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Collaborative Innovation and Imitation in the KIBS Industry

Supervisor
Ch. Prof. Claudio Giachetti

Graduand
Sara Cavalletto
Matriculation Number 859058

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1. INTRODUCTION

The importance of innovation for the economic development has made it a subject studied extensively in economic literature. Today it is considered one of the main drivers of productivity and growth and for this reason, scholars have devoted a substantial amount of research to it.

Unfortunately, the same attention has not been paid to imitation, even though it is a more widespread phenomenon than innovation.

Due to the social stigma associated to imitation, firms and entrepreneurs are often unwilling to declare that they have imitated products or services already in the market, perhaps in other areas.

Although imitation and innovation may appear to be two diametrically opposite phenomena, they have some aspects in common, especially in the case of *"creative imitation"*. This is in fact the imitation of a product already present in a market, but embodies an amount of innovation and creativity, to be improved or adopted to new contexts. In this way the product (whether it is a good or a service) can be made suitable for new markets or new uses.

One of the aspects that characterize both imitation and innovation is the dose of environmental uncertainty that firms and entrepreneurs face when deciding whether to undertake one path or the other. This uncertainty is evident in the case of innovation: despite the possibility for the innovator, or pioneer, to aspire to many benefits being first to the market (called *"first movers advantages"*), he is investing its resources without knowing whether he will actually be able to bring the new product to market, if and when it will be accepted, and after how much time imitators will enter the market, damaging his revenues.

In the case of the imitator, this uncertainty is often not considered, although he does not know if he will actually be able to succeed in imitating the product, if it will be really superior to the others or if it will be stuck with a "me-too" product image.

To keep up with environmental uncertainty and reduce the risks arising from it, it is important for firms to engage in building links of co-operation and sharing with other actors in the system.

Through these relationships it is possible for them not only to share resources (human, economic, technological, and other assets), but also to find useful information about the

market they are operating, new opportunities and technologies that have worked, or experiments that have proven to be a failure.

Partners and ties become a new mean to search and process information and different actors work jointly to achieve a common innovative goal. Innovative companies are therefore moving to an *"open innovation"* model, where they collaborate with several actors and partners to reach and sustain innovation.

The aim of this work is to study how different external search strategies can affect innovative and imitative outputs. To this end, it has been chosen to use the services sector, and in particular KIBS (Knowledge-intensive business services).

Services have long been considered as unproductive and mere users of innovations coming from the manufacturing sector. Today, however, the conception of this sector has changed and KIBS in particular are considered extremely important in innovative dynamics. Due to their potential to activate and assist knowledge creation processes in the companies they are in contact with, they are in fact called *"bridges for innovation ".*

KIBS are particularly interesting as they are dynamic, fast growing and a source of new technologies that can affect the entire economy. In addition, they act as knowledge integrators, participating in ongoing knowledge networks with other companies, research institutes and universities.

Finally, they have been recognized as an important source of development in Regional Innovation Systems. They in fact help in generating, converting and diffusing knowledge, easing the birth of *"knowledge hubs".*

This work starts then with a general analysis of this type of services, proposing their different definitions, the sectors included in the KIBS industry, and lingers then on their peculiarities. Some space is then dedicated to the important role that these companies cover in innovative dynamics. A paragraph is also devoted to their diffusion in Italy and Europe.

At the conclusion of this first overview of the KIBS sector, this work then goes to the analysis of one the characterizing element of KIBS: knowledge. Following mainly Nonaka and Takeuchi's studies, the different types of knowledge are analyzed, focusing in particular on the distinction between explicit and tacit knowledge and their creation and dissemination processes. These elements are very important to understand the co-production mechanisms and interactions that KIBS maintain with external actors (especially with their clients), to introduce innovations.

The last two paragraphs of the chapter have been devoted to the co-production relationships with customers, since the description of the responsibilities of the customers and the company in these processes and their management helps to better understand the relationships that the KIBS can have with a wider range of collaborators.
The third chapter moves then to the key topic of this paper: innovation and imitation in services.
A review of the progress made by the literature in the study of innovation in the services sector and the main difficulties encountered by scholars in addressing this topic are proposed. The main approaches to this phenomenon developed by the literature (assimilation approach, demarcation approach and synthesis approach) are also presented.
It then goes to the study of the innovations themselves, starting from the main distinctions offered by the literature (concerning the services sector and the manufacturing sector indistinctly). The distinction between process and product innovations is then deepened, but considered to be of little relevance to the scope of this analysis, given the blurring boundaries between product and process in the case of services. The distinction between radical innovations and incremental innovations, considered more meaningful is then presented. Starting with the studies of Den Hertdog, other concepts and patterns of innovation more relevant to the service sector are presented.
The focus moves then on imitation and the problems encountered in the analysis of *"new-to-the-firm"* but not *"new-to-the-industry"* products. In this regard, the types of imitations recognized by literature, from copies to creative imitations are presented.
To emphasize the importance of environmental uncertainty on imitative choices, theories that have tried to explain these behaviors are then presented. *"Information-based"* theories in particular help to understand how imitation is often perceived (even erroneously) as a safer strategy than innovation. The advantages and disadvantages of both strategies are then illustrated.
Finally, a reflection is dedicated to the importance of collaborations in the event that a company decides to invest in the introduction of new products (goods or services), whether they are new only to the firm itself or to the entire market.
The fourth is dedicated to the empirical study, with the initial presentation of the database and the approach used to analyze the KIBS companies in the sample. It was then sought through the use of Qualitative Comparative Analysis to determine the effect that different

external search strategies (in terms of breadth, depth and size) have on innovative and/or imitative outputs. The results are then described.

The last chapter summarizes the main results and then discusses the implications of the same for KIBS companies. The main limits of the model are then given, with indications of future research.

2. KIBS: KNOWLEDGE-INTENSIVE BUSINESS SERVICES

Traditional economics has always conveyed the message that the factors underlying the development of a company are the accumulation of financial capital and the availability of labor force and raw materials.

However, in today's economic environment characterized by globalization, we have seen substantial changes in the way of doing business. Behind these changes we can find a strong acceleration of innovation processes and transformations that are continuing at a fast pace.

Today innovation – broadly defined as the commercial application of new knowledge – has become one of the key drivers of productivity and growth. Accordingly, the ability to create and manipulate knowledge has become a strategic element, a source of competitive advantage and a critical factor for the production of value added. The importance of knowledge in today's economic environment is also reflected by the term *"knowledge economy"*, coined to refer to a segment of the economic system in which value is produced through knowledge, or where the most important commodity to be produced and consumed is information, rather than manufactured goods. Specifically, it is presented as an economy in which the share of knowledge-intensive employment is prevalent, where the economic weight of the sectors linked to information has become decisive and in which the share of intangible assets exceeded the share of the tangible ones.

Given that information represents a culturally more advanced commodity, the consequences of a shift towards this knowledge economy "*will extend far beyond the technological and economic realm, to make irreversible changes in all spheres of human activity"*[1].

In the last decades, we have assisted to an increasing *"outsourcing"* in the economy, with a growing importance of service industries in the production of value within companies.

Firms often tend to outsource some stages of the value chain to other companies, when they are unable or unwilling to develop them on their own. These companies, specialized in knowledge intensive services, which have as clients other businesses, are defined by the term KIBS (Knowledge-intensive Business Services).

[1] Barras, R. (1990). *Interactive Innovation in Financial and Business Services: The Vanguard of the Service Revolution*. Research Policy 19 (1990), pp. 215-237.

The result of these changes is an economy in which human capital and knowledge-intensive business services play a fundamental role as knowledge brokers in the innovation processes.

Before starting an analysis of the KIBS industry and its innovation and imitation dynamics, is important to understand some characteristics and peculiarities of the macro-sector to which they belong: the service industry.

2.1 The Service Industry

After WWII, Western economies lived the rise of the service sector and the decline of manufacturing industries, moving from an agriculture- and manufacturing-based to a service- and knowledge-based economy, a change that has been called "*servicification*"[2]. As a result, most of these economies depend for the larger part of their GNP on service sales[3], which contribute to over 70% of employment in OECD countries[4].

In general terms, the word *"service"* describes a heterogeneous collection of activities, from professional, business or financial services to consumer services.

Traditionally services were defined through a process of exclusion: once production industries are defined, everything else was allocated to the tertiary sector.

This view has now changed, thanks to the growing importance of this sector: services are now considered as activities directed at creating changes or transformations of forms, place or time of availability in some entities. These entities could be material objects, goods, people, the natural environment or symbolic representations[5].

To produce a service means "*to organize a solution to a problem (a treatment, an operation) which does not principally involve supplying a good. It is to place a bundle of capabilities and competences (human, technological, organizational) at the disposal of a client and to organize a solution, which may be given to a varying degrees of precision"*[6].

A classification of the service sector is provided by the International Standard Industrial

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[2] Drejer, I. (2004). *Identifying Innovation in Surveys of Services: a Schumpeterian Perspective*. Research Policy, 33(3), pp.551-562.

[3] Nijssen, E., Hillebrand, B., Vermeulen, P. A. M. and Kemp, R. (2006). *Exploring Product and Service Innovation Similarities and Differences.* International Journal of Research in Marketing, 23(3), pp. 241-251

[4] Baltacioglu, T., Ada, E., Kaplan, M., Yurt And, O. and Cem Kaplan, Y. (2007). *A New Framework for Service Supply Chains*. The Service Industries Journal, 27(2), pp.105-124.

[5] Metcalfe, J. and Miles, I. (2000). Introduction, Overview and Reprise. In: Metcalfe, J. and Miles., I. (Eds.) *Innovation Systems in the Service Economy. Measurement and Case Study Analysis.* Kluwer Academic Publishers, Boston, pp. 1-14

[6] Gadrey, J., Gallouj, F. and Weinstein, O. (1995). *New Modes of Innovation.* International Journal of Service Industry Management, 6(3), pp.4-16.

Classification (ISIC), which identifies four categories of services[7]:

- Trade, restaurants and hotels;
- Transport, storage and communications;
- Finance, insurance, real estate and business services;
- Community, social and personal services.

The groups mentioned in this classification are very heterogeneous, so in order to understand better the specificities of this sector, other categorizations need to be considered. Another relatively successful grouping is the one proposed by Miles[8]. It is based on the functions performed and the markets served by different groups of services, which are:

- Product services, like finance or business services;
- Distributive services, like trade, transports and communication;
- Personal services, like entertainment, hotels, catering and domestic services;
- Social services, like the ones related to the medicine, health and government.

Generally, in the service industry, value creation is given by the integration of intangible resources and capabilities such as knowledge, competences, cognitive-centric workforce and customer collaboration[9].

Although the application of manufacturing-related concepts in several service innovation researches could suggest that these two sectors are substantially similar, the latter has some important differences that deserve and in-depth analysis, as they affect the way in which firms innovate or imitate each other.

Some researchers[10] have therefore highlighted the elements that characterize services, which are:

- The close interaction between production and consumption: it can be deep up to the point where the service cannot be provided if the service user or the service provider does not take part in the provision. This could generate problems in

[7] United Nations Statistics Division (2002). *International Standard Industrial Classification of All Economic activities, Rev. 3.1.* Available at: https://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=17&Lg=1&Top=1 [Accessed 24 Apr. 2017]

[8] Miles, L. (1995). *Service Innovation: Statistical and Conceptual Issues*. PREST Working Paper, University of Manchester

[9] Scerri, M. and Randhawa, K. (2015). *Service Innovation: a Review of the Literature.* In: Argarwal, R., Selen, W., Roos, G., Green, R. (Eds.) The Handbook of service innovation. Springer, pp. 27-51

[10] Tether, B. and Hipp, C. (2002). *Knowledge Intensive, Technical and Other Services: Patterns of Competitiveness and Innovation Compared*. Technology Analysis & Strategic Management, 14(2), pp.163-182.

changing the service provided for the service provider, who does not have the same degree of autonomy over its production, as is typically the case for manufacturers.

- The intangible nature of service output: services have been defined as *"the fruits of economic activity which you cannot drop on your foot"*[11]. Despite their intangible nature, they can act on tangible goods, on people, changing their physical and/or emotional state (e.g. transportation or entertainment), or on symbols (e.g. information processing). Because of their intangible nature, services tend to have more vague relationship between what is produced (i.e. the service product) and the process of production, than is typically the case in manufacturing. Indeed, in the case of services the term *"product"* itself refers often to a process, which may be composed by several activities, procedures or protocols.
- The key role of human resources in service provision: the creation and the provision of services is considered as dependent on humans, and in particular on their knowledge and capabilities. The main *"tools"* and "*technologies"* used often "*take the form of knowledge and skills embodied in individuals (or teams) and are implemented directly when each transaction occurs, rather than in physical plant or equipment*'[12]. For this reason, in order to innovate in services is often necessary to change what people do, and this may meet several resistances.
- The critical role of organizational factors in firm's performance: this depends on whether the *"product"* can be separated from the process of provision. In the case of traditional services, they depend on the provider and user being in the same physical space (e.g. in the case of restaurants). For this reason, their provision is local and limited to a small scale. Conversely, more modern services, and in particular those that act on information, do not need to be provided in the close proximity of the user. Consequently, there is a strong relation between the technology employed and the organizational form of the service, which has implications for the process of service provision and the nature of the service provided.

[11] Pennant-Rea, R. and Emmott, B. (1983). *The Pocket Economist*. 1st ed. Cambridge: Cambridge University Press

[12] Gallouj, F. and Weinstein, O. (1997). *Innovation in Services*. Research Policy, 26(4-5), pp. 537-556

- The weakness of intellectual property protection in services: patents and trademarks are seen as poorly working in the case of services. Accordingly, competitors may copy quickly successful service concepts, and companies may thus tend to focus their innovative efforts on back-office functions, which are considered less imitable. This is not true for all kind of services: for complex and/or poorly defined ones, and for those requiring substantial input from the user, the nature and the quality of the service provided may be the primary source of competitiveness[13].
- The importance of client participation: several terms have been used to describe this participation (interface, interaction, co-production, socially regulated service relationship, service relationship) but the central element is always the same: the bond between service provider and client during the provision of the service.

These elements represent the main peculiarities identified by the literature in the service sector and influence deeply the way in which the firms, belonging to this field, innovate and conduct their business.

2.2 The KIBS industry: possible definitions and a general overview

This particular field of the service sector has been described by a variety of terms in the economic literature: *"quaternary sector", "high-tech services", "the advanced sector"* or simply *"KIBS".*

The last term is the acronym used for *"Knowledge-intensive Business Services"*, and denotes those companies based on knowledge-intensive activities, which analyze and redistribute knowledge on behalf of other companies, that do not have the tools (or that are not willing) to carry out such activities internally[14]. Essentially, they are a subset of business services, which are themselves a subset of all services (Tab. 1).

In particular, in the report created by Miles et al. (1994) is stated that KIBS could be described as service enterprises based on a strong and intellectual value added and that are strongly innovative[15].

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[13] Tether, B. and Hipp, C. *Knowledge Intensive, Technical and Other Services: Patterns of Competitiveness and Innovation Compared.* Cit.

[14] Miles, I. *Service Innovation: Statistical and Conceptual Issues*. Cit.

[15] Miles, I., Kastrinos, N., Flanagan, K., Bilderbeek, R., den Hertodog, P., Huntink, W. and Bouman, M. (1994). *Knowledge-intensive Business Services: Their Roles as Users, Carriers and Sources of Innovation.* PREST, Manchester.

<table>
<tr><td rowspan="3">Business Related Services</td><td rowspan="2">Business Services</td><td>Knowledge Intensive Business Services</td><td>• Software and computer services (ICT)
• Strategy and management consultancy
• Auditing, accountancy, tax and legal advise
• Marketing services, opinion pooling
• Technical services, engineering
• Personnel training, headhunting</td></tr>
<tr><td>Operational Business Services</td><td>• Security services
• Equipment renting
• Facility management, cleaning
• Administration, bookkeeping
• Temporary labor recruitment
• Other operational services (e.g. catering, translating, call centers)</td></tr>
<tr><td colspan="2">Network-Intensive Services</td><td>• Wholesale, export and import services
• Transport and logistics
• Banking, insurance, stock exchange
• Telecommunication couriers, cable services
• Energy services</td></tr>
</table>

Table 1 - Classification of Business Services. Source: adaptation from Miles et al. (1995)

Alternatively, they can be seen as *"consultancy firms"* in a broad sense, and more generally, "*as firms performing, mainly for other firms, services encompassing a high intellectual value-added"*[16].

