2 Sexo: Masculino Feminino

4.3 Idade: < 25 Anos 25 - 35 anos 35 - 45 anos 45 - 55 anos > 55 anos

4.4 Habilitações Literárias

(1 = ensino básico, 2 = ensino secundário, 3 = escola de formação profissional, 4 = licenciatura, 5 = mestrado 6 = doutoramento)

II. A – ATIVIDADES DE INOVAÇÃO

5. Responda às seguintes questões, sobre **inovação**, de acordo com a sua opinião (tendo

⁶ **Pessoal ao serviço:** inclui as pessoas que, no período de referência, participaram na atividade da empresa qualquer que tenha sido a duração dessa participação, nas seguintes condições:

- Pessoal ligado à empresa por um contrato de trabalho, recebendo em contrapartida uma remuneração;
- Pessoal ligado à empresa, que por não estar vinculado por um contrato de trabalho, não recebe uma remuneração regular pelo tempo trabalhado ou trabalho fornecido (por exemplo: proprietários/gerentes, familiares não remunerados, membros ativos de cooperativas);
- Pessoal com vínculo a outras empresas, que trabalharam na empresa sendo por esta diretamente remunerados;
- Pessoas nas condições das alíneas anteriores, temporariamente ausentes por um período igual ou inferior a um mês por férias, conflito de trabalho, formação profissional, assim como por doença e acidente de trabalho.

em conta o período temporal 2012 a 2014):

5.1 Qual o papel que desempenha a inovação tecnológica (produtos/serviços/processos novos ou melhorados) e a inovação não tecnológica (práticas de negócio/ métodos de organização/ técnicas/políticas novas ou melhoradas) na empresa?

5.1.1 E no Sector?

5.1.2 Qual é o mais importante para a sua empresa?

5.2 Quem desenvolve essas inovações tecnológicas/não tecnológicas?

5.3 Qual o papel da inovação na introdução em novos mercados (Europeus e fora da Europa)?

5.6 Qual a percentagem do volume de negócios, do ano 2014, que resultou da introdução de novos produtos/serviços/processos (da inovação tecnológica) no mercado europeu, durante o período em análise?

5.6.2. E no mercado fora da Europa?

5.6.3 E relativamente à inovação não tecnológica? (Europa e fora da Europa)

5.7 A empresa participa nas atividades de inovação desenvolvidas pelos seus clientes? De que forma?

5.8. E nas atividades de inovação desenvolvidas por outras empresas? Quais? (Fornecedores; concorrentes; laboratórios, universidades e institutos; outras)

5.8.1 De que forma?

II. B – CONHECIMENTO

6. Responda às seguintes questões sobre **conhecimento** de acordo com a sua opinião (tendo em conta o período temporal 2012 a 2014):

6.1 Existe uma estratégia de gestão de conhecimento? Como se delinea?

6.2 Existem regras (protocolos) definidas?

6.3 Como envolvem os colaboradores?

6.4 Partilham o conhecimento por toda a empresa? De que forma?

6.5 Partilham conhecimento com clientes? De que forma?

6.5.2 E com outras entidades/empresas?

6.6 A organização aprende com as outras organizações?

6.7 Na empresa cria-se conhecimentos através de cooperação com clientes?

6.8 Faz parte das prioridades da empresa a criação, acumulação e disseminação de conhecimento.

II. C – REDES DE INOVAÇÃO

7. Responda às seguintes questões sobre **redes (e cooperação)** de acordo com a sua opinião (tendo em conta o período temporal 2012 a 2014):

7.1 Que tipo de redes de inovação a empresa tem estabelecidas?

7.2 Cooperam apenas com empresas regionais/nacionais ou também se envolvem com empresas internacionais?

7.2.1 Que tipo de organizações são estas? (Empresas, organizações governamentais, universidades...)

7.3 Qual o tipo de parceiro de cooperação mais importante para as atividades de inovação da

empresa? (Outras empresas do mesmo grupo; Fornecedores de equipamento, materiais, componentes ou software; Clientes ou consumidores do setor privado/público; Concorrentes ou outras empresas do mesmo setor de atividade; Consultores e laboratórios comerciais; Universidades ou outras instituições do ensino superior; Estado, institutos de investigação públicos ou privados)