The main problem with these definitions is that they do not reflect the diversity of KIBS forms and activities, and, for this reason, more extensive definitions need to be considered.

Despite the problem of defining what KIBS are, this particular kind of service firms can be recognized as bearers of distinctive features. They are, in fact, private companies or organizations that:

- have personnel with a deep professional knowledge, so, knowledge and/or abilities related to specific field or sector.

They provide:

[16] Muller, E. (2001). *Innovation Interactions between Knowledge-Intensive Business Services – Analysis in Terms of Evolution, Knowledge and Territories*. Physica, Heidelberg

- products and services based on knowledge (and often involve an extensive use of technologies);
- intermediary products and services that often promote information analysis and the knowledge creation inside client firms;

In addition, their main clients are "businesses" and not the individual consumer.

Bilderbeek and Den Hertdog (1998) provide a similar description. According to them, KIBS are:

- private (or semi-private) companies and organizations;
- relying heavily on professional knowledge i.e. knowledge or expertise related to a specific (technical) discipline or (technical) functional domain;
- supplying intermediate products and services that are knowledge-based[17].

According to these definitions, a large number of industries, covering a rather wide range of services, can be considered as KIBS. For instance, a great part of the professional service sector can be considered knowledge-intensive, be technology-based or not.

2.2.1 KIBS characteristics and taxonomies

Despite the presence of several definitions and similar concepts (albeit with some nuances), scholars agree on one thing: KIBS are one of the pillars on which the *"knowledge economy"* is based, and they provide non-material, knowledge-intensive services to other firms and public institutions[18]. During their activities, they interact intensively with their client firms, providing them with external knowledge and competences, and supporting their innovative processes.

The work of Miles and his colleagues in the Nineties, which provides a first definition of KIBS, can be considered as a starting point in the analysis of this topic: after that, different scholars showed a deep interest in these realities and in their peculiarities and common features[19]. The first peculiarity recognized to KIBS is the knowledge intensity of the service provided for their clients. Knowledge, as will be discussed, is an important element characterizing the kind of activities carried on by these companies.

The second element is their function of consulting (which can be also expressed as a

[17] Bilderbeek, R. and den Hertdog, P. (1998). *Technology-based Knowledge-Intensive Business Services in the Netherlands: their Significance as Driving Force Behind Knowledge-driven innovation.* Vierteljahrshefte zur Wirtschaftsforschung, Ducker & Humblot, Berlin. Vol. 67, Iss. 2, pp. 126-138

[18] Miles, L. *Service Innovation: Statistical and Conceptual Issues*. Cit.

[19] Muller, E. and Zenker, A. (2001). *Business Services as Actors of Knowledge Transformation: the Role of KIBS in Regional and National Innovation Systems.* Research Policy, 30(9), pp. 1501-1516

problem-solving function).

The last one instead is the strongly interactive or client-related character of the service provider. This feature is related also to the co-production processes characterizing their activities: the services produced by KIBS are often designed and developed collaborating with client firms, which play a fundamental role in the (often personalized) realization of the service itself. This causes a deep interaction between KIBS and their clients, which may end up as loyalty.[20]

To sum up, these companies rely on an extensive use of new knowledge and technology, often have personnel with high levels of personal preparation and they are based on strong, repeated over time, interactions with their final users.

As already mentioned above, the existing literature offers several definitions of KIBS companies, but they are often not able to specify the variety of forms and activities in which they are involved.

KIBS are firms born to help other organizations to deal with problems for which external sources of knowledge are needed. Consequently, there are practically as many kinds of KIBS as there are areas of knowledge and this leads to the considerable diversity in their evolution, structure and activities.

The KIBS industry encompasses then several sectors based on the statistical nomenclature NACE, revision 1.1, illustrated in Tab. 2. This nomenclature classifies business services in section K *"Real estate and business activities",* division 70-74. Some KIBS however are active also in other sectors, such as logistics, telecoms and financial services.

Two main categories of KIBS can be identified: Professional KIBS (called also p-KIBS) and Technology KIBS (or t-KIBS)[21].

In the first category enter those traditional professional services, like accounting, legal services, financial, marketing and communication ones, which come in contact with new technologies mainly as users. In the second category instead, we can find technology-based services, like telematics services, computer networks, software design, consultancies and R&D, and more generally those KIBS that *"derive their immediate function primarily from the production and transfer of technology-related knowledge"*[22] .

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[20] *Ibid.*

[21] Miles, L. *Service Innovation: Statistical and Conceptual Issues.* Cit.

[22] Bilderbeek, R. and den Hertdog, P. *Technology-based Knowledge-Intensive Business Services in the Netherlands: Their Significance as Driving Force Behind Knowledge-driven Innovation.* Cit.

NACE division 72: Computer and related activities
72.1 Hardware consultancy 72.2 Software consultancy and supply 72.3 Data processing 72.4 Database activities 72.5 Maintenance and repair of office, accounting and computing machinery 72.6 Other computer related activities
NACE division 73: Research and experimental development
73.1 Research and experimental development on natural sciences and engineering 73.2 Research and experimental development on social sciences and humanities
NACE division 74: Other business activities
74.11 Legal activities 74.12 Accounting, book-keeping and auditing activities, tax consultancy 74.13 Market research and public opinion polling 74.14 Business and management consultancy activities 74.15 Management activities of holding companies 74.20 Architectural and engineering activities and related technical consultancy 74.3 Technical testing and analysis 74.4 Advertising 74.5 Labour recruitment and provision of personnel 74.8 Miscellaneous business activities n.e.c. 74.81 Photographic activities 74.84 Other business activities n.e.c.
Note: The broad NACE divisions 70-74 include some sub-sectors that are not strictly KIBS, and thu have been omitted from this list; some parts of 74.6 (Investigation and security activities); 74.7 (Industrial cleaning); 74.82 (Packaging activities); 74.83 (Secretarial and translation activities). NACE 71, excluded from the list above, involves 'Renting machinery and equipment without operator and of personal and household goods' which is often grouped together with these sectors. For purposes of statistical analysis, these sectors are often aggregated with 'real estate', and this group then, in turn, with 'financial intermediation'.

Table 2 - The Main KIBS sectors based on NACE nomenclature, Rev. 1.1. Source: Eurostat (2002)

However, it is not easy to make a clear distinction between the two categories, as some activities, like marketing, advertising or design, could fit to both. Despite this ambiguity, both groups are a source of external knowledge for the client firm, and they contribute to innovation in their users, providing highly specialized workforce and contributing to economic performance and growth.

Concerning the analysis of the KIBS sample used for this study, three different categories of KIBS are used: ICT KIBS, like software design companies (partially comparable to the t-KIBS category), Professional Services (similar to the p-KIBS category) and Design KIBS. This last category includes marketing and communication consultancy companies and design studios involved in every step of the company value chain, from productive processes to the final offer.

2.2.2 KIBS as "bridges of innovation"

As will be explained in the next chapter, services in the past were often seen as laggards in innovation, despite their important contributions to competitiveness.

With the economic developments of the last decades (first and foremost *"knowledge economy"* and globalization), the perception of services, and KIBS in particular, changed:

if at the beginning they were considered as mere providers or transfers of specific information, more recently they have been identified as leaders of innovation and hubs of innovation networks[23].

During the last two decades, the KIBS sector has grown under different points of view, from entry rates and number of firms to the share of employment and value added.

As economies develop, there is a constant increase in the demand for knowledge inputs, which becomes also more sophisticated. In this situation the role of specialized providers becomes fundamental, with functions that are complementary (or even competing) with those of the public knowledge-generating institutions.

The tertiary evolution and the growing outsourcing trends of the economies are consequently at the basis of a redistribution of knowledge in favor of KIBS and away from traditional service and manufacturing sectors.

KIBS play a role that is particularly significant in advanced regions, where an eventual increase in manufacturing productivity depends on highly specialized suppliers. This role has been recognized already in the early 1960s by Machlup: "*Certain services of specialists in particular kinds of transitory knowledge have a market value, not because it takes especially scarce qualifications to acquire knowledge, but because the 'division of knowledge is a great time-saver and thus a highly productive arrangement in the economy"*[24].

The growing importance of this kind of companies is thus one of the main characteristics of the *"knowledge economy":* these services are dynamic, fast growing and intellectually intriguing and they are a source of new technologies that have an impact on the whole economy. Although they constitute only a small proportion of the service sector, their significance goes beyond their size; they are a source of high quality, high-wage employment and wealth creation, and they act as knowledge integrators[25], participating actively in ongoing knowledge networks with other firms, research institutes and universities.

Today, more and more scholars[26] explicitly recognize their active role in the interactive learning process that helps the development of innovation capabilities and innovation

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[23] Tether, B. and Hipp, C. *Knowledge-intensive, Technical and Other Services: Patterns of Competitiveness and Innovation Compared.* Cit.

[24] Sarell, M. and Machlup, F. (1963). *The Production and Distribution of Knowledge in the United States.* American Sociological Review, 28(5), p.840.

[25] Bessant, J. and Rush, H. (1995*). Building Bridges for Innovation: the Role of Consultants in Technology Transfer.* Research Policy, 24, pp. 97-114

[26]Den Hertog, P. (2000). *Knowledge-Intensive Business Services as Co-Producers of Innovation.* International Journal of Innovation Management, 4(4), pp.491-528.

outcomes, calling them *"bridges of innovation"*[27], highlighting their potential in triggering and helping the process of knowledge creation and conversion in the firms they work with.

Thanks to the close interactions with the network to which they belong, KIBS are seen as helping in bridging the gaps in others' (in general, client firms) innovation processes, in particular in the case of SMEs (Small and Medium-size Enterprises). When SMEs try to innovate, they often find themselves in front of several problems, like capital and general resource scarcity, lack of qualified managers and difficulties in accessing information flows and technical know-how. Internal R&D alone is not sufficient for most SMEs in order to be successful innovators and their innovative capacities depends more and more on their access to external information sources[28].

Thence, KIBS can help firms (and SMEs in particular), providing services which are fundamental for the success of their innovative efforts and are the result of an interactive process, in which the final product in continuously adapted to the client's need. For this reason, they are defined also as (potential) co-innovators.

KIBS can be considered as *"bridges for innovation"* in particular for some roles that they play with respect to different actors of the market:

- Purchasers: business-related services buy knowledge, equipment and investment goods from manufacturing industry or other services;
- Providers: business-related services provide knowledge and services to companies in the manufacturing industry or in the service sector;
- Partners: business-related services deliver knowledge or services, which are complementary to the manufacturing industry's products or to other services.

KIBS can perform different functions for their clients, like the detection and analysis of problems, the (abstract) establishment of a diagnosis and the (concrete) participation

Doloreux, D. and Muller, E. (2007) *The Key Dimensions of Knowledge-Intensive Business-Services (KIBS) Analysis. A Decade of Evolution*. Working paper on firms and regions, number U1/2007. Fraunhofer-Institute fur System – und Innovationsforschung (ISI). Karlsruhe

[27] Czarnitzki, D. and Spielkamp A. (2000). *Business Services in Germany: Bridges for InnovatioN.* Discussion paper n. 00-52, ZEW, Manheim.

[28] This phenomenon is reported in some studies as 'innovation without research', i.e. firms which acquire and use external knowledge not generated within their own R&D processes.

during the problem-solving process[29] and consequently, their bridging activity can take different forms[30]:

- Expert consulting, that aims to provide specific solutions to specific and complex problems;
- Experience sharing, consisting in transferring knowledge from one context to the other;
- Brokering, putting different users in contact across different range of services and resources;
- Diagnosis and problem clarification, based on helping users in identifying and defining their particular innovation needs;
- Benchmarking, with the process of identifying and focusing on *"good practices"* in the same industry or also in others, which could be applied by the client firm;

On account of this, KIBS can offer a variety of services to their clients, having different kinds of bonds with them and, therefore, they can support their innovative effort at different levels and play different roles in their innovation processes. They can play a *"Facilitator"'* role, supporting a client firm innovation process, but without giving birth to the innovation inside the KIBS itself nor transferring it to the client. An example of this situation is the one of the consultancy firm helping its client to introduce a new account management system. They can be also "*Carriers",* which play a crucial role in transferring existing innovations and ideas from one firm or industry to the others, even though the innovation itself does not originate from the KIBS itself. This is the case for example of an IT firm implementing and customizing an innovative ERP software in a client firm. Finally, they can act as "*Sources"* playing a major role in initiating and developing innovations in client firms, usually through a close interaction with them. This is the case, for example, of an advertising agency developing a completely innovative campaign for a client.

KIBS in the end have a two-fold relation with their clients: on one side, they act as a bridge, or as an interface, between their clients and the environment, boosting their innovation capabilities. On the other, they may enrich their knowledge base thanks to their interactions with their clients, increasing their own ability to innovate. The result of these interactions can be represented as a virtuous cycle, hypothesis supported by the evidence

[29] Gadrey, J. (1994). *Les Relations de Service dans le Secteur Marchand*. In: de Bandt, J., Gadrey, J., (Eds.), Relations de Service, Marchés de Services. CNRS, pp. 23-41

[30] Bessant, J. and Rush, H. *Building Bridges for Innovation: the Role of Consultants in Technology Transfer.* Cit.

that interacting SMEs and KIBS are more innovation oriented than non-interacting firms, with those interactions having an impact on their respective innovation features[31].

Clearly, there are several differences concerning how different SMEs (and firms in general) and KIBS innovate and interact, which reflect the disparities in the generation and diffusion of knowledge by firms.

2.2.3 KIBS growth in Italy and Europe

Statistics on KIBS, as well as on business services, have been largely neglected until recently. However, increasing information is coming on stream due to the growing importance of this sector.

Even at a first approach to the data, it is clear that the KIBS sector not only covers a great variety of activities, as already mentioned in the preceding paragraphs, but also its spatial dimension presents a great variety.

This can be explained at a more general level of analysis: firms are embedded in a network of horizontal and vertical relationships that create a system at the local level, which may be more or less favorable. This system has an important role in favoring innovation at the regional level, being based on elements and relationships, which interact in the production, diffusion and use of new and economically useful knowledge[32]. Moreover, it is shaped by a set of *"soft factors"* (codes of conduct, norms, social regulations) and is characterized by specific infrastructures (transport, communication systems) and knowledge providers (research institutes, universities) and governance mechanisms. The process of interactive learning in which KIBS are active too is strongly influenced by the local dimension, as stable knowledge partnering depends on the closeness of links that, in turn, is influenced by spatial, institutional and cultural proximity.

While KIBS are attracted by those regions providing the best conditions for their growth, they can in turn play an important role in the development of a region or a country, as they not only develop their own knowledge, but also stimulate the production of knowledge among their network, acting as knowledge purchasers, providers and partners. For example, a qualified and diversified labor pool is fundamental for KIBS

[31] Muller, E. and Zenker, A. *Business Services as Actors of Knowledge Transformation: the Role of KIBS in Regional and National Innovation Systems.* Cit.

[32] Lundvall, B.A. (1992). *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning.* (Eds.) Pinter Publishers, London

growth, but at the same time, the educational level influences the Regional Innovation System (RIS) capacity to absorb and elaborate the knowledge generated by KIBS.

This has been a matter of study for several scholars, who defined KIBS as *"knowledge agents"*, i.e. economic players that generate, convert and/or diffuse knowledge though the system, contributing to the development of the regional knowledge-base[33].

The development of *"knowledge hubs"* i.e. knowledge-intensive clusters, has become a popular target for policy-makers, being *"soft"* skills recognized as important factors and sources of regional competitiveness. KIBS industries in particular are perceived to play a crucial role in RIS, as they offer the possibility to create the opportunities for interactive learning, helping the creation of local linkages and contributing to the systems' connectivity to outside knowledge networks.

However, other reasons can contribute to explain the concentration of KIBS in certain regions: among them, the importance of face-to-face contacts for the exchange of tacit knowledge plays a fundamental role. KIBS are known to play a crucial role in solving clients' problems, and this role requires direct contacts and interactions with them, in order to figure solutions, combining their knowledge with externa sources. Consequently, proximity results helpful in managing these information flows.

Despite what may be though, the development of communications and the general trend towards de-materialization, which should help networks to not depend on proximity, does not strongly affect this sector: the complex cognitive processes involved need not only large flows of codified scientific and technical information, but also a lot of tacit knowledge for using and interfacing information[34].

The emergence of KIBS in Europe has been the answer to different needs: the evolution, in mature industrial regions, of manufacturing industry towards high technology functions and the liberalization and transformation towards new competitive technical and organizational cultures. The result is what has been defined a '*mosaic of KIBS-intensive regions, which play the role of knowledge producers, convertors, attractors and gatekeepers for larger economic areas'*[35].

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[33] Corrocher, N. and Cusmano, L. (2012). *The 'KIBS Engine' of Regional Innovation Systems: Empirical Evidence from European Regions.* Regional Studies, 48(7), pp.1212-1226.

[34] Héraud, J.A. (2000). *Is There a Regional Dimension of Innovation-oriented Knowledge Networking?* Paper presented at the Fifth Regional Science and Technology Policy Research Symposium (RESTPOR), Kashikojima, Japan, 5-7 September

[35] Corrocher, N. and Cusmano, L. *The 'KIBS Engine' of Regional Innovation Systems: Empirical Evidence from European Regions.* Cit.

In general, the patterns of growth in the KIBS industries across Europe are characterized both by a large heterogeneity across high-income areas, and by a general trend towards a highly qualified *"tertiarization".* Major city regions are seen as the ideal locus for innovation as metropolitan areas represent on the one hand, a nexus of highly dynamic markets to be served by knowledge-intensive services and on the other, they offer large and diversified labor market for advanced services. In the end, these cities facilitate interaction and knowledge diffusion.

KIBS diffusion responds to a broad increase in demand for highly qualified knowledge providers and it can be observed that they are a characterizing element of high-income, innovation-oriented regions.

This is confirmed also in to the report drawn during the Europe INNOVA[36] initiative in 2009, which states that Knowledge-intensive Business Services often accompany regional prosperity and innovation. This is demonstrated by the strong, positive relationship between the concentration of KIBS in a region (Location Quotient) and the region's economic prosperity (GDP per capita), represented in Fig. 1.

The report, through the comparison between the ranking of the regions by population and by KIBS employment, confirms also the fact that KIBS are located mainly in urban areas (Tab. 3). However, the relationship between the size of the city and the employment in the KIBS sector is not always direct: some cities have a KIBS sector larger than the expected, while others fall in the opposite situation.

In the first category we have: Zürich, Stockholm, Oxford, Inner London, Brighton, Frankfurt am Main, Berlin, München, Stuttgart, and Athens. Those cities, having a KIBS sector smaller than the expected, instead are: Katowince, Palermo, Bari, Naples, Marseille, Valencia, Antwerpen, Sevilla and Venice[37].

[36] Europe INNOVA is an initiative for innovation professional supported by the European Commission. Its fundamental objectives fall in line with the policy direction set out within the 6th FP priority of 'Structuring the European Research Area' and aspires to inform, assist, mobilize and network the key in the field of entrepreneurial innovation, including company managers, policy makers and cluster managers.

[37] Europe INNOVA, March 2009. *Priority Sector Report: Knowledge Intensive Business Services.* Available at: http://www.clusterobservatory.eu/common/galleries/downloads/kibs.pdf [Accessed 22 Apr. 2017]

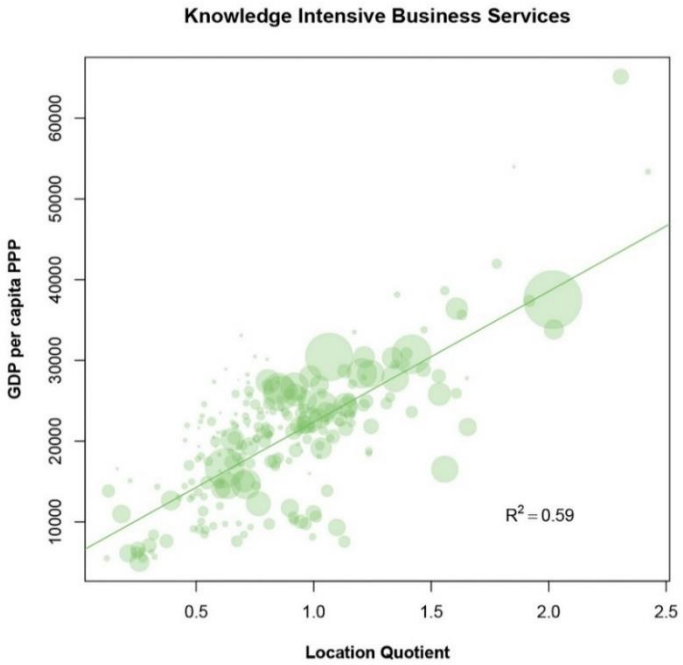

Fig. 1 - Strength of the relationship between the concentration of KIBS and GDP per capita. Source: Priority Sector Report: Knowledge-intensive Business Services (2009)

Region	Largest City	Size rank	KIBS rank
Ile de France (FR)	Paris	1	1
Lombardia (IT)	Milan	2	4
Andalucia (ES)	Sevilla	3	24
West-Nederland (NL)	Amsterdam	4	3
Cataluña (ES)	Barcelona	5	7
Vlaams Gewest (BE)	Antwerpen	6	27
Rhône-Alpes (FR)	Lyon	7	18
Campania (IT)	Naples	8	47
Madrid (ES)	Madrid	9	5
Danmark (DK)	Danmark	10	10
Düsseldorf (DE)	Düsseldorf	11	12
Lazio (IT)	Rome	12	9
Mazowieckie (PL)	Warszawa	13	19
Sicilia (IT)	Palermo	14	60
Provence-Alpes-Côte d'Azur (FR)	Marseille	15	43
Slaskie (PL)	Katowice	16	69
Veneto (IT)	Venice	17	29
Outer London (UK)	Outer London	18	18
Valencia (ES)	Valencia	19	45
Köln (DE)	Köln	20	13
Piemonte (IT)	Turin	21	26
Oberbayern (DE)	München	22	8
Emilia Romagna (IT)	Bologna	23	22
Ireland (IE)	Ireland	24	14

Table 3 - Top 24 cities for either population or KIBS employment. Source: Priority Sector Report: Knowledge-intensive Business Services (2009)

Regarding the share of KIBS employment, it is typically concentrated in the capital cities of the respective countries (Fig. 2). Also in this case some exceptions are present: in Germany the regions in the South and West focus on KIBS even more than Berlin, and in the UK, where the regions around London, as well as Manchester, Liverpool and Edinburgh, exhibit high relative KIBS employment rates.

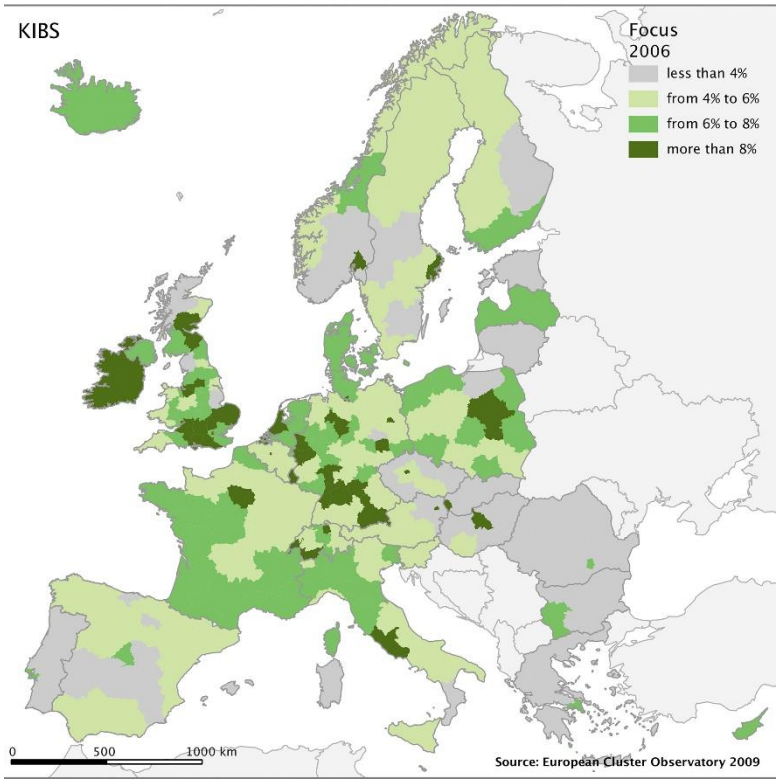

Fig. 2 - Share of a region's labor force employed in KIBS. Source: Priority Sector Report: Knowledge-intensive Business Services (2009)

Finally, the report highlights also that, in Europe, the average annual growth in KIBS employment is higher than the growth in total employment (1.7% compared to 1.2% between 2001 and 2007).

Regarding Italy specifically, less data are available, but some reports contain useful information about KIBS diffusion. The ISTAT Report of 2015 confirms the positive European trend also in the Italian KIBS sector, with these particular business services reporting the best performances in the economy.

This positive trend is confirmed also by one of the latest Unioncamere Report available, which states that despite the crisis, one of the fastest-growing sectors is the business services one, with 9'290 new enterprises only in 2014[38], which brought the total number

[38] Centro Studi Unioncamere, May 2015. Rapporto Unioncamere 2015 – Alimentare il digitale: il future del lavoro e della competitività dell'Italia. Available at: www.unioncamere.gov.it/download/4793.html [Accessed 22 Apr. 2017]

of KIBS active in the Italian territory to be 143'365[39], located mainly in Lombardy and Lazio[40].

This growth is part of a positive trend started in the Nineties: since then the number of people employed in knowledge-intensive services increased significantly, as shown in Fig.3. Despite this growth, this has not been followed by a proportional increase in the value added, mainly because those sectors inside the KIBS one, reporting the highest growth are the labor-intensive ones, like the research, the selection and the supply of personnel. In 2010, this sector occupied 1.2 millions of people, which correspond to the 9.5% of the total amount occupied in the service sector[41].

More recently, according to the same report, over the 3.7 millions of people employed in the business service sector, 880'000 people were occupied inside p-KIBS, while 840'000 were occupied in t-KIBS. These numbers correspond, respectively, to the 5.4% and 5.2% of the overall productive system.

Generally, Italian KIBS are smaller than American and English ones, with the 96% of the KIBS existing in 2014 being small enterprises with less than 50 employees, the 90% of which are micro-enterprises, with less than 10 employees[42].

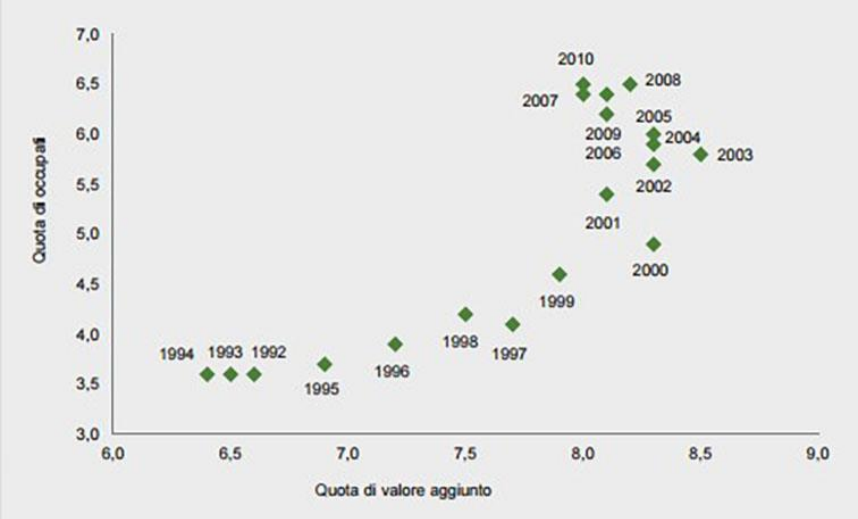

Fig. 3 - Value added and employed personnel in knowledge-intensive services sector (1992-2010). Source: Ocse, STAN Structural Analysis Database

[39] AIDA, Analisi Informatizzata delle Aziende Italiane. Available at: https://aida.bvdinfo.com/version-201776/home.serv?product=AidaNeo [Accessed 2 June 2017]

[40] Muller, E. and Zenker, A. *Business Services as Actors of Knowledge Transformation: the Role of KIBS in Regional and National Innovation Systems.* Cit.

[41] ISTAT, (2015). *Rapporto sulla competitività dei settori produttivi.* Edizione 2015. Available at: http://www.istat.it/it/files/2015/02/Rapporto-competitivit%C3%A0-2015.pdf [Accessed 15 May 2017]

[42] Cabigiosu, A. (2016). *L'Innovazione e la Progettazione nei Servizi Knowledge-intensive.* G. Giappichelli Editore

Regarding Veneto, the region analyzed in this work, at the beginning of this century the percentage of KIBS companies present in the territory was lower than the national average, while today it is one of the regions with the highest concentration of KIBS.

2.2.6. Drivers of development in KIBS

Despite the crisis, the KIBS sector in the last years demonstrated more than once that its growth rate is much faster compared to that of the other sectors, which are often its users. This sustained growth is attributed mainly to changes in the extent to which all sectors are demanding inputs from KIBS. As a result, some main drivers of growth for this field of the service industry can be identified in:

- Outsourcing: firms in the last decades have increasingly contracted out services that were originally performed internally. There are several reasons behind this new behavior, one of the most important being the philosophy of focusing on the core competencies of the firm to be more flexible. This leads to some advantages not only for the firms outsourcing their activities, but also for the KIBS firms too, which can count on economies of scale or improved efficiency and on effectiveness that comes from experience. Although outsourcing is changing the shape of economies, it not a sufficient explanation for KIBS growth rates, as there are still several KIBS-type employees in different sectors of the economy[43]. For this reason, other drivers need to be considered.
- Technologies: a major driver of growth is represented by the rapid increase of technology-related business services, with computer and information technology services being the most relevant example. The rapid evolution and proliferation of technologies represents not only a considerable opportunity for firms, but also a problem for organization wanting to make effective use of this opportunity. In order to keep up and be always updated with these developments, it is necessary to acquire substantial (new) knowledge. Despite the creation of internal IT capabilities in many firms, IT services provide an alternative source of knowledge.

[43] European Foundation for the Improvement of Living and Working Conditions Report. (2005). *Sector Futures: the Knowledge-intensive Business Services Sector.* Available at: https://www.eurofound.europa.eu/observatories/emcc/articles/working-conditions/the-knowledge-intensive-business-services-sector-what-future [Accessed 22 Apr. 2017]

These services are multifaceted as more and more services emerged to help client firms to deal with different technological problems, some of them working mainly around specific bodies of technological knowledge (e.g. mechanical engineering or nanotechnologies), while others are more focused on specific problems (e.g. environmental problems and the technologies needed to deal with them).

- Regulations and social change: some KIBS, such as specialized services to support legal and accountancy frameworks, can help their clients in flourishing in their specific social environment. Compliance with health and safety standards, environmental regulations and similar issues may represent a major challenge for firms, especially for those companies working across countries with different traditions. KIBS can help them providing basic information, advice, training and intermediation services. Other KIBS are more in the business of helping their clients in understanding and relating to different markets, cultures, consumers and stakeholders, like market research, marketing and public relations services. This kind of services existed for a long time, but globalization increased their importance in the last decades.
- Trends in the labor market: on the one hand, there are skill scarcities, which render work in some KIBS sectors more lucrative compared to other sectors. On the other hand, there may be changes in the workforce as more people look for diversified careers. KIBS work offers relatively high levels of learning on the job and diversity of work experiences, for this reason both these trends should encourage work in KIBS.
- Other drivers: internationalization and globalization have often been mentioned as an important couple of factors pushing firms to seek inputs from KIBS, in order to be able to operate in different environments. They may also be thought as drivers affecting KIBS directly[44]: they may result as a stimulus for KIBS firms themselves to internationalize to follow their clients into new operating environments or to find new markets.