7.4 A empresa coopera com instituições de ensino superior? Quais as razões?

7.4.1 Que tipo de cooperação estabelece com estas instituições?

7.5 Identifique a instituição de ensino superior com maior impacto na cooperação com a sua empresa (se aplicável): _____

7.6 A empresa coopera com clientes? Quais as razões?

7.6.1 Que tipo de cooperação estabelece com estas empresas?

7.6.2 A empresa colabora com os clientes para apoiar os seus processos de inovação?

7.7 A cooperação com outras empresas aumenta o desempenho da sua empresa?

7.7.1 E o desempenho das empresas com as quais coopera?

7.8 A empresa participa ativamente numa rede formal de partilha de experiências e conhecimentos?

II. D – FATORES DE LOCALIZAÇÃO

8. Responda às seguintes questões sobre **localização** de acordo com a sua opinião:

8.1 A proximidade de outras empresas, nomeadamente, dos clientes é importante? Porquê?

8.2 Porque escolheram a localização urbana/rural?

II. E – ESTRATÉGIAS DE INTERNACIONALIZAÇÃO

9. Responda às seguintes questões sobre **Internacionalização**, de acordo com a sua opinião (tendo em conta o período temporal 2012 a 2014):

9.1 Qual o motivo para iniciar o processo de Internacionalização da Empresa?

9.2 De que forma(s) estão presentes noutra(s) mercado(s)?

9.2. A empresa apoia/facilita o processo de Internacionalização de outras empresas? Como? (e.g. Partilha de conhecimento; transferência de conhecimento; (co)criação de conhecimento, ...)

10. No sentido de dar continuidade a este estudo, pretendemos numa investigação futura conhecer o ponto de vista dos clientes quanto à influência que os serviços empresariais intensivos em conhecimento desempenham no seu processo de inovação. Neste sentido, solicitamos que, se possível, nos recomendem algum(uns) cliente(s) em cujo processo de inovação tenham de alguma forma participado/colaborado.

OBRIGADO PELA SUA COLABORAÇÃO E CONFIANÇA

ESTA ENTREVISTA ESTÁ SUJEITO AO SIGILO ESTATÍSTICO. NÃO SE PODERÃO DIVULGAR DADOS INDIVIDUALIZADOS.

Obs: Em caso de dúvidas ou para qualquer esclarecimento adicional, poderá contactar-nos através do correio eletrónico abraga@estgf.ipp.pt (Alexandra Braga).

Caso pretenda receber os resultados destes estudos, introduza:

Endereço Eletrónico: _____

Empresa: _____

Annex 3

Data:

Assunto: Projeto de Investigação "Inovação Intensiva em Conhecimento" - Solicitação de colaboração

Exmos. Srs.

A Escola Superior de Tecnologia e Gestão do Instituto Politécnico do Porto (www.estgf.ipp.pt), está a levar a cabo um projeto de investigação sobre as empresas de serviços intensivas em conhecimento (tradicionalmente denominadas de KIBS), no âmbito da elaboração da tese de Doutoramento em Gestão (na UBI) da **Docente** Alexandra Braga. Este projeto revela-se de particular importância pois tem como objetivo **ampliar o conhecimento** sobre uma fração da economia tão importante, e sobre a qual o conhecimento é ainda limitado.

Nesse sentido, seria muito importante contar com a vossa colaboração, através do preenchimento de um inquérito, cujo tempo médio de resposta é de 10 minutos.

Estamos certos da importância deste estudo não só para o meio académico, mas também para o meio empresarial, pelo que, caso pretendam, poderemos enviar, posteriormente, um relatório que sumariza os principais resultados.

O link para o preenchimento do inquérito é:

<http://www2.estgf.ipp.pt/limesurvey/index.php/176665/lang-pt>

Certos de que perceberão o interesse deste projeto, agradecemos, antecipadamente, o tempo dispensado no preenchimento do inquérito.

Aproveitamos para garantir a total confidencialidade dos dados, e caso não pretendam identificar-se, têm essa opção, precisando apenas de colocar a código de atividade exercida para que as respostas sejam consideradas no cluster a que pertencem.

Melhores cumprimentos,

Alexandra Maria da Silva Braga

Docente Eq. Assistente

Escola Superior de Tecnologia e Gestão de Felgueiras | School of Technology and Management of Felgueiras



Politécnico do Porto | Polytechnic Institute of Porto

Rua do Curral, Casa do Curral

4610-156 Felgueiras

Tlf: 255 314 002 - Fax: 255 314 120

e-mail: abraga@estgf.ipp.pt

QUESTIONÁRIO DE INVESTIGAÇÃO AO ESTUDO "A INFLUÊNCIA DOS KIBS NA INOVAÇÃO DOS CLIENTES"



Este questionário aborda questões sobre os dados gerais da sua empresa e um conjunto de afirmações sobre atividades de inovação, conhecimento, integração em redes, fatores de localização e estratégias de internacionalização. Quando preencher o questionário tenha, por favor, em conta que na segunda parte as questões foram concebidas para que sejam respondidas através de uma escala de intensidade que represente a perceção/opinião que tem sobre o assunto em questão. Apresentam-se cinco pontos, em que **1** representa a opinião menos concordante, **5** a mais concordante, e **3** uma posição neutra face à afirmação. **Assinale a sua resposta com um X.** Não há respostas corretas e incorretas. Apenas se pretende conhecer a sua opinião.

É importante que responda a todas as questões, caso contrário o questionário não poderá ser considerado válido para tratamento estatístico. As respostas são completamente confidenciais.

Agradecemos a sua preciosa colaboração nesta investigação.

Obs: Em caso de dúvidas ou para qualquer esclarecimento adicional, poderá contactar-nos através do correio eletrónico abraga@estgf.ipp.pt (Alexandra Braga).

Existem 50 perguntas neste inquérito

I – Caracterização da empresa

[]1. Apresentação da empresa Nome da Empresa:

Por favor, escreva aqui a sua resposta:

[]Número de Identificação de Pessoa Coletiva (NIPC):

Neste campo só é possível introduzir números.

Por favor, escreva aqui a sua resposta:

[]Atividade principal CAE: *

Neste campo só é possível introduzir números.

Por favor, escreva aqui a sua resposta:

(Decreto -Lei n.º 381/2007 - Rev. 3)

[]Descrição da CAE: *

Por favor, escreva aqui a sua resposta:

(Decreto -Lei n.º 381/2007 - Rev. 3)

[]Morada

Por favor, escreva aqui a(s) sua(s) resposta(s):

Rua e Número:

Código Postal:

Município:

[] Contactos

Por favor, escreva aqui a(s) sua(s) resposta(s):

Telefone:	<input type="text"/>
Fax:	<input type="text"/>
Website:	<input type="text"/>
Endereço eletrónico:	<input type="text"/>

[]**2. Mercados Geográficos****2.1 Indique quais os mercados geográficos dos serviços prestados pela empresa, durante o período de 2012 a 2014:**

*

Por favor, selecione uma resposta apropriada para cada item:

	Sim	Não
A. Mercado Local/regional, em Portugal	<input type="radio"/>	<input type="radio"/>
B. Mercado Nacional (em Portugal, para além do local/regional)	<input type="radio"/>	<input type="radio"/>
C. Outros Países da União Europeia (UE) ou países associados ¹	<input type="radio"/>	<input type="radio"/>
D. Outros países	<input type="radio"/>	<input type="radio"/>

¹ Inclui os seguintes países membros e associados da União Europeia (UE): Albânia, Alemanha, Áustria, Bélgica, Bósnia e Herzegovina, Bulgária, Chipre, Croácia, Dinamarca, Eslováquia, Eslovénia, Espanha, Estónia, Finlândia, França, Grécia, Hungria, Irlanda, Islândia, Itália, Kosovo, Letónia, Liechtenstein, Lituânia, Luxemburgo, Macedónia, Malta, Montenegro, Noruega, Países Baixos, Polónia, Reino Unido, República Checa, Roménia, Sérvia, Suécia, Suíça e Turquia.

[] 2.2 De entre os mercados geográficos assinalados, indique qual o que teve maior peso no volume de negócios da empresa durante o período de 2012 a 2014? (Escolha a letra correspondente)

Por favor, selecione apenas uma das seguintes opções:

- A.
 B.
 C.
 D.