  Generally, KIBS are seen as sheltered from international competition. The differences in regulations across countries, in language and culture and the national character of professional qualifications have all contributed to make this

[44] Miozzo, M. and Miles, I. (2003). *Internationalisation, Technology and Services.* Edward Elgar Publishing, Cheltenham, Northampton

sector one of those where there are more difficulties than usual in internationalization.

The rise of knowledge-based economy might also be seen as a driver of KIBS growth. The growing importance of services in the economic life (often referred to as *"servicisation"* of the economy) derivers from the fact that firms in all sectors recognize that their competitive advantage is based more on the actual services delivered to their customers through the transaction than on the particular goods being sold.

2.3 Knowledge: a general analysis

In today's economy, knowledge is seen as "the only meaningful resource"[45].

Organizations are often presented as knowledge-creating entities, where knowledge and the capability to create and exploit it are a fundamental source of sustainable competitive advantage, since it is accumulated through organizational learning and is difficult to imitate. Indeed, the competition to hire highly qualified personnel is increasing, compared to that referred to those having a lower level of education[46].

Information and knowledge are intangible goods, which are produced and traded especially by the service sector[47] and KIBS services in particular are involved in the production, combination and distribution of knowledge coming from different sources, helping the efficient distribution and utilization of knowledge in the system.

KIBS are characterized by their ability to collect knowledge and information from the external environment and to transform them, combining them with internal knowledge into service outputs, which are often highly customized to particular user's requirements. These business that apply specialized knowledge, ranging from technical, market and institutional knowledge to specific requirements of enterprises, are said to represent core knowledge sources and intermediaries in the innovation system[48].

It order to have a better understanding of innovation dynamics in KIBS, is important to mention some theories about how knowledge generates and how it is processed, transmitted and accumulated.

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[45] Drucker, P. (1993). *Post-Capitalist Society.* Butterworth Heinemann, London.

[46] Miles, I. et al. *Knowledge-intensive Business Services: Their Role as Users, Carriers and Sources of Innovation*. Cit.

[47] Miozzo, M. and Miles, I. *Internationalisation, Technology and Services.* Cit.

[48] Miles, I. (2005). *Knowledge-intensive Business Services: Prospects and Policies.* In: Foresight, vol. 7, n. 6, pp. 39-63.

2.3.1 Definitions and taxonomies

Knowledge is defined as "*a dynamic human process of justifying personal belief towards the truth"*[49]. Consequently, it is strictly related to human actions and a context-specific, relational, dynamic and humanistic process[50].

Organizations are dynamic entities, where the interactions among individuals or among individuals and the environment, create knowledge. The organization itself interacts with its environment, reshaping it and itself through a process of knowledge creation.

It is almost impossible to talk about knowledge without mentioning the work of Nonaka and Takeuchi[51], which supports the well-known distinction, pioneered by Polanyi[52], between:

- Explicit or codified knowledge, which essentially represents formal know-how, i.e. the rational knowledge. It can be expressed in formal language and is typically codified in books, reports, teaching programs, patents, mathematical terms and handbooks or available in the form of formulas, technical specifications or embedded in equipment. Thanks to its characteristics, it is relatively easy to transfer and store, but in order to be interpreted and understood, tacit knowledge may be necessary.
- Tacit knowledge, which instead is made up of ideas, facts or even feelings, values and views, and can be hardly put into formal language and it is often closely linked to personal experience and embedded into specific people, firms and organizations. It encompasses, for example, both those aspects of know-how, which are hardly formalized in books and are most often acquired by processes of learning-by-doing, and the so-called routines. For this reason, it remains in the possession of those involved and hiring can be seen as a way to acquire new human capital and knowledge. Organizational knowledge, embedded in organizational processes, routines and structures, cannot be transferred without transferring the body of people working together.

[49] Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation.* New York/Oxford: Oxford University Press

[50] Nonaka, I., Toyama, R. and Nagata, A. (2000). *A Firm as a Knowledge-creating Entity: A New Perspective on the Theory of the Firm.* Industrial and Corporate Change, vol. 9, issue 1, pp. 1-20.

[51] Nonaka, I. and Takeuchi, H. *The knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation.* Cit.

[52] Polanyi, M. (1967). *The Tacit Dimension.* Garden City, New York: Doubleday Anchor

This brings to a second distinction in knowledge, the one between individual knowledge and organizational knowledge. The first one is possessed by the single individual and operator, while the latter includes both the knowledge possessed by single individuals and the routines, procedures and strategies that are developed at the corporate level and shared between the members of an organization.

Clearly, tacit knowledge is more difficult to identify and in the context of innovation may cover several dimensions. Despite the many efforts of "*knowledge engineering"* (i.e. efforts to formalize tacit knowledge, extracting it from experts), it is clear that even high-technology activity still rely in high levels of tacit knowledge[53].

Tacit and explicit knowledge are thus complementary, but their composition and combination can vary, according to the different situations and contexts.

Another important distinction that needs to be considered is the one between knowledge and information.

Despite the fact that the term "*knowledge-intensity"* is often used as a synonym for "*information-intensity"*, the two concepts present some differences.

The definition that describes knowledge as "*organized information"* results too static. Knowledge, as highlighted by the definitions provided above, cannot be reduced to the content of manuals, but it is rather "*a dynamic process. It involves the ability to organize information, as well as the results of applying that ability"[54].*

Knowledge hence cannot be regarded as the mere result of the sorted accumulation of information in a stockpile, but rather as a complex structure, with quite loose patterns, with its parts connected in various ways by ties characterized by different degrees of strength[55].

Moreover, knowledge is strongly affected by the cognitive features of the individual who holds it: we cannot separate the knower from the known.

Finally, we cannot consider knowledge separately from the communication processes though which it is exchanged, which may require the building of a common language, a common classification and categorization of messages to share and common knowledge and shared learning processes in order to be successful.

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[53] Nonaka, I. and Takeuchi, H. *The knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation.* Cit.

[54] Miles, L. *Service innovation: Statistical and Conceptual Issues*. Cit.

[55] Ancori, B., Bureth, A. and Cohendet P. (2000). *The Economic of Knowledge: the Debate about Codification and Tacit Knowledge.* Industrial and Corporate Change, vol. 9, n. 2.

"Knowledge transfer thus typically requires more interaction between the participants than does information transfer"[56], it is strongly related to the learning process, and may be created and developed in several ways, from *"learning-by-doing"* and experimentation to communication and formal training.

For KIBS, this means that their ability to access knowledge from the outside (from both suppliers and clients) and to integrate it with the existing one is fundamental. Consequently, they need to invest efforts and internal resources on building communication skills and *"dynamic capability"* i.e. a firm's ability to use existing firm-specific capabilities and to develop new ones[57].

According to Nonaka and Tacheuki's theory, innovation emerges from the interaction between explicit and tacit knowledge, therefore, it is the process behind knowledge creation that fuels innovation, and not knowledge per se[58].

Individuals and their interactions with the organization are thus closely linked to the process of knowledge creation and all the possible kinds of conversions can be summarized in a four-dimensional model:

- Socialization: it is characterized by the development of tacit knowledge from tacit knowledge. Sharing their experiences people create shared mental models and technical skills, but they can also develop tacit knowledge trough observation, imitation and practice.
- Externalization: it consist in the development of explicit knowledge from tacit knowledge. Tacit knowledge is rationalized and articulated into specific concepts and formal models (e.g. like manuals). In this way, it takes the form of explicit knowledge, through metaphors, analogies, concepts and hypotheses.
- Internalization: is characterized by the move from explicit to tacit knowledge. It consists in the process of *"learning-by-doing",* through which specific explicit knowledge is embodied into an individual's tacit knowledge base, in the form of shared mental models or know-how.

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[56] According to Miles, this may not involve close interaction at the point of delivery of knowledge as a product or in the final transaction. A consultancy report or a CD may be simply delivered to the final user. But there will usually have been prior interaction, for example to determine customer requirements and the knowledge structure in which information has to be fitted.

[57] Teece, D.J., Pisano, G. and Shuen, L.E. (1990). *Firm Capabilities, Resources and the Concept of Strategy: Four Paradigms of Strategic Management.* CCC Working Paper, n. 90-8.

[58] Nonaka, I. and Takeuchi, H. *The knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation.* Cit.

- Combination: it consists in the development of explicit knowledge from explicit knowledge. Existing information is reconfigured through sorting, adding, combining and categorizing of existing knowledge, and this may involve also the combination of elements from different knowledge systems.

All these modes of knowledge conversion can be involved in organizational knowledge creation, which is hence a continuous and interactive process. This requires a dynamic element to be added to the model, in order to be representative.

First, the process starts with socialization: a field of interaction is created, in which organization's members can share easily their experience and mental models. Then an internalization phase is triggered by dialogue and reflection. In this step it is important for members to find a way to articulate hidden tacit knowledge (i.e. through metaphors), which is difficult to communicate otherwise. As a third step, a combination mode is trigger, between the newly created knowledge and the knowledge already existing in other areas of the organization. This may result in the creation of a new product, service or managerial system. Finally, internalization is triggered by *"learning-by-doing".*

The model presented above provides relevant concepts for analyzing KIBS relationships with their customers and partners in developing new products. First of all, the role of the combination of different forms of knowledge is emphasized: empirical researches support the idea that in KIBS relationships tacit knowledge flows are at least as important as other more explicit, codified forms of knowledge[59]. Furthermore, the model highlights the importance of interaction between individuals, employees and team-members, fundamental in creating organizational knowledge. Finally, it presents a focus on the dynamic nature of knowledge conversion processes: the constant process of exchanging, mixing, linking, reshaping and enriching different forms of explicit and tacit knowledge is what typically happens when KIBS interact with their customers. KIBS can trigger processes of knowledge conversion in their clients and vice versa.

These considerations are not only applicable to client relationships, although they are the most frequently considered by the literature, but can be extended also to all the relationships that KIBS have with their external knowledge sources, such as suppliers, collaborators and partners in general.

[59] Miles, I. et al. *Knowledge-intensive Business Services: Their Roles as Users, Carriers and Sources of Innovation.* Cit.

2.3.2 Knowledge in the KIBS-client interface

There are multifarious kinds of knowledge flows between KIBS and their clients. Sometimes the resources exchanged (like the solution to the client's problem) can be very tangible and concrete, like in the case of a software program. More often, the outcome of a KIBS-client interaction may be more complex, sophisticated and intangible, since explicit knowledge is often accompanied by tacit components. In fact, in many cases, during the co-operation between the KIBS and the client firm, knowledge resources are developed and exchanged, and the result may be something more difficult to identify, like a better understanding of new potential markets or the improvement of a management team's internal communication.

Many services may hence be much more complex than a software, and not easily containable in a written report, but even when this is possible, they may require various interactions and exchanges of tacit knowledge, in order to be provided.

In the case of KIBS, the quality of the service provided depends largely by the quality of the interactions between the firm and the client.

The way in which the relationship between the KIBS and the client is articulated and the knowledge resources involved can be better understood analyzing four dimensions:

- Tangible versus intangible knowledge: as already explained, explicit knowledge is not the only one involved in KIBS activities. Even when they provide really tangible services they need to exchange information with the client firm, to learn about it and they may even use it as a reference for future projects.
- Human embodied versus non-human capital: knowledge can be embodied in humans, and in this case it needs face-to-face interactions in order to be transmitted. Otherwise, disembodied knowledge flows can be written down as reports, action planes or databases or even incorporated into goods. In the service sector, human-embodied knowledge flows are considered to be at the core, but non-human capital should not be neglected, especially if we consider the technologies available to certain companies. Conversely, the latter can imply better results, if combined with human embodied knowledge.
- Explicit knowledge versus tacit knowledge: Nonaka and Tacheuki in their work explain the conversion process by which tacit knowledge is transformed in explicit knowledge, recombined and internalized again. It is almost impossible to price the

tacit knowledge that is exchanged between the KIBS firm and its client, but this does not mean that is not important.

- Contractual versus non-contractual forms of knowledge: another important characteristic of the knowledge flows between KIBS firms and their clients is the degree to which these are provided by a contract or they simply occur because of the close interactions between the two. Especially when the relationship between the two is steady, trustful and long-term, contractual and non-contractual forms of knowledge exchange coexist[60].

Three main phases can be identified in the KIBS process of knowledge production and diffusion: first, an acquisition phase, in which both tacit and codified knowledge, related to a specific problem, are gathered, then a recombination phase, in which they are integrated with the knowledge already available. Finally, a diffusion phase takes place, in which the new knowledge generated during the process is transferred to the client[61].

This interaction-based generation of knowledge consists mainly in learning by interacting with clients and trying to solve their problems. The knowledge acquired is then recombined with the one previously existing. This may coincide with a partial codification of the newly acquired knowledge, which favors the mastering of the newly created one, which is finally applied as new or enhanced services. These constitutes a way of partially transferring knowledge from the KIBS to its clients, diffusing it into the environment and creating new possibilities of interaction and knowledge generation.

Codification not only allows the divisibility of knowledge bodies, but gives also the possibility to process knowledge and sell it into *"modules"* to different clients. Moreover, it increases the overall knowledge base and firm's absorptive capacity. This may lead in turn to increased knowledge-creation, more innovation and further economic growth.

Customer interaction is crucial in KIBS, as they have to offer specific and customized services to other businesses. This makes the ability to listen and interact with customers vital to achieve a long-term competitive advantage.

Absorptive capacity, that is, the ability to learn and assimilate knowledge from other subjects, is therefore an important ability to develop.

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60 Nonaka, I. and Takeuchi, H. *The knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation.* Cit.

61 Strambach, S. (2001). *Innovation Processes and the Role of Knowledge-intensive Business services.* In: Koschatzky, K., Kulicke, M. and Zenker, A. (Eds.) *Innovation Networks – Concepts and Challenges in the European Perspective*. Physica, Heidelbergh, pp. 53-68.

It is the result of individual and organizational skills and the ability to access external sources of knowledge. Openness to external environmental stimuli, ability to exchange knowledge and information with an external partner network and focus on internal knowledge should be balanced[62]. External partners have an important impact on KIBS's innovative capabilities: these subjects are not necessarily just customers, but also other actors in the network in which the KIBS companies operate, as suppliers, research centers or universities.

For a firm is thus important to expose *"receptors"* to the environment in order to absorb and exploit external knowledge, which is considered a fundamental component of innovative capabilities[63].

2.4 The role of clients and key elements for effective co-operation

In the case of KIBS companies, development processes are strongly oriented to collaboration, as customers have much of the knowledge (which may be either tacit or codified) and competences they need to successfully deliver possible solutions. Customers also have other critical knowledge: the goals the service company has to reach to provide an optimal solution and a service that responds fully to the needs of the customer.

For service providers, and therefore for KIBS, it is important to understand not only their customers, their processes and procedures, but also how competitive and environmental factors can alter their needs and wants[64]. Managing with a proactive approach the co-production with customers, helping them to interact and to dialogue, not only increases the likelihood of a project's success, but also nurtures KIBS' learning and increases the operational efficiency of its business. These efficiencies, understood as the ability to react in less time (time saving) and at lower costs, aggregated for all customers, can help to build a long-term competitive advantage for the service provider, positively impacting on its reputation and its long-term relationships. Creating efficient customers for co-

[62] Deephouse, D.L. (1996). *To be Different, or to be the Same? It's a Question (and Theory) of Strategic Balance.* Strategic Management Journal, vol. 20, n. 2, pp. 147-166.
[63] Massa, S. and Testa, S. (2004). *Innovation or Imitation? Benchmarking: a Knowledge-management Process to Innovate Services.* Benchmarking: An International Journal, vol. 11, n. 6, pp. 610-620.
[64] Lovelock, C. and Young, R. (1979). *Look to Consumers to Increase Productivity*. Harvard Business Review, pp. 168-176.

production processes becomes therefore useful to establish a competitive advantage that is hardly imitable by competitors, as underlined by various research[65].

In the analysis of the client's role within the company, a job analysis is performed, similar to the one done for the employees. Clients need to understand what tasks and behaviors are required to them, they must be sufficiently motivated to play their role and have the knowledge, skills and techniques needed to contribute to the provision of the service. They also need to be aware of the various roles they will cover during the development of the service: buyers, co-producers and users of the service.

The first step in the relationship with the client is therefore the client job analysis, in which the responsibilities arising from being a customer of a KIBS involved in co-production processes, are identified. The main elements, resulting as essential in an effective client participation, concern with communicative openness, sharing of problem solving, level of tolerance, personal dedication and active involvement in the various production and distribution processes, support and agreements with the company[66].