[] 3. Informação económica e social da empresa:**3.1 Volume de Negócios**

Por favor, selecione uma resposta apropriada para cada item:

	Menos de 50.000 €	De 50.000€ a 100.000€	De 100.000€ a 200.000€	De 200.000€ a 300.000€	De 300.000€ a 400.000€	De 400.000€ a 500.000€	Mais de 500.000€
2012	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2013	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2014	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[] 3.2 Pessoas ao serviço na empresa² *

	2012	2013	2014
Número médio de pessoas ao serviço na empresa em:	<input type="text"/>	<input type="text"/>	<input type="text"/>

[]

3.3 Indique a percentagem aproximada de pessoas ao serviço² na empresa com formação superior entre 2012 e 2014 (Incluir pessoas ao serviço com o grau de bacharelato, licenciatura, mestrado, doutoramento) *

Por favor, selecione uma resposta apropriada para cada item:

	2012	2013	2014
0%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1% a 4%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5% a 9%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10% a 24%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25% a 49%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50% a 74%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
75% a 100%	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

² **Pessoal ao serviço:** inclui as pessoas que, no período de referência, participaram na atividade da empresa qualquer que tenha sido a duração dessa participação, nas seguintes condições:

- a) Pessoal ligado à empresa por um contrato de trabalho, recebendo em contrapartida uma remuneração;
- b) Pessoal ligado à empresa, que por não estar vinculado por um contrato de trabalho, não recebe uma remuneração regular pelo tempo trabalhado ou trabalho fornecido (por exemplo: proprietários/gerentes, familiares não remunerados, membros ativos de cooperativas);
- c) Pessoal com vínculo a outras empresas, que trabalharam na empresa sendo por esta diretamente remunerados;
- d) Pessoas nas condições das alíneas anteriores, temporariamente ausentes por um período igual ou inferior a um mês por férias, conflito de trabalho, formação profissional, assim como por doença e acidente de trabalho.

[]4. Pessoa responsável pela resposta:

(Recomenda-se a nomeação de alguém ligado à Gestão de Topo da empresa, ou que mantendo-se na sua esfera de atuação, possua autonomia e autoridade suficientes para interpelar e recolher informação junto a vários setores/áreas funcionais da empresa)

4.1 Função na empresa/Cargo: *

Por favor, escreva aqui a sua resposta:

[]4.2 Sexo: *Por favor, selecione **apenas uma** das seguintes opções:

- Feminino
- Masculino

[]4.3 Idade: *Por favor, selecione **apenas uma** das seguintes opções:

- < 25 Anos
- 25 - 35 anos
- 35 - 45 anos
- 45 - 55 anos
- > 55 anos

[]4.4 Habilitações Literárias: *Por favor, selecione **apenas uma** das seguintes opções:

- Ensino básico
- Ensino secundário
- Escola de formação profissional
- Licenciatura
- Mestrado
- Doutoramento

II. A – ATIVIDADES DE INOVAÇÃOResponda às seguintes questões, assinalando o seu grau de concordância em relação às afirmações sobre **inovação** que se apresentam a seguir.

[]

5. Durante o período de 2012 a 2014, nesta empresa foram introduzidos (as):

(1 = Discordo completamente, 2 = Discordo 3 = Não concordo nem discordo 4 = Concordo e 5 = Concordo completamente) *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
5.1 Serviços novos ou significativamente melhorados lançados no mercado (não necessita de ser novidade no setor de atividade ou no mercado, mas deverá ser novidade em relação aos serviços comercializados pela empresa. É irrelevante se a inovação foi desenvolvida originalmente pela empresa ou por outras empresas/instituições)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.2 Processos novos ou significativamente melhorados lançados no mercado (por exemplo, métodos de produção de serviços novos ou melhorados; métodos de logística, entrega ou distribuição dos fatores produtivos ou produtos finais novos ou significativamente melhorados)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.3 Atividades de apoio aos processos da empresa novas ou melhoradas (por exemplo, novos sistemas de manutenção, de contabilidade ou de informática)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.4 Novas práticas de negócio na organização dos procedimentos (por exemplo, na gestão da cadeia de fornecedores, na reengenharia de negócios, na gestão do conhecimento, "lean production", na gestão da qualidade, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.5 Novos métodos de organização das responsabilidades e da tomada de decisão (por exemplo, primeira utilização de novos sistemas de responsabilização dos trabalhadores, de trabalho em equipa, descentralização, integração ou desintegração de serviços, sistemas de formação, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.6 Novos métodos de organização das relações externas com outras empresas ou instituições públicas (por exemplo, primeira utilização de alianças, parcerias, outsourcing ou subcontratação, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.7 Novas técnicas ou meios de comunicação (Media) para a promoção dos serviços (por exemplo, utilização pela primeira vez de uma nova forma de publicidade, nova imagem da marca, introdução de cartões de fidelidade, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.8 Novos métodos de distribuição/colocação de serviços ou novos canais de vendas (por exemplo, utilização pela primeira vez de um sistema de franchising ou distribuição de licenças, vendas diretas, venda exclusiva a retalho, novas formas de apresentação de um produto, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.9 Novas políticas de preço para os serviços (por exemplo, utilização pela primeira vez da variável preço para determinar a procura, sistema de descontos, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]

6. Quem desenvolveu essas inovações tecnológicas (de produto/processo)?

(Considerar as incluídas nos pontos 5.1, 5.2 e 5.3) *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
6.1 A empresa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.2 A empresa em cooperação com outras empresas ou instituições*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.3 A empresa adaptando ou modificando inovações desenvolvidas originalmente por outras empresas ou instituições*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.4 Outras empresas ou instituições*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Inclua outras empresas ou empresas pertencentes ao grupo (tais como subsidiárias, empresas irmãs ou sede social, etc.). Instituições inclui Universidades, institutos politécnicos, institutos de investigação, Instituições Privadas Sem Fins Lucrativos (IPSFL), etc.

[]

7. Quem desenvolveu essas inovações não tecnológicas (organizacionais/marketing)?

(Considerar as incluídas nos pontos 5.4 até 5.9) *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
7.1 A empresa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.2 A empresa em cooperação com outras empresas ou instituições*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.3 A empresa adaptando ou modificando inovações desenvolvidas originalmente por outras empresas ou instituições*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.4 Outras empresas ou instituições*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Inclua outras empresas ou empresas pertencentes ao grupo (tais como subsidiárias, empresas irmãs ou sede social, etc.). Instituições inclui Universidades, institutos politécnicos, institutos de investigação, Instituições Privadas Sem Fins Lucrativos (IPSFL), etc.

[]8. Algum dos serviços novos ou significativamente melhorados, introduzidos pela empresa durante o período de 2012 a 2014, foi: *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
8.1 Novo apenas para a empresa (podendo já existir no seu mercado)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.2 Novo para o mercado de Portugal?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.3 Novo para o mercado Europeu?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.4 Novo para o mercado mundial?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]9. Qual a percentagem do volume de negócios do ano de 2014 que resultou da introdução de novos serviços no mercado europeu durante o período de 2012 a 2014? *Por favor, seleccione **apenas uma** das seguintes opções:

- 0% e menos de 1%
- 1% e menos de 5%
- 5% e menos de 10%
- 10% e menos de 25%
- 25% ou mais
- Não sabe
- Não aplicável

[]10. Qual a percentagem do volume de negócios do ano de 2014 que resultou da introdução de novos serviços no mercado fora da Europa durante o período de 2012 a 2014? *Por favor, seleccione **apenas uma** das seguintes opções:

- 0% e menos de 1%
- 1% e menos de 5%
- 5% e menos de 10%
- 10% e menos de 25%
- 25% ou mais
- Não sabe
- Não aplicável

[]

11. Durante o período de 2012 a 2014, a empresa participou nas seguintes atividades de inovação desenvolvidas pelos seus clientes:**(1 = Discordo completamente, 2 = Discordo 3 = Não concordo nem discordo 4 = Concordo e 5 = Concordo completamente) ***

Por favor, seleccione uma resposta apropriada para cada item:

	1	2	3	4	5
11.1 Aquisição externa de I&D (I&D extramuros): atividades de Investigação e Desenvolvimento (I&D) que a empresa (cliente) contratou a outras empresas ou a instituições de investigação públicas ou privadas para criar novo conhecimento, ou para resolver problemas científicos ou técnicos (inclui o desenvolvimento de software quando se enquadre neste âmbito).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.2 Aquisição de maquinaria, equipamento, software e edifícios: aquisição de maquinaria avançada, equipamentos, software e edifícios para serem utilizados no desenvolvimento de produtos ou processos novos, ou significativamente melhorados.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.3 Aquisição de conhecimento existente noutras empresas ou instituições: aquisição de conhecimento existente (know-how), trabalhos com direitos de autor, invenções patenteadas e não patenteadas, etc. de outras empresas ou instituições para o desenvolvimento de produtos ou processos novos, ou significativamente melhorados.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.4 Formação para atividades de inovação: formação contratada externamente especificamente para o desenvolvimento e/ou introdução de produtos ou processos novos ou significativamente melhorados	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.5 Introdução das inovações no mercado: atividades contratadas externamente especificamente para introduzir no mercado bens ou serviços novos ou significativamente melhorados, incluindo estudos de mercado e campanhas publicitárias no lançamento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.6 Design: atividades contratadas externamente para desenhar, ou alterar a forma ou aparência de bens ou serviços	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.7 Outras: outras atividades contratadas externamente para implementar produtos ou processos novos ou significativamente melhorados, tais como estudos de viabilidade, testes, engenharia industrial, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.8 Introdução em novos mercados europeus: atividades contratadas externamente para introduzir produtos ou desenvolver novos mercados dentro da Europa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.9 Introdução em novos mercados fora da Europa: atividades contratadas externamente para introduzir produtos ou desenvolver novos mercados fora da Europa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]11.10 Outras (indique quais):

Por favor, escreva aqui a sua resposta:

II. B – CONHECIMENTO

Responda às seguintes questões, assinalando o seu grau de concordância em relação às afirmações sobre **conhecimento** que se apresentam a seguir:

[]

12. Considerar o período de 2012 a 2014:

(1 = Discordo completamente, 2 = Discordo 3 = Não concordo nem discordo 4 = Concordo e 5 = Concordo completamente) *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
12.1 Nesta empresa existem protocolos estabelecidos acerca da forma como se partilha conhecimento (a nível interno)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.2 Nesta empresa existem protocolos estabelecidos acerca da forma como se partilha conhecimento (a nível externo)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.3 Nesta empresa o conhecimento é adquirido facilmente através de manuais e documentos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.4 Nesta empresa elaboram-se atas das reuniões de forma a documentar resultados de projetos e de grupos de trabalho	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.5 Nesta empresa partilham-se conhecimentos através de manuais e de documentos internos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.6 Nesta empresa o conhecimento é facilmente partilhável pelos colegas de trabalho	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.7 Nesta empresa o conhecimento é facilmente partilhável com colaboradores de outras empresas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.8 Nesta empresa o conhecimento é facilmente partilhável com os clientes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.9 Nesta empresa é fácil receber pessoalmente conselhos dos supervisores	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.10 Nesta empresa realizam-se reuniões informais para partilha de conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.11 Nesta empresa existe uma relação próxima a um "mentor" que facilita a passagem de conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.12 A empresa partilha experiências com outras empresas que a ajudam na compreensão das mesmas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.13 A organização aprende com as outras organizações	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.14 Nesta empresa cria-se conhecimentos através de cooperação com clientes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.15 Faz parte das prioridades da empresa a criação, acumulação e disseminação de conhecimento.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]Comentários:

Por favor, escreva aqui a sua resposta:

II. C – REDES DE INOVAÇÃO

Responda às seguintes questões, assinalando o seu grau de concordância em relação às afirmações sobre **informação e cooperação** que se apresentam a seguir:

[]13. Durante o período de 2012 a 2014, a empresa cooperou no âmbito das atividades de inovação com: (1 = Discordo completamente, 2 = Discordo 3 = Não concordo nem discordo 4 = Concordo e 5 = Concordo completamente) *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
A. Outras empresas do mesmo grupo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Fornecedores de equipamento, materiais, componentes ou software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Clientes ou consumidores do setor privado	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Clientes ou consumidores do setor público (inclui organizações governamentais da administração local, regional e nacional, assim como agências, escolas, hospitais e outras organizações governamentais fornecedoras de serviços de segurança, transporte, alojamento, energia, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Concorrentes ou outras empresas do mesmo setor de atividade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Consultores e laboratórios comerciais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Universidades ou outras instituições do ensino superior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Estado, institutos de investigação públicos ou privados	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]14. (Caso aplicável) Qual o tipo de parceiro de cooperação mais importante para as atividades de inovação da empresa? (escolha a letra correspondente)

Por favor, selecione **apenas uma** das seguintes opções:

- A
 B
 C
 D
 E
 F
 G
 H

[]

As questões seguintes prendem-se com a cooperação com as instituições de ensino superior (IES)

(Caso não se aplique, avance para a questão 19)

15. Durante o período de 2012 a 2014, a empresa cooperou com instituições de ensino superior, devido a:

(1 = Discordo completamente, 2 = Discordo 3 = Não concordo nem discordo 4 = Concordo e 5 = Concordo completamente)

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
15.1 Proximidade Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.2 Contactos pessoais frequentes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.3 Confiança recíproca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.4 Competência mútua	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]16. Durante o período de 2012 a 2014, que tipo de cooperação estabeleceu com Instituições de ensino superior?