- Communication openness: a good and frequent communication is what prevents relationships, even the most carefully designed, from crumbling down[67]. A close relationship between the service provider and the customer needs coordinated actions to be successful, particularly when the relationship itself and the outputs resulting from it are complex and customized. Knowledge-based solutions, which enable the client to achieve his goals and at the same time are adapted to his technological and economic environment, require open communication covering all project-related information. For the customer this means sharing with the KIBS firm its knowledge about the production and distribution processes, the strategic goals and the characteristics of the sector and market in which the company competes. In addition, consumers are expected to communicate openly about expectations in terms of relationship and project output, as well as goals, values, visions and priorities regarding the project itself. Openness is critical especially in the initial stages of the project, when the nature of the problem has yet to be

[65] Bowen, D. (24-26 Sept. 1998). *Creating High Performance Customers*. Presentation at the Frontiers in Services Conference, Vanderbilt University
Prahalad, C.K. and Ramaswamy, V. (2000). *Co-opting Customer Competence*. Harvard Business Review, pp. 79-87

[66] Bettencourt, LA., Ostrom, A., Brown, S.W. and Roundtree, R. (2002). *Client Co-Production in Knowledge-intensive Business Services.* In: *California Management Review,* vol. 44, n. 4, pp. 100-128.

[67] Mohr, J.J., Fisher, R.J. and Nevin, J.R. (1997*). Collaborative Communication in Interfirm Relationships: Moderating Effects of Integration and Control.* Journal of Marketing, n. 60, pp. 103-115.

defined and the available solutions are different. In this situation, only the customer is in the position to define what the key information is.

- Shared problem solving: optimal knowledge-based solutions require a two-fold relationship between the service provider and the customer. The latter contributes to the relationship with a unique perspective and skills that should be exploited for success. Moreover, the complex and personalized nature of the various projects inevitably leads to problems and adjustments, which make shared problem solving crucial. These situations require customers able to think critically and to play an active role in developing possible solutions, for example by taking the initiative and communicating any problems or providing constructive feedbacks. A customer who sees his role as passive and limited to paying for a service, in the end, can compromise the relationship and its output[68].
- Accommodation: flexibility and willingness to respond to the needs of the other are the basis for effective partnerships. However, some customers are not receptive to inputs from suppliers and this leads service providers not to be able to exercise their abilities in terms of problem solving and solution development. The natural consequence of this type of relationship are internal tensions and sub-optimal results. Consequently, customers should be willing to reach compromises and return to the board of experts to reach their goals, while maintaining a functional relationship with them. Similarly, KIBS themselves and their employees must be open to collaboration and capable of managing and interpreting customers' information.
- Tolerance: problem solving processes can be long and complex and uncertainty and coordination can aggravate the situation, creating unavoidably, unexpected complications. In addition, solutions may be sub-optimal and require adjustments. Clients play a key role in this, as their reactions to these complexities are crucial in promoting positive relationships or additional tensions: those who can respond to smaller problems with patience and understanding promote the development of effective and open relationships with the provider.
- Advocacy: the active involvement of the customer, a term that also includes the end users of the project solution, is often crucial to the success of the project. They

[68] Smith, J.B. and Barclay, D.W., (1996). *The Effects of Organizational Differences and Trust on the Effectiveness of Selling Partner Relationships*. Journal of Marketing, n. 61, pp. 3-21.

should be involved by the project leader (usually an employee of the KIBS client company), as the project's success may depend on their active participation in the project and in the clear communication of vision and benefits of the new product[69]. In this way, a sense of self-ownership about the project results can be stimulated, avoiding the creation of barriers to the introduction of the new product/service and to the consequent changes.

- Involvement in project governance: projects that achieve success are defined by customers not only in terms of effective solutions but also in terms of cost and timing. Customers then have the task of checking, on behalf of the company, that the project is heading towards the set goals. Customers who are successful in co-production of knowledge-based services are actively involved in project governance, including ensuring that it achieves the stated goals by tracking progress in internal components, keeping information on key issues, and acting as a bond with the internal staff.
- Personal dedication: although several customer employees can be involved in the project with KIBS, the project leader's commitment is essential to achieve efficient partnerships and not to lose sight of the goals. It is therefore necessary for success that leaders are committed to fulfil the responsibilities associated with their role in interaction with KIBS.

As co-producers of knowledge-based solutions, customers can be seen as "*partial employees"*[70] of KIBS companies, or as partners. Their resources are fundamental to the success of the project and the report, especially when it comes to customer experience, access to its communications systems, its skills, workspaces and more generally, to all the resources and the budget allocated to the project.

2.4.1 Co-production management

Co-production management is divided into three phases: it starts with the selection of customers, goes through training and integration processes, and ends with performance evaluation.

As far as customer selection is concerned, it is important for KIBS to seek partnerships

[69] Noble, C. and Mokwa, M. (1999*). Implementing Marketing Strategies: Developing and Testing Managerial Theory.* Journal of Marketing, n. 62, pp. 57-73.
[70] Mills, P.K. and Morris, J.H. (1986). *Clients as 'Partial' Employees: Role Development in Client Participation*. Academy of Management Review, pp. 726-735.

with clients characterized by similar philosophies, methods and processes. This will facilitate the relationship development, and it will ease to overcome the tensions that could arise. If the company is also able to create relationships with customers willing to understand the level of involvement required to them, this will encourage the creation of profitable relationships, as opposed to those relationships with clients seeking a service provider to solve all their problems alone. It is also important to evaluate the customer's project priority too, as it influences its motivation to engage and devote the necessary resources, and customer resources themselves, as they fundamental to the success of the project.

The beginning of a relationship is therefore critical to ensure a future for the relationship itself. In fact, at this stage, the customer is more inclined to define contractual and behavioral standards and expectations. Opinions will be built about skills, motivation and needs and these opinions, once formed, will hardly change. It is hence crucial, at this stage, to identify the relationship development opportunities, expectations, the content of the relationship, and the importance of customer engagement.

Although the term *"co-production"* is concerned, it mainly refers to interactions and interpersonal relationships between KIBS and company employees. In order to be effective, they must be based on shared and recognized goals, trust and collaboration.

Keeping training and information sessions at this stage of interaction with the client, helps to clarify each other's expectations and create a dialogue open to information transfer. At this stage, individuals can then socialize and start exchanging tacit knowledge and coding. These interactions also allow to increase interpersonal sharing and mutual understanding, which are fundamental elements for creating a trustful relationship.

Thus, it is important for KIBS to clarify the role expected from the client and to inform him of the responsibilities that he will have, not giving his participation for granted. A client that understands the relationships between actions and goals in terms of time, budgets and solutions is the key to success. Involving the customer in project planning is therefore important to facilitate cooperation, increase personal motivation, and reach the ultimate goal.

In the case of companies relying heavily on co-production, such as KIBS, acquired industry experience is not enough to ensure a competitive advantage: they are actually required to develop new projects to respond to specific customer issues. In such cases, KIBS cannot only have technical expertise in its field, but they also needs to develop intangible

knowledge, such as relational skills, to foster mutual trust, teamwork and to actively engage the client in the process of problem-solving. For this reason, knowledge workers (i.e. KIBS employees) have to develop in addition to their technical skills, relational skills. This for KIBS involves significant changes in human resource management and performance measurement systems and the development of a business culture supporting soft skills and practices such as selection, training, and reward for behaviors that favor the creation of relationships, but also the implementation of indicators that allow to evaluate the willingness of the customer to collaborate.

As far as the latter is concerned, it is not always easy to evaluate the impact of customer relationships with project performances. This is because a continuous monitoring can lead to a decrease in the customer's willingness to cooperate, as KIBS could be perceived as too invasive. For this reason, the assessment should be based primarily on the self-assessment made by the customer, as well as on the socialization and adaptation efforts in terms of shared norms and values.

This co-production management model is relevant to a wide variety of KIBS businesses, especially for those offering relatively complex, unstructured and customized service solutions. Effective co-production in these cases can increase the likelihood of success and customer satisfaction, and is a competitive opportunity for KIBS businesses[71].

The relevance of co-production may vary depending on various factors, including the sector in which KIBS and the customer operate and the customer's expertise, but in general, in every sector, co-production is very important in the initial stages of the project, to understand the needs of the customer and the context in which it operates. In the service development phase, however, it is the KIBS that has the necessary skills, and the client plays a minor role, which mainly involves monitoring the work of KIBS, unless it has technical skills that enable him to interact actively with the KIBS.

These principles can then be applied also to the relationships with other actors, as the criteria at the basis of successful co-production are the same.

2.4.2 Clients taxonomies

[71]Bettencourt, L.A. et al. *Client Co-Production in Knowledge-intensive Business Services.* Cit.

KIBS clients can be divided into two main categories[72]: customers that rely on KIBS for their services but who have no specific expertise in this regard and experienced customers, with whom KIBS exchange both information and knowledge. The latter can transfer specific knowledge they accumulated to KIBS, in a one-way flow (at least at the beginning of the relationship) that goes from the customer to the service provider.

Working with experienced customers gives KIBS the opportunity to develop new procedures and to codify them, so that they become part of the enterprise and can be replicated efficiently in other supply relationships.

These customers are the main source of innovation for KIBS, both because they require more advanced solutions that try the KIBS's innovative capabilities and because they can transfer their knowledge (tacit and explicit) to KIBS. In particular, in the case of tacit knowledge, for KIBS it becomes essential to observe the best practices of the customer, so to learn directly from his modus operandi.

Experienced customers are therefore companies that often have direct experience with the service provided by KIBS (as in the case of companies who decide to outsource part of their business) and know how to clearly communicate their needs and evaluate KIBS proposals. Nevertheless, above all, experienced clients should be willing to participate in the design of the service and make the necessary resources available. Not all customers are therefore able to promote virtuous interaction with KIBS, characterized by knowledge-transformation cycles: skills and willingness to collaborate are the characteristics of expert customers, who recapture in interaction an opportunity for mutual growth and learning.

[72] Cabigiosu, A., Campagnolo, D., Furlan, N. and Costa, G. (2015). *Modularity in KIBS: the Case of Third-party Logistics Service Providers.* In: *Industry and Innovation,* vol. 22, n. 2, pp. 126-146.

3. INNOVATION AND IMITATION IN KNOWLEDGE-INTENSIVE BUSINESS SERVICES

The importance of innovation for the economic development and the prominent role played by the service sector in today's economy have made service innovation an important issue to be analyzed by the literature[73].

In the past, services were seen as incapable of producing innovation. This negative reputation was due to several problems met by scholars in approaching this new research field.

First, the tools used to measure innovation have been developed at a time when manufacturing was at the center of the economy, while services were considered largely unproductive[74]. Consequently, their focus is on science and on technological innovation and they proved to be quite meaningless for the service sector. The *"fuzzy"* nature of services makes the measurement of changes through traditional economic methods particularly difficult[75]. R&D intensity or the number of patents issued, for example, are typical measures of innovativeness, but in the case of service firms their values have been found to be not the most significant.

However, this does not mean that service companies are uninspired, but simply that they are less technology-oriented than their manufacturing counterparts and that they do not often produce outputs that obviously embody advanced technologies[76]. Therefore, several scholars[77] pointed out the importance of adopting a broad, not strictly technological view of innovation in services. They should be studied as a loosely coupled system, with both technological and non-technological trajectories[78], the latter being *"All*

[73] Den Hertog, P.. *Knowledge-Intensive Business Services as Co-Producers of Innovation.* Cit.
Miles, I. *Knowledge-intensive Business Services: Prospects and Policies.* Cit.
[74] Drejer, I. *Identifying Innovation in Surveys of Services: a Schumpeterian Perspective*. Cit.
[75] Gallouj, F. and Weinstein, O. *Innovation in Services*. Cit.
[76] Love, J.H. and Mansury, M.A. (2012). *External Linkages, R&D and Innovation Performance in US Business Services.* Industry and Innovation, 145, pp. 477-496
[77] Den Hertog, P. *Knowledge-Intensive Business Services as Co-Producers of Innovation.* Cit.
Gallouj, F. (2002). *Knowledge-intensive Business Services: Processing Knowledge and Producting Innovation*. In: *Productivity, Innovation and Knowledge in Services.* New Economic and Socio-Economic Approaches, Gadrey, J. and Gallouj, F. Edward Elgar, Cheltenham, Northampton
[78] Sundbo, J. and Gallouj, F. (2000). Innovation as loosely coupled systems in services. In: Metcalfe, J.S. and Miles, I. (eds.) Innovation Systems in the Service Economy, Measurement and Case Study Analysis. Dordrecht: Kluwer Academic Publishers, pp. 43-69

innovation activities of firms which do not relate to the introduction of a technologically new or substantially changed process"[79]*.*

The problem of measuring innovation activities in services thus comes from their complexity, in addition to their interdependencies with other economic, social, technological and organizational developments. Services are indeed characterized by intangibility, heterogeneity, perishability, increased customer interaction and simultaneity between production and consumption.

Moreover, services are a much more heterogeneous sector of manufacturing, with the consequence that new, more dynamic and articulated approaches need to be developed to capture all the nuances of innovation in these areas.

As far as research on service innovation is concerned, theory building is still in its infancy. The peculiarities of services (and therefore of KIBS) make the identification, classification and measurement of changes in this area extremely complicated.

Innovation is certainly a powerful force behind growth and prosperity, but it is not the only one: imitation too plays an important role in the economic environment. The most common view in the literature was that organizations had to *"innovate or die"*[80]*,* with imitators forced to content themselves with the crumbs let by ingenious innovators. Imitation has long been considered as an act of desperation, a poor attempt to not be left behind in the competitive game.

Contrarily, humans have always relied on imitation to survive in hostile environments, observing and acquiring traits and behaviors useful to thrive. Imitation is thus critical to innovation and business survival, as it facilitates the diffusion of new ideas, technologies and inventions. Moreover, thanks to globalization and technological advances has become more feasible, cost effective and much faster. Imitative behaviors are so spread and common today that many of the firms considered as pioneers are actually successful imitators of smaller, forgotten, innovators.

3.1 Innovation in KIBS and its drivers

Innovation can be defined as any change affecting one or more terms of one or more vectors of characteristics (of whatever kind – technical, service or competence) of a

[79] OECD/Eurostat (1997). Proposed Guidelines for Collecting and Interpreting Technological Innovation Data – Oslo Manual. Paris: OECD

[80] Shenkar, O. (2010). *Copycats – How Smart Companies Use Imitation to Gain a Strategic Edge.* Harvard Business Press

product, whether it is a good or a service[81]. These changes are the result of different mechanisms: appearance, association or dissociation, they may be *"programmed",* and therefore the intentional result of R&D efforts, or *"emergent",* then the fruit of learning activities.

They can also be the answer to different factors, but some main driving forces behind innovations in services can be identified[82]:

- Social changes, like the aging population trend, which increased the demand for health services;
- Technological changes, like the evolution of the internet, which offered a new marketing place for consumers;
- Economic changes, like the increase in the past of house prices, which made rent services to grow;
- Environmental changes, like the increasing pollution, which required new services and programs to deal with industrialization;
- Political changes, like the liberalization happened in different sectors, which increased market competition;
- Value or ethical changes, caused for example by the increased awareness of resource scarcity.

Innovation in KIBS has found difficulties in analyzes, categorizations and measurements, as it is a very complex phenomenon: it may involve new services, new ways of producing and delivering services, new forms of interaction with customers and even new forms of quality control and assurance[83].

As already mentioned in the previous paragraph, service firms (and consequently KIBS) are characterized by some peculiarities that make them different from manufacturing firms. These peculiarities indeed have an impact also in the way in which these firms innovate and are at the basis of the measurement problems faced by scholars in studying this topic.

- The human factor: in the service sector, human activities have an importance that cannot be neglected. When studying innovation in the service industry, the

[81] Gallouj, F. and Weinstein, O. *Innovation in Services*. Cit.

[82] Flikemma, M., Jensen, 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, 16:7, pp. 541-558.

[83] Den Hertog, P. *Knowledge-Intensive Business Services as Co-Producers of Innovation.* Cit.

attention should be focused not only on technical innovations, but also on the importance of non-technological elements like organizational knowledge.