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
16.1 Ausência de colaboração	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.2 Colaborações esporádicas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.3 Colaboração contínua	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.4 Recurso com frequência aos docentes do ensino superior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]Outras (indique quais):

Por favor, escreva aqui a sua resposta:

[]17. Identifique a instituição de ensino superior com maior impacto na cooperação com a sua empresa (se aplicável):

Por favor, escreva aqui a sua resposta:

[]18. Durante o período de 2012 a 2014, as seguintes alternativas tiveram influência na criação da cooperação entre a empresa e a IES:

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
18.1 Ampliar o mercado da região geográfica de atuação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.2 Desenvolver novos produtos e/ou serviços	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.3 Desenvolver novos conceitos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.4 Partilhar custos de I&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.5 Gerar intercâmbio formal e informal de pessoas e ideias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.6 Elevar a eficiência operacional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.7 Partilhar tecnologias e conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.8 Aprender com o parceiro de cooperação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.9 Reduzir custos gerais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]Outras (indique quais):

Por favor, escreva aqui a sua resposta:

[]

As questões seguintes prendem-se com a cooperação com outras empresas e instituições (exceto clientes e IES)**(Caso não se aplique, avance para a questão 21)****19. Durante o período de 2012 a 2014, a empresa cooperou com outras empresas/instituições, devido a:**

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
19.1 Proximidade Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.2 Contactos pessoais frequentes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.3 Confiança recíproca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.4 Competência mútua	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]20. Durante o período de 2012 a 2014, as seguintes alternativas tiveram influência na criação da cooperação entre a empresa e outras empresas/instituições:

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
20.1 Ampliar o mercado da região geográfica de atuação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.2 Sugestão de ideias para melhorar produtos (bens/serviços) ou processos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.3 Desenvolver novos produtos e/ou processos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.4 Desenvolver novos conceitos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.5 Partilhar custos de I&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.6 Gerar intercâmbio formal e informal de pessoas e ideias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.7 Elevar a eficiência operacional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.8 Reduzir custos gerais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.9 Partilhar tecnologias e conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.10 Aprender com o parceiro de cooperação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]20.11 Outras (indique quais):

Por favor, escreva aqui a sua resposta:

[]

As questões seguintes prendem-se com a cooperação com empresas clientes**21. Durante o período de 2012 a 2014, a empresa cooperou com clientes, devido a: ***

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
21.1 Proximidade Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21.2 Contactos pessoais frequentes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21.3 Confiança recíproca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21.4 Competência mútua	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]22. Durante o período de 2012 a 2014, as seguintes alternativas tiveram influência na criação da cooperação entre a empresa e os clientes: *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
22.1 Ampliar o mercado da região geográfica de atuação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.2 Sugestão de ideias para melhorar produtos (bens/serviços) ou processos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.3 Desenvolver novos produtos e/ou processos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.4 Desenvolver novos conceitos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.5 Partilhar custos de I&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.6 Gerar intercâmbio formal e informal de pessoas e ideias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.7 Elevar a eficiência operacional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.8 Reduzir custos gerais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.9 Partilhar tecnologias e conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.10 Aprender com o parceiro de cooperação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]22.11 Outras (indique quais):

Por favor, escreva aqui a sua resposta:

[]25. A empresa: *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
Participa ativamente numa rede formal de partilha de experiências e conhecimentos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]23. A empresa colabora com os clientes para apoiar os seus processos de inovação da seguinte forma: *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
23.1 como facilitadora da inovação (ao apoiar um cliente no seu processo de inovação)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23.2 como transportadora de inovação (ao desempenhar um papel na transferência de inovações existentes de uma empresa para outra, ou dentro da indústria)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23.3 como fonte de inovação (ao desempenhar um papel central na iniciação e/ou desenvolvimento de inovação para os seus clientes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]24. Considera que a cooperação com outras empresas aumenta: *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
24.1 o desempenho da sua empresa?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24.2 o desempenho das empresas com as quais coopera?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

II. D – FATORES DE LOCALIZAÇÃO

Responda às seguintes questões, assinalando o seu grau de concordância em relação às afirmações sobre **localização** que se apresentam a seguir.

**[]26. Os seguintes fatores influenciaram a sua decisão quanto à localização da sua empresa:
(1 = *Discordo completamente*, 2 = *Discordo* 3 = *Não concordo nem discordo* 4 = *Concordo* e 5 = *Concordo completamente*) ***

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
26.1 Naturalidade ou proximidade da residência do fundador	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.2 Desejo do fundador, gestores e funcionários de viver nessa localidade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.3 Boas condições de alojamento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.4 Clima	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.5 Atitude da comunidade face ao negócio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.6 Bons acessos e infraestruturas rodoviárias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.7 Outras infraestruturas físicas (caminhos de ferro, aeroportos, telecomunicações, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.8 Proximidade dos centros urbanos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.9 Proximidade do mercado e a dimensão das aglomerações	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.10 Especialização geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.11 Qualificação do capital humano	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.12 Custos com salários	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.13 Custos da propriedade industrial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.14 Densidade populacional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.15 Nível de atividade económica do local onde se localiza a empresa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.16 Proximidade das matérias-primas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.17 Proximidade dos serviços	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.18 Proximidade de centros administrativos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.19 Incubadora de empresas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.20 Acesso ao conhecimento gerado por IES ou centros de investigação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.21 Acesso aos parques de ciência	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.22 Incentivos de I&D, criação de empregos ou outros incentivos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.23 Proximidade de instituições de ensino	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.24 Feiras tecnológicas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.25 Empresários de referência na região	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[]Outros (quais):

Por favor, escreva aqui a sua resposta:

II. E – ESTRATÉGIAS DE INTERNACIONALIZAÇÃO

Responda às seguintes questões, assinalando o seu grau de concordância em relação às afirmações sobre **Internacionalização**, durante o período 2012 a 2014, que se apresentam a seguir:

[] Estratégias de internacionalização

(1 = Discordo completamente, 2 = Discordo 3 = Não concordo nem discordo 4 = Concordo e 5 = Concordo completamente) *

Por favor, selecione uma resposta apropriada para cada item:

27. A empresa colabora frequentemente com instituições externas, para implementar estratégias de inovação. 1 2 3 4 5

[] 28. (Caso aplicável) As motivações que mais peso tiveram no momento em que a empresa decidiu internacionalizar o seu negócio para o mercado externo foram:

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
28.1 Necessidade de crescimento da empresa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.2 Obtenção de economias de escala	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.3 Exploração de competências próprias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.4 Diversificação do risco	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.5 Estrangulamento do mercado doméstico	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.6 Melhorar Margens e rentabilidade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.7 A internacionalização decorre do processo de inovação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.8 Procura de mão-de-obra barata	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.9 Proximidade das fontes de matéria-prima	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.10 Reação à atuação da concorrência	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.11 Acompanhamento de clientes importantes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[] 28.12 Outras (indique quais):

Por favor, escreva aqui a sua resposta:

[] 29. A empresa colabora com os clientes para facilitar/apoiar os seus processos de internacionalização da seguinte forma: *

Por favor, selecione uma resposta apropriada para cada item:

	1	2	3	4	5
29.1 Partilha de conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29.2 Transferência de conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29.3 (Co)criação de conhecimento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

III. INVESTIGAÇÃO FUTURA

[]30. No sentido de dar continuidade a este estudo, pretendemos numa investigação futura conhecer o ponto de vista dos clientes quanto à influência que os serviços empresariais intensivos em conhecimento desempenham no seu processo de inovação. Neste sentido, solicitamos que, se possível, nos recomendem algum(uns) cliente(s) em cujo processo de inovação tenham de alguma forma participado/colaborado.

Por favor, escreva aqui a sua resposta:

[]Caso pretenda receber os resultados destes estudos, introduza:

Por favor, escreva aqui a(s) sua(s) resposta(s):

Endereço eletrónico	<input type="text"/>
Empresa	<input type="text"/>

Obrigado pela sua colaboração e confiança.

Este questionário está sujeito ao sigilo estatístico. Não se poderão divulgar dados individualizados.

Submeter o seu inquérito
Obrigado por ter concluído este inquérito.