The labor-intensive nature of services is particularly important for KIBS, where a highly qualified human capital is a key strategic asset. For this reason, the level of education of employees could be used as an alternative indicator of innovative potential.

- Organization of the innovation process: in the service industries, R&D is not the core of innovation activities. Many innovation in this sector use technological innovations just as mere tools to create and improve existing product and processes. Consequently, the organization of innovation processes involves different departments and functional units inside the company, and it is not limited to the R&D department.
- Innovation output typologies: classical innovation taxonomies may have less sense considering services peculiarities. For example, the use of the distinction between radical and incremental innovations and its relevance for the tertiary sector, which is characterized by a fast and continuous innovation process, has been questioned. Actually, new services can be easily copied by competitors and the constant innovation process needed to face competition impacts on the making of radical innovations[84].

  Another distinction that loses part of its meaning is the one between product and process innovation, due to the simultaneous production and consumption of services. To solve the problem, new innovation concepts have been introduced, like *"delivery innovation",* which refers to innovation in the area of delivery, covering both product- and process-oriented issues[85]. In addition, the high level of interaction between supplier and consumer makes it possible to locate innovation even at the level of interaction itself, not just in the process or in the product, much less common in the case of manufacturing.[86]
- Intangibility: it makes the identification and measurement of innovation difficult. Being services highly intangible, service providers find it difficult to display in advance their offer; hence, also their qualities are difficult to explain to clients.

[84] Preissl, B. (1997). *Service innovation in Germany.* SI4S Report n. 3, DIW, Berlin
[85] Miles, L. *Service Innovation: Statistical and Conceptual Issues*. Cit.
[86] Scerri, M. and Randhawa, K. *Service Innovation: a Review of the Literature.* Cit.

Intangibility also hampers efforts towards standardization, complicating the definition of common standards. Finally, it represents a main issue in the protection of service innovations, creating difficulties in the creation of a temporary monopoly based on some sort of patent protection. This, clearly, reduces the incentives for innovation activities.

- Customer integration: close relations with customers are seen as important success factors for KIBS, and their integration in the production process is based on the simultaneous production and consumption.

  A problem related to co-production processes is the fact that much of KIBS's production consists in partially (or totally) customized services, tailored to the needs of the individual customer. The result of this consideration has been the birth of concepts like *"ad hoc"* innovations, which is *"the interactive (social) construction of a solution to a particular problem posed by a given client"*[87]. They are particularly relevant in consultancy firms, where the available knowledge and experience accumulated over time are re-combined and exploited to create fresh solutions and new knowledge.
- Structure of the service sector: another important characteristic of this sector is its being predominantly made up of small enterprises, which generally are though to face more difficulties in collecting resources devoted to innovations.
- Regulatory issues: legal and professional regulation is at the core of many service industries, and for this reason, changes in this field can have a strong impact on the whole sector.

All these features can have different effects on innovation activities in different areas, and their combined effect is not always easy identifiable.

3.1.1 Theoretical approaches to service innovation

One of the main issues scholars have to face when studying innovation in the service sector is to decide whether they should considered it as a body of innovation in its own right, with its own conceptual foundations and peculiarities, or if they should study it with the same approach used for innovations in manufacturing.

[87] Gallouj, F. and Weinstein, O. *Innovation in Services*. Cit.

The debate generated by this tension has led to the emergence of three different approaches[88] to describe, explain and analyze this topic:

- Assimilation approach: it sees services and manufacturing as fundamentally similar. Researches done under this approach study innovation using methods and constructs for manufacturing: they focus on a manufacturing-based technology product-process approach[89] to innovation and technology-based indicators and metrics, thus potentially ignoring other important and pertinent forms of service innovation (e.g. organizational innovation). Therefore, they tend to offer a limited perception of innovation dynamics.
- Demarcation approach: it considers innovation in services to be substantially different from innovation in manufacturing. Therefore, new instruments, indicators and theories have been used to better understand its dynamics. The studies[90] based on this approach, highlight features that are perceived as distinctive for service innovation, such as their intangible nature, inseparability and enhanced interactivity between client and firm, implicitly stating that these do not apply to the other sectors. The risk arising by using this approach is to neglect that intangible attributes could exist also in organizational, process and technological innovations[91].
- Synthesis approach: it is an integrative approach, which considers the blurring boundaries between manufacturing and services, and overcomes the traditional dichotomy between the two[92]. It attempts to address the missing aspects of both the demarcation and the assimilation approaches, recognizing that studies on innovation in services have helped to point out some aspects of innovation patterns, neglected in the past in relation to manufacturing innovation, but which are actually widely spread across the economy. This approach is seen as more and

[88] Coombs, R and Miles, I. (2000). *Innovation, Measurement and Services: The New Problematic.* In: Metcalfe, J.S. and Miles, I. (Eds.). *Innovation Systems in the Service Economy. Measurement and Case Study Analysis,* pp. 85-103. Boston: Kluwer Academic)
[89] Drejer, I. *Identifying Innovation in Surveys of Services: a Schumpeterian Perspective*. Cit.
[90] Gadrey, J. et al. *New Modes of Innovation.* Cit.
Drejer, I. *Identifying Innovation in Surveys of Services: a Schumpeterian Perspective*. Cit.
Hipp, C. and Grupp, H. (2005). *Innovation in the Service Sector: The Demand for Service-specific Innovation Measurement Concepts and Typologies.* Research Policy, 34, pp. 517-535
[91] Drejer, I. *Identifying Innovation in Surveys of Services: a Schumpeterian Perspective*. Cit.
[92] Gallouj, F. and Weinstein, O. *Innovation in Services*. Cit.
Preissl, B. (2000). *Service Innovation: What Makes It Different? Empirical Evidence from Germany*. In: Metcalfe J.S. and Miles, I. (Eds.) *Innovation Systems in the Service Economy. Measurement and Case Study Analysis*, pp. 125-148. Boston: Kluwer Academic.

more important: as manufacturing and service industries are increasingly intertwined, a common framework to study them is needed. The main goal of this approach is then "*To create both theoretical [...] and empirical approaches to innovation that are able to embrace all economic activities, including manufacturing and services, without favoring some activities (and their modes of innovation) over others"*[93].

3.1.2 Different typologies of innovation in KIBS

Most of the new innovation concepts used in the service literature are just a rephrasing of the established one, while others are a way to stretch the concept, to go beyond not only the traditional product/process dichotomy, but also to overcome the limits of the actual innovation definitions.

In general, the distinction between technological innovation, product and process, recalls theories on innovation in manufacturing and is therefore attributable to the assimilation approach. Organizational innovation is a concept closer to the demarcation approach, while radical, incremental, new-to-the-world, sector, and industry innovations are transversal concepts, thus consistent with the synthesis approach.

Service innovation is rarely limited to a change in the features of the service itself. It often coincides with new distribution models, interaction with customers, and activities such as quality control. In practice, therefore, many innovations seem to be a mix of changes of various dimensions and adaptation of existing services.

3.3.1 Product and process innovation

Considering the different typologies of innovation, it is important to refer to the well-known distinction between product innovation and process innovation.

The term *"product innovation"* is used to indicate the introduction of a product, or in this case a service, new in terms of technical features and functions, compared to the one previously offered by the company. *"Process innovation",* instead, refers to the change of a series of activities related to service delivery, ranging from production to distribution[94].

[93] Tether, B.S. (2005). *Do Services Innovate (Differently)? Insights from the European innobarometer Survey*. Ind Innov 12(2), pp.

[94] Cabigiosu, A. *L'Innovazione e la Progettazione nei Servizi Knowledge-intensive.* Cit.

Therefore, the focus of innovation is on processes, with changes that can affect, for example, the software or equipment adopted by the company.

Product innovations require greater organizational and learning efforts, as they imply the introduction of both new services and new delivery procedures, while new processes affect only the latter[95]. Service providers need to acquire new knowledge at the organizational and managerial level, especially in cases where the new service is based on new production and distribution processes. This greater complexity is balanced by the greater impact that these innovations have on the growth of service companies, as they often coincide with the company's entry into new markets or segments. Process innovations, contrarily, are less destructive for existing business competences, as they involve the introduction of changes in processes and not in the specific features of the service offered.

For their features and purposes, product innovations are generally associated with radical and proactive technological strategies, which should lead to greater economic returns. Process innovations on the contrary, generally prevail in traditional sectors, in the case of defensive technological strategies, often associated with the rationalization and restructuring of the process itself.

In the industrial sector, the distinction between these two types of innovation has long been recognized as crucial in identifying different business strategies. Conversely, the available literature has often suggested that in the case of services it is not possible to distinguish between the two types of innovation. Nevertheless, the service delivery process actively involves the client, creating an unclear distinction between the production phase, in which to introduce the innovation and the supply one. Consequently, the economic returns of the two types of innovation may be difficult to quantify[96].

Some scholars[97] have suggested that the process innovation due to the adoption of a new technology, developed by a supplier, is at the basis of product innovations in the services sector. The definition of product innovation has then been re-elaborated to fit to the service sector, resulting as *"the exploitation of new technologies enabling a new service or a new way – at least new to the firm – of exploiting an existing technology, announced as a*

[95] Hipp, C. (2000). *Information Flows and Knowledge Creation in Knowledge-intensive Business Services: Scheme for a Conceptualization.* In: Metcalfe, J.S. and Miles, I. (Eds.) *Innovation Systems in the Service Economy.* Economics of Science, Technology and Innovation, vol. 18. Springer, Boston, MA.

[96] Miles, L. *Service Innovation: Statistical and Conceptual Issues*. Cit.
Gallouj, F. and Weinstein, O. *Innovation in Services.* Cit.

[97] Barras, R. (1986). *Towards a Theory of Innovation in Services.* Research Policy, vol. 15, n.4, pp. 161-173.

new service". Process innovation instead has been conceptualized as *"the adoption or the invention of, or the production of, a new technology and its applications: both cases aim at improving existing services*"[98].

A potentially more significant distinction for services has been suggested[99], namely the one between internal vision and external vision of innovative activities, where the former refers to how the enterprise manages its own innovation activities, while the second is more focused on the interactions of the company with other actors for innovative purposes. This reflects the considerations on the importance of external resources for KIBS. While manufacturing companies are easier to innovate through R&D activities, service companies are more likely to leverage customer and supplier collaboration.

It is therefore clear that KIBS firms are more closely linked to an external vision in terms of using relations as sources of innovation. As a result, these firms rely less on the accumulation of internal capabilities (despite their generally high-skilled staff), to move faster to the industry's best practices.

3.1.2.2 Radical and incremental innovation

Another way to distinguish different kinds of innovations is to consider their level of novelty, but both economics and management struggle to deal with the nuances of innovation novelty and intensity. Generally, innovations are classified according to their level of intensity, as *"incremental"* or *"radical innovations".*

The first term refers to changes characterized by a low level of complexity, improvements and adaptations of small non-critical dimensions. They can therefore be considered as improving interventions of a service, developed during the use or thanks to a learning-by-doing process. For this reason, this kind of innovation is presented as a *"competence enhancing"* form, i.e. an innovation that builds upon existing knowledge and skills[100].

They appear usually when a dominant design has been selected[101], when firms focus on improving and refining the product through incremental improvements, indeed they often take the form of smaller enhancements around major radical innovations. They are

[98] Flikemma, M. et al. *Identiyfying Neo-Schumpeterian Innovation in Service Firms: A Conceptual Essay with a Novel Classification.* Cit.

[99] Mansury, M.A. and Love, J.H. (2008). *Innovation, Productivity and Growth in US Business Services: A Firm-level Analysis*. Economics and Strategy Group, Aston Business School, Aston University, Birmingham.

[100] Schilling, M.A. (2012). *Strategic Management of Technological Innovations.* McGraw-Hill Education

[101] Abernathy, W.J. and Utterback, J.M. (1975). *A Dynamic Model of Process and Product Innovation*. Omega 3(6), pp. 639-656

considered more common compared to radical innovations, their rewards are smaller, but they require fewer economic and human efforts.

They can take different forms (like the improvement of certain final characteristics as well as the reduction in production costs by changing certain characteristics) and may or may not be based on technical advances.

In some studies,[102] this class is further subdivided into improvement innovation, which indeed consists just in the improvement of certain characteristics, without changes to the main structure of the system, and incremental innovation, where the general structure of the systems is maintained, but it is marginally modified through the addition or substitution of some elements. This additional classification complicates even more the attribution of a degree of novelty to an innovation, due to the extreme difficulty met in establishing a clear boundary between incremental and improvement innovation. The main problem to deal with consists in differentiating the moment at which a new characteristic is added to the final product, from the one at which a simple improvement is made.

Radical innovations, however, are innovation that are extremely new and different from prior solutions, they are revolutionary and relevant, and usually result from strong investments in technologies and resources that enable the company to radically change its internal skills. For this reason, these innovations are defined as *"competence destroying"*, i.e. they render obsolete existing knowledge and skills, and require the development of new ones[103].

They involve the creation of a totally new product i.e. one defined in terms of characteristics unconnected with those of an old product. A radical innovation is very new and different from prior solutions, thus radicalness might be interpreted as a combination of newness and differentness.

Although these two concepts seem to be clearly defined, it is difficult to find an innovation that is only radical or incremental. It is not possible in reality to think about these distinctions as diametrically opposite solutions, but they should rather be interpreted as a series of possible solutions, in a continuum that goes from one system to the other.

Another distinction used in the literature about KIBS, based on the degree of newness, is

[102] Gallouj, F. and Weinstein, O. *Innovation in Services*. Cit.

[103] Schilling, M.A. *Strategic Management of Technological Innovations.* Cit.

the one between *"new-to-the-firm"* and *"new-to-the-industry"* innovations[104] (at which sometimes *"new-to-the-world"* innovations are added[105]).

The term *"new-to-the-industry",* is used to refer to those radical innovations that affect not only the company that adopt these solutions, but also the whole industry in which it operates, influencing its technological, productive and organizational standards, to reach new optimal solutions. Product or services different from those offered by competitors are thus pushed into the market.

These innovations require important managerial and organizational skills, as they involve practices that have not been developed yet and mostly implicit knowledge.

While on the one hand these innovations should have a greater impact on the growth of the company and its reputation[106], on the other hand, they may face a more difficult introduction: only customers who are strongly open to innovations can accept and look positively to new services resulting from these changes. These will not only be a major risk factor, but could also result in learning costs and costs associated with the disposal of old assets. Moreover, first-generation break-through products usually offer poor performance-price ratios and need several product developments before being accepted by the market. For this reason, they are considered to offer *"the carrot of spectacular reward or the stick of destitution"*[107].

These innovations are thus, *"competence destroying"* not only for the KIBS itself, but also for its customers[108] and consequently, customer interaction becomes indispensable for KIBS to reduce clients' resistance to the innovation, and to improve its chances of success.

On the contrary, the term *"new-to-the-firm"* innovations is used to define innovations which have been taken by the company, but have already altered the production processes and services offered by competitors in the market. Therefore, the firm detects some products or processes already implemented by its competitors and decides to adapt its offer. In this case, the introduction of the innovation/imitation may be the answer to a specific request coming from a customer.

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[104] Hipp, C. and Grupp, H. *Innovation in the Service Sector: The Demand for Service-specific Innovation Measurement Concepts and Typologies.* Cit.

[105] Therrien, P., Doloreux, D. and Chamberlin, T. (2011). *Innovation Novelty and (Commercial) Performance in the Service Sector: A Canadian Firm-level Analysis.* Technovation 31, pp. 655-665.

[106] Love, J.H. and Mansury, M.A. *External Linkages, R&D and Innovation Performance in US Business Services.* Cit.

[107] Schumpeter, J., A. (1942). *Capitalism, Socialism and Democracy.* Unwin: London.

[108] Tushman, M. L., and Anderson, P. (1986). *Technological Discontinuities and Organizational Environments.* Administrative Science Quarterly 31, pp. 439-465.

They therefore imply a lower level of novelty than *"new-to-the-industry"* innovations, and the strong change in the skills and processes that they require to the firm is not reflected to the whole industry, which has already faced these changes. In this situation, customers and suppliers already have a certain level of confidence with the changes brought by the innovation, which is more easily accepted. Lower change costs and risks are the result of this confidence. In addition, companies that innovate others' innovations can improve them at relatively lower costs than introducing radically new products.

Novelty, in evaluating innovations, can be therefore defined according to different criteria: technical variables (like the use of radically new technologies) or by the timing of the introduction of the new product in the market[109].

These two levels of innovation (*"new-to-the-firm"* and *"new-to-the-industry"*) allow us to identify innovative companies according to their timing of entry, and thus to distinguish innovator and imitators, the first movers that create a new market and followers entering once they have internalized the skills and knowledge needed, observing the innovative enterprise.

3.1.2.3 Innovation factors

While in recent years the literature has repeatedly discussed the competitive strategies and innovative paths of KIBS firms, empirical research on the subject is still limited.

In these studies, various types of innovation found in the services sector have been proposed. Innovation in services can in fact take on different forms: from innovation to the technologies at the base of the service, to the activities needed to provide the service or to the organization of human resources.

A four-dimensional model can be used to explain the possible modes of innovation that characterize KIBS[110]:

- The service concept: it is the notion of the service itself, a brief description of how the service is going to satisfy client needs, its functions and characteristics, the clients to whom it is targeted, it positioning and its innovative elements.

A specific service concept may be already established and familiar in a certain market, but completely new for another one. Conceptual innovation is more likely to be found in

[109] Therrien, P. et al. *Innovation Novelty and (Commercial) Performance in the Service Sector: A Canadian Firm-level Analysis.* Cit.

[110] Den Hertog, P. *Knowledge-Intensive Business Services as Co-Producers of Innovation.* Cit.

service firms than in manufacturing, indeed, such innovation are generally highly intangible. Despite in some cases the service itself might be quite tangible, the new features not necessarily have to be.

The first step in developing a new concept is to identify customer needs through the activation of information flows between them and the KIBS. Interpretation of these needs can then be more or less complex, and the shift from these to the service specifications involves an important work to prepare metrics and evaluation criteria, which are needed in the process and benchmarking activities versus the competition or previous versions of the service.

- Technology: this kind of innovation concerns the way in which service firms affect technological development. Despite the possibility to have service innovation without technological innovation, there is a strong relationship between the two[111]. In fact, many dynamic service companies, including KIBS, tend to invest more in ICT than product companies and the available statistics about these investments show that, in the actual economic system, the bigger and faster growing share of the total investments in ICT belongs to the service sector[112]. These investments have enabled KIBS companies to innovate their production, delivery and distribution processes, allowing them to create a gap between service development and its consumption, increasing then their geographical reach, with a positive impact on their ability to handle remote supply relationships.

Technology, generally, may play a wide range of roles in innovation, from an enabling factor, to something closer to a supply-pushed, technology-driven innovation.

The relation of the single firm with technology may vary too, according to its degree if awareness of the available technological options, the degree to which it has access to the technologies themselves or to the knowledge needed and to the degree to which it can act as demanding customers and define its technological needs.

Innovation in services has long been considered as supplier-dominated, and thus services discussed as mere consumers of new technologies, coming from suppliers of equipment, materials, software and other inputs, to which they make only minor contributions. This asserted supplier domination in the service sector was first discussed by Barras, who

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[111] *Ibid.*

[112] Corrocher, N., Cusmano, L. and Morrison, A. (2008). *Modes of Innovation in Knowledge-intensive Business Services: Evidence from Lombardy.* Springer-Verlag, pp. 174-196.

introduced the concept of *"reverse product cycle"* (RPC)[113]. This model proposes a dynamic view of innovation, in which firms belonging to the service sector, thanks to the adoption of new technologies, developed by their suppliers, are able to introduce process innovations, which boost first the labor productivity of their existing services, and then improve the quality of the service offered, encouraging the expansion of the markets served. These process innovations once mastered can lead to the emergence of wholly new service products.

Limiting the analysis of service innovation to the production and use of advanced technologies means to ignore the creative use of the new technologies often developed by service firms, through adoption and reinvention processes. The emphasis on technological innovation in services has then been moderated by the acknowledgment of the importance of non-technological elements.

- The client interface: in this case, the innovative efforts affect the design of the interface between the service provider and its clients. In the service sector there is a general tendency towards the production (and marketization) of client-specific products. The interaction between clients and provider is a fundamental source of innovation in business services, where clients are deeply involved in the production process, up to the point where it is impossible to distinguish clearly the producer's activity from the customer's one. This high degree of co-design and co-production makes difficult to allocate the innovation to the service provider or to the client, but the way a service provider interface with its clients may be alone a source of innovation.

Especially in the case of KIBS, the user participation in production and delivery processes is one of the most important features. Co-production can have different levels of user engagement: on one side, there is the service provider execution of the service on behalf of the client, while on the other there is the execution of the service by the customer through the technologies and the tools made available by the service provider.

It is important to remember that the client-provider interface can be both the source and the *"laboratory*" of the innovation, particularly in case of ad hoc innovations[114].

- The service delivery system/organization: this is often related to the preceding dimension, but it refers to the internal organizational arrangements that need to be done

[113] Barras, R. *Towards a Theory of Innovation in Services*. Cit.
[114] Gallouj, F. and Weinstein O. *Innovation in Services*. Cit.

in order to allow service workers to perform their task properly, and to develop and offer innovative services.

New services often require not only new organizational forms, but also (inter)personal capabilities and skills, and organizations need to be designed and employees trained in order to facilitate innovation inside the firm. Human capital is therefore a strategically important factor in innovation, and for this reason, KIBS companies invest increasingly in human resources. These investments are important for continually enriching and renewing the products offered by KIBS, which are based on both explicit and tacit knowledge. The latter is embedded in its employees, and despite the increasing codification made possible by ICT, it still plays a key role in information processing, its transformation into high-value-added services, and generally in knowledge-gathering processes.

This dimension is closely related to the concept of organizational innovation i.e. as *"an important organizational change"*[115] , which might be firm or sector specific. Three main forms of organizational innovation have a particular meaning for service firms: *"multi-unit organization"*, which is mainly related to a firm's growth and geographical expansion; *"new combinations of services"*, which is better known as architectural innovation or modularization, where novelty comes from the way in which components are combined ; and *"customers as co-producers"*, which is one of the main peculiarities of KIBS[116].

The main problems faced by scholars with this concept are the lack of tools for measuring it and its organizational specific nature, which makes difficult to sum up results to an aggregate level[117].

Any service innovation involves some combination of these dimensions, but the cross-linkages among them might change from case to case. In the case of completely new services, for example, new delivery systems need to be implemented, employees need to be trained to change the way they work, to learn how to interact with customers and how IT is used during the production processes, while also a new service concept may be created. A particular dimension may dominate in a service innovation, but quite likely,

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[115] Tether, B. and Hipp, C. *Knowledge Intensive, Technical and Other Services: Patterns of Competitiveness and Innovation Compared*. Cit.

[116] Van der Aa, W. and Elfring, T. (2002). *Realizing Innovation in Services*. Scandinavian Journal of Management, 18(2), pp. 155-171

[117] OECD-EUROSTAT (1997). *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data – Oslo Manual".* Paris. Available at: http://www.oecd.org/science/inno/2762979.pdf [Accessed 19 June 2017]

this will trigger a set of changes also in the other ones, needed to obtain a successful innovation. For this reason, it is not advisable to just consider one factor of innovation, although they may appear to be separated, as the links between them can create additional value for KIBS. The weight of the specific dimensions and the importance of their cross-linkages vary across individual services, innovations and firms. Similarly, also the inputs needed to connect the different dimensions change, depending on the specific service and degree of formalization of the innovative process[118].

3.1.2.4 Innovation patterns

Returning to the model of the main innovation modes just presented, the analysis can go on to explain the five innovation patterns proposed by Den Hertdog (2000).

The view that dominated in the past was the one of a service sector being supplier-dominated in the innovation field. Service firms were thus seen as dependent on their suppliers for innovative inputs, which were then processes and transformed in more or less innovative service products. Den Hertdog's work instead demonstrated that the service sector is quite far from this view, playing a role in innovation broader than expected, up to the point where is the service firm to affect the innovation processes of its clients and suppliers.

Five innovation patterns are identified, which represent different mix of linkages between three main actors in the market:

- Suppliers of inputs (human resources, capital, equipment)
- The service firm
- The client of the service product (which could be another firm, like in the case of KIBS, or the final user).

The relationships between these actors influence the characteristics of firms and the way they act on the market, also affecting their innovative dynamics.

The first pattern consists in *"supplier-dominated"* innovation, which follows the traditional *"technology-pushed"* view of service innovation. Service firms are then users and implementers of innovations coming from external sources (generally hardware industries), and have little scope in influencing the product developed by their supplier. In turn, they have often to bring some organizational changes in order to be able to exploit

[118] Den Hertog, P. *Knowledge-Intensive Business Services as Co-Producers of Innovation.* Cit.

efficiently the innovation (e.g. to train employees) and to offer higher quality services. An example of this innovation is the introduction of microwaves in the catering industry, which extended the possibilities for food preparation.

The second pattern consists in *"innovation within services*". In this case, the innovation does not come from and external source but takes place in the service firm itself. It could be both technological, non-technological or a combination of the two. An example of this model is a new product, a new product bundle, or a new delivery system, designed and implemented in the service firm, possibly with an innovative support from the outside.

The third pattern is named *"client-led innovation"*: in this case, innovation comes inside the service firm, but it is the response to a need clearly articulated by its clients. Generally, every successful innovation can be interpreted as the answer to new customers' needs, but for some service innovation this is more evident, like in the case of green banking services, born as an answer to people aiming to invest in socially responsible firms. In this case, the need that triggers the innovation process can come both from a segment of the market or a single client, like in the case of KIBS.

The fourth pattern is *"innovation through services".* It results more complicated, because the service firm influences the innovative process taking place inside a client firm. It may provide different knowledge resources to support it in several ways, like expert project managers, or innovative tailor-made software packagers or even providing employees training about product selection and implementation. These different kinds of support may coexist, particularly in the case of KIBS.

The fifth pattern is called *"paradigmatic innovation".* This pattern involves "*complex and pervasive innovations affecting all actors in a value chain profoundly: when driven by fundamentally new technologies, they are labelled technological revolutions or new technology systems"*[119]. These innovations may come as an answer to new regulations, emerging resource constraints and other important changes that force different elements of the value chain to take an action. They imply the creation of completely new infrastructures, the creation of new knowledge and adaptation from the part of intermediates and final users.

3.1.2.5 External relationships innovation

[119] Freeman, C. and Perez, C (1988). *Structural Crisis and Adjustment: Business Cycles and Investment Behaviour.* In: *Technical Change and Economic Theory*. Ed. G. Dosi et al., London: Pinter Publishers.

Another type of innovation proposed by the literature, which needs to be considered in the case of KIBS, is external relationship innovation[120].

Innovation cannot be seen as a matter solely within the single KIBS firm, as its links and relationships with the external environment play a key role: KIBS, in fact, are embedded in a network of relationships, like strategic alliances, joint ventures, R&D partnerships, collaborative production or co-marketing with several partners (customers, suppliers, public authorities or competitors)[121]. Literature[122] has confirmed that these relationships can be useful to reduce the risks of innovation, stimulate creativity and accelerate or develop the quality of innovations, signaling them within businesses. In short, the most common rationales for external collaborations involve a combination of risk-sharing, obtaining access to new markets and technologies, speeding products to markets and pooling complementary skills[123].

This dimension of innovation is not present in Den Hertodog's model, but has been proposed, in recent innovation studies, as a subset of organizational innovation.

External relations have a great importance for KIBS innovation processes. Therefore, a change in their configuration can have a strong impact on their performances. KIBS rely on several potential external resources, from which they receive input for innovation, since their limited dimension and their highly specific skills can be a limit to their ability to develop new services independently.

The actors with which KIBS can collaborate are manifold and at various levels of the value chain. Upstream of the value chain, supplier relationships can be exploited in the effective and efficient acquisition of new process technologies by KIBS, and therefore be important for the innovation of parts of the enterprise, especially when it decides to move to unknown areas.

On the other side of the value chain, KIBS have close relationships with their customers, which are a useful source of information about growing market areas, those not yet covered by competitors or the strategies they use. These interactions allow KIBS to better understand the market in which they operate and what services they could innovate or

[120] Flikemma, M. et al. *Identiyfying Neo-Schumpeterian Innovation in Service Firms: A Conceptual Essay with a Novel Classification.* Cit.

[121] Djellal, F. and Gallouj, F. (2001). *Patterns of Innovation Organization in Service Firms: Postal Survey Results and Theoretical Models*. Science and Public Policy, 28, pp. 57-67.

[122] Love, J.H. and Mansury, M.A. *External Linkages, R&D and Innovation Performance in US Business Services.* Cit.

[123] Tether, B.S. *Do Services Innovate (Differently)? Insights from the European innobarometer Survey*. Cit.

imitate. These relationships, whether formal or informal, are then a source of innovative ideas and suggestions, but they can be also a constraint when the firm invests heavily in the dialogue with the single customer but then fails to grasp common and shared needs among multiple customers.

For this reason, it is important for KIBS to have a network of partners, not just as customers and suppliers, but also external consultants. These allow KIBS to quickly access knowledge and resources external to the organization, increasing the service offerings in a short time.

Finally, KIBS companies can also rely on their competitors as sources of new ideas. This can be done directly, for example through partnerships for the development of a new technology, or indirectly, through a benchmarking process. In the second case, the firm can in fact take a competitor as a benchmark and imitate its best practices to improve its performance and to introduce innovations to the organization. By observing the competitor, the firm begins a process of acquisition of explicit and tacit knowledge, which, once integrated with the knowledge already existing in the company, can give rise to improvements and innovations. The network of external sources of a KIBS firm is therefore crucial in understanding in which direction to invest. Clients are not the only meaningful source, since suppliers and consultants in particular can help the company to approach logics of incremental innovation, to differentiate the services offered to exploit new business opportunities and to understand the final market to update the offer.

3.2 Imitation in KIBS

Limiting the analysis of imitation to the amount of researches carried out about it, and comparing it to what has been written about innovation, it would be spontaneous to think that imitating innovations made by others is an uncommon and economically unimportant activity.

This is certainly linked to the *"social stigma"* associated to the concept of imitation: if companies are ready to define themselves as innovators and celebrate their discoveries, the same attitude is not reserved to those products or services that are imitated. Moreover, economists rarely consider imitation as a rational behavior with an intelligent pursuit; rather they judge it as a form of "*naïve learning"*[124].

[124] Shenkar, O. *Copycats – How Smart Companies Use Imitation to Gain a Strategic Edge.* Cit.

Nevertheless, *"Imitation is not only more abundant than innovation, but it is actually a much more prevalent road to business growth and profits"*[125].

In the services sector in particular, where the innovation process is rapid and mostly incremental, changes often result from intra- or extra-sector imitation. The result is that three-quarters of those who declare themselves as innovators have imitated existing services[126].

Imitation is a behavior that has always existed, and in economics emerges in different business domains. Firms can copy products, services, processes, management methods, organizational forms, and more, with examples of successful product imitations that date back to the 1500s[127]. Moreover, imitation is an integral part of the process of diffusion of innovations, which allows the adoption of superior methods or products.

In cases of extreme environmental uncertainty, however, imitative behaviors can lead to negative consequences, such as speculative bubbles or waste of resources in duplicative efforts, which will turn out to be ruinous. In fact, imitation tends to concentrate the resources invested in the economic system on a limited number of alternatives, reducing the variety and increasing the overall risk for a sector.

Firms can imitate for a wide range of reasons, and their actions can have different causes and consequences. They can copy their rivals because they think they have more reliable information or just to keep up. Imitation can also increase competition or reduce it. Its consequences are hardly foreseeable, and it can affect not only the single business but also its consumers and the economic system.

Scholars often emphasize the role of environmental uncertainty as a triggering factor for imitation: in situations of uncertainty, where is difficult for managers to anticipate the possible effects of their actions, copying successful products (or services) becomes a key element in the competitive game.

Imitative behaviors can also result in anti-competitive situations: by doing similar actions, the chances of one of the actors to be more successful than the others are lower. Imitation can thus help to preserve the status quo[128].

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[125] Levitt, T. (1966). *Innovative Imitation.* Harvard Business Review, September-October, pp. 63-70

[126] Djellal, F. and Gallouj, F. *Patterns of Innovation Organization in Service Firms: Postal Survey Results and Theoretical Models*. Cit.

[127] Schnaars, S.P. (2002). *Managing Imitation Strategies.* The Free Press, New York.

[128] Lieberman, M.B. and Asaba, S. (2006). *Why Do Firms Imitate Each Other?* Academy of Management Review, vol. 31, n.2, pp. 366-385

This does not mean that it has only negative effects: imitation certainly has business attractiveness, which makes it a powerful and common strategy, but at the same time is often not appreciated. These advantages will soon be illustrated, after a brief analysis of the different levels of imitation that can be identified and the reasons behind this strategic behavior.

3.2.1 Kinds of copies

In the field of innovation and imitation things are never black or white: there are many intermediate nuances, often difficult to distinguish clearly.

In the case of imitation, not everything can be defined as a pure copy. There are several levels of imitation, which lie within a continuum that goes from illegal duplicates of famous products to innovative products inspired by others already in the market[129].

"Counterfeits" are copies of famous products, presented with a known trademark or brand name, belonging to the original innovator. They are usually low quality products sold thanks to a respected brand name, for which consumers are willing to pay a premium-price. An example are the bags and watches sold as high fashion products in the middle of our streets.

They are therefore the least creative attempt at imitation. The main difference between this type of imitation and the ones that presented below is that this one is strictly illegal: producers earn on a protected brand name or a trademark of a famous brand, robbing the innovator of its well-deserved profits. Much of the stigma associated with the concept of imitation comes from these products and the negative impact they have.

"Knockoffs" or *"clones"* are instead the same product sold by the innovator, but with a lower price and carrying a brand name different from the original one. They are thus legal copies of a product, a condition made possible thanks to particular circumstances, such as the absence or expiration of patents, trademarks and copyrights. However, they can lead to complex legal issues that need to be solved by a court. In this case, an example could be the one of IBM-PC clones, diffused after that the first IBM personal computer was launched.

"*Design copies*" instead imitate the design, style, or fashion of popular innovators' products. In sectors where design is one of the most important features of the product,

[129] Schnaars, S.P. *Managing Imitation Strategies.* Cit.

design copies are very close to the previously mentioned knockoffs. Instead, in cases where design is a secondary trait of the product, design copies can hide unique and innovative technologies. In this case, it can be said that imitation has also innovative aspects. An example of design copies are the Japanese cars produced in the 80s, which imitated the design of German cars but with the Japanese technology behind it.

The last kind of imitation is called *"creative adaptation*" or *"creative imitation".* This is the more innovative case of imitation: an existing product is improved or adapted to a new competitive environment or situation. In the first case, improvements may be possible because those who enter a growing market after the innovator can have access to more recent technologies, or have more time to better interpret the market and offer products that best fit to its needs. In the second case, instead, the imitator recognizes the potentials of an innovation already developed in another sector, and applies it to the sector where it operates.

This type of imitation is far more popular than the most famous breakthrough innovations and often defined as incremental innovation. New products are often built on the old ones: most of the innovations arise from existing ideas, concepts, and practices, and are creative adaptation to new applications. Conversely, imitations can include a good amount of innovation.

This phenomenon has been called also *"imovation"*[130]*.* Imovators consider imitation an additional process of innovation, and not a contradictory one. They consciously decide when to follow one path or the other, and demonstrate to master capabilities useful for both innovators and imitators, such as knowing how to sort large amounts of information and to know how to exploit different knowledge sources from different areas and disciplines.

3.2.2 Theories behind imitation

Different theories have been proposed about the reasons that drive firms to adopt an imitative behavior and they can be categorized into two macro-groups[131]: *"information-based"* theories, build on the concept that firms follow (even erroneously) those who are considered to have superior information, and *"rivalry-based"* theories, according to which

[130] Shenkar, O. *Copycats – How Smart Companies Use Imitation to Gain a Strategic Edge.* Cit.
[131] Lieberman, M.B. and Asaba, S. *Why Do Firms Imitate Each Other?* Cit.

companies follow their competitors to maintain competitive equality or otherwise to reduce rivalry.

3.2.2.1 "*Information-based"* theories

In uncertain and complex environments, managers are more responsive to information coming from the outside of their firm, and in particular to those coming from their competitors.

Among the theories that fall into this group, we find the so-called *"information cascade"* or *"social learning theory"*. In these cases, a first agent acts basing his choices only on the information in his possession. His actions then reveal this information to other agents in the market. The information accumulates gradually, to the point that some followers may decide to ignore their own information (if they conflict with those coming from the outside) and imitate the decisions of the first agent.

Decisions and actions of certain actors, perceived as more credible, can be evaluated more than the others. For example, small or new businesses may decide to imitate their established or successful competitors, seeing them as sources of reliable information.

In these cases, as well as the accumulation of positive information, reaching a critical mass, can trigger the cascade upward, the same applies to negative signals, which can reverse the process.

Therefore, according to scholars[132], in certain situations is optimal for firms to ignore the information in their possession and to follow the actions of other agents.

Another possible explanation for herd behavior is given by the *"reputation theory",* according to which managers mimic the actions of other agents, ignoring their own information, in order to avoid a bad reputation. Imitating, in fact, they try to signal their own quality.

While the theories proposed so far are classified as economic theories, imitation can be explained also by theories of organizational sociology and ecology and in particular from *"institutional isomorphism".* Isomorphism is a process that forces the actors in a population to resemble when they have to face the same combination of environmental

[132] Bikchandani, S., Hirschleifer, D. and Welch, I. (1992) *A Theory of Fads, Fashion, Custom and Cultural Change as Informational Cascades"*. Journal of Political Economy, vol. 100, issue 5, pp 992-1026

conditions. Scholars[133] therefore argue that the efforts of rational individuals to change their organizations make these organizations more and more similar.

When the environment in which they operate is uncertain, organizations fit to what other organizations do. In these contexts, the company that follows the others is perceived as more legitimate or successful than those who do not. A mimetic attitude is thus considered rational, as it allows economizing search costs related to the uncertainty the company faces.

Despite mimetic isomorphism could seem like a rational kind of imitation, where firms fit to superior organizations, it often hides ritualistic aspects rather than rational motivations[134]. This is because often, once an agent adopts some behavior, this is given for certain and institutionalized. Consequently, it is adopted by other agents without any thought.

The main difference between *"mimetic isomorphism"* and *"information cascade"* consists in the institutionalization of behaviors that happens in the first, which makes them more durable and resistant to changes resulting from new information.

The motives of those who imitate may be different, also depending on whether they are early or late followers[135]. If the former tend to be rational and weight their actions, the latter often do not actively engage in interpreting signals from other agents, but merely copy established and successful companies to signal, in turn, their own legitimacy and to gain a certain status.

This type of status-enhancing imitation can bring benefits to the enterprise and its owners, resulting in rational behavior even though the actions involved may not be the best for the firm. Better reputation can, nevertheless, improve business relationships with resource providers in uncertain environmental situations.

According to *"information-based"* theories, companies learn drawing inferences from the behaviors of other firms in their environment. Firms can learn by collecting more detailed information, both observing and studying the experience of early movers and through their own experience[136]. This second learning method, that is, direct experience, is more

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[133] Di Maggio, P.J. and Powell, W.W. (1983). *The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields.* American Sociological Review, n. 48, pp. 147-160

[134] Lieberman, M.B. and Asaba, S. *Why Do Firms Imitate Each Other?* Cit.

[135] Fligstein, N. (1991). *The Structural Transformation of American Industry: an Institutional Account of the Causes of Diversification in the Largest Firms, 1919-1979.* In: Powell, W.W. and Di Maggio, P.J. (Eds.) *The New Institutionalism in Organization Analysis,* Chicago: University of Chicago Press

[136] Baum, J.A.C., Li, S.X. and Usher, J.M. (2000). *Making the Next Move: How Experiential and Vicarious Learning Shape the Locations of chains' acquisitions.* Administrative Science Quarterly, n.45, pp. 766-901.

expensive and time consuming than imitation. The way firms decide to learn is thus closely tied to their resources and the time they can devote to the learning processes. Therefore, in very uncertain environments, where decisions need to be made quickly, imitation becomes a very attractive perspective. However, in most cases, companies tend to use a combination of these two methods.

Organizations, in order to facilitate the process of learning from others and speed up the implementation of what they have learned, need to invest in *"absorptive capacity"*[137]. The followers able to develop this ability can afford to wait before committing to a certain decisions and gather useful information without compromising their ability to react.

Information-based imitation can have extraordinary amplification effects, which may lead to dramatically negative results. Information cascades can in fact trigger bubbles, in the same way in which they can speed the adoption of superior products and methods.

Another risk, associated with this type of imitation, is to reach sub-optimal results, which increases when managers feel forced to commit before they have enough information and reduced uncertainty.

3.2.2.2 "*Rivalry-based"* theories

This second group of theories considers imitation as a firm reaction to reduce competitive rivalry or risk. In this case, the actions of competitors are not seen as sources of information, but as a threat: firms then imitate each other's to neutralize possible aggressive actions or to maintain their relative position in the market.

This type of imitation is particularly common in markets where companies have similar resources and market positions, and therefore, where extremely strong competition can lead to erosion of prices and profits. To avoid it, firms can use diametrically opposite solutions. They can use a differentiation strategy, diversifying their resources and their position on the market, isolating themselves from the actions of rivals and reducing their chances to be imitated. This can lead to greater profits if the diversified positioning results attractive. Nevertheless, it can be risky, as agents cannot be certain about the outcome of the process and the superiority of the new niche.

Otherwise, they can decide to undertake a homologation strategy, where they copy the actions of competitors in an attempt to reduce both competition and risk.

[137] Cohen, W.M. and Levinthal, D.A. (1990). *Absorptive Capacity: a New Perspective on Learning and Innovation.* Administrative Science Quarterly, n. 35, pp: 128-152.

Homogeneous strategies, and hence tacit collusion between competitors, can therefore be used to mitigate competition in cases where resource homogeneity leads to intense pressure. Coordinating companies are able to increase the general profitability of the industry, as to mimic the actions already taken by competitors can be interpreted as a signal of commitment to maintain the status quo.

In other cases instead, imitation is the result of behaviors aimed to reduce risk. Through *"follow-the-leader"* behaviors, competitors maintain a parity situation where no one is better or worse than the others.

In some markets, incentives for imitation may be reduced, while in others, as in the case of *"winner-takes-all"* markets, they may increase. In the last case, rival firms can adopt similar strategies to prevent others from establishing their superiority. In the case of R&D competition for example, the first innovative company can get a patent that will prevent competitors from adopting the same strategy. The same situation may occur in markets characterized by bandwagon effect and network externalities[138].

Identifying the reasons behind imitation is not easy, and the situation is made even more complex by the fact that the theories so far proposed are not mutually exclusive. Both types of imitation in fact can be present simultaneously.

Another problem is the difficulty of distinguishing imitation from other types of isomorphism, including the simplest case in which some companies adopt similar strategies as independent, but identical responses, to the same environmental shock.

Companies are often subject to the same fluctuations in demand and have access to the same information on the macroeconomic condition, to which they can respond in similar ways. Considering these examples as imitation would be incorrect, as they are independent of one another[139].

Similarly, the imitative process is influenced by resource constraints that affect the behaviors and strategies of each enterprise. In fact, firms with very different resources will hardly adopt similar strategies, even if they face the same environmental shock. Companies are therefore able to imitate each other's only when they can rely on a set of similar or comparable resources.

[138] Katz, M.L. and Shapiro, C. (1985). *Network Externalities, Competition and Compatibility.* American Economic Review, n. 75, pp. 424-440

[139] Lieberman, M.B. and Asaba, S. *Why Do Firms Imitate Each Other?* Cit.

Imitation can make the outcome of a market extreme, with consequences that can be either negative or positive for both companies and the society. Imitating companies tend to converge towards a common choice faster and in a greater number than they would otherwise do. This can lead to positive effects such as the rapid diffusion of products and optimal methods, but unfortunately, it can have devastating negative effects too. In the event that early movers have chosen a superior innovation, imitation helps to accelerate convergence towards the optimal solution, by promoting network effects and common standards, from which consumers can benefit. Similarly, rivalry and shared learning encourage companies to accelerate their path towards progress. In the case in which what is imitated proves instead, to be inferior, imitation can lead to what is defined as *"competency trap"*[140]*,* or to a lock-in situation with inferior choices. Imitation can therefore increase the risk for an entire industry. Contrarily, in cases in which companies act separately this risk can be reduced, as diversity allows avoiding the worst results for the industry.

3.2.3 First movers, early followers and late entrants

The distinction, between *"new-to-the-firm"* and *"new-to-the-industry"* innovation, used in this work, allows differentiating innovators or first-movers from imitators, or followers. A firm that introduces and innovation in an entire sector can be, in fact, considered as an innovator. Contrarily, those firms who adopt an innovation already existing in the market can be considered as imitators.

Those who enter in a certain market can be classified in different ways, one of which is their order of entry. It allows to distinguish the pioneer or first mover, which by definition is the first entrant to sell in a new product or service category, from the followers, which are the subsequent entrants. Later entrants can then be classified according to whether they have reacted immediately to a pioneer's entry or they have waited, so according to the amount of time that has passed between the two entries. In this way we can differentiate also the early entrants, which consist in those entrants that are early to market, but not the first, from the late entrants, those firms that do not enter the market until the time the product begins to penetrate the mass market or even later.

[140] Levitt, B. and March, J. (1988). *Organizational Learning.* Annual Review of Sociology, n. 14, pp- 319-340

The concept of imitation is often confused with the one of later market entry, despite the two phenomena being linked but distinct. Later entry simply means that the company enters the market after the pioneer, but the product offered could be an innovative product on its own. On the contrary, the imitator enters the market by offering a product that consciously copies or mimics that of the first mover. Similarly, pioneering and innovating are not synonymous: while the innovator is the one who materially develops a new product, the pioneer is the first to bring it to market, but not necessarily the one who developed it.

For this reason, a strategy of later market entry does not necessarily imply imitation: in fact, different companies can develop, simultaneously but independently, new products. When one of them proposes the result of his efforts to the market, the others are obliged to do the same, not to be penalized in the competitive dynamics.

On the contrary, imitation always implies later entry. In fact, the imitator, not having a product on its own, enters with an imitative product or an improved versions inspired by the pioneer.

3.3.4 First-mover advantage vs free-rider effect

In the management literature, the concept of first mover attracted the attention of several scholars. In particular, the benefits of this condition have often been presented as exceptional and secure, with managers from all kinds of activities ready to assume that a head start guarantees an insuperable competitive advantage.

Unfortunately, the data contradict this belief: many of the pioneers or innovators fail and end up being forgotten, with the consequence that those who are remembered are the successful followers.

A first-mover advantage can be defined as a *"firm's ability to be better off than its competitors as a result of being first to market in a new product category"*[141].

Being first to the market has then some advantages that may drive firms to invest much of their resources in innovation activities: technological leadership, the appropriation of scarce resources useful for the innovation and the establishment of buyer switching costs are just some of the advantages that convince firms to adopt this strategy. These

[141] Suarez, F. and Lanzolla, G. (2005). *The Half-Truth of the First-Mover Advantage.* Harvard Business Review, 83(4), pp. 121-127

advantages can improve a firm's market share and profitability over a more or less long period.

Nevertheless, being first to the market is considered a more risky strategy, compared to a *"wait-and-see"* one. First, new products require large investment, often present poor performance-price ratios and require several developments before the market accepts a new dominant design. Moreover, commercial success should not be taken for granted: break-through products are more likely to face *"market inertia"* and difficulties in market acceptance.

Hence, being first to the market does not automatically mean commercial success and leadership. The state of first mover can therefore give advantages, but not always. Much depends on the characteristics of the enterprise, its resources, in some cases even on luck, but above all by the circumstances in which it operates. Two factors in particular have proven to have a significant influence on the fate of the pioneers: the pace at which the technology of the product is evolving and the pace at which the market for that product is expanding[142].

For these reasons, first-mover advantages can be counterbalanced by *"free-rider"* effects, which come for the followers[143].

Whether it is more advantageous to be the first in the market or to take a *"wait-and-see"* strategy is a dilemma that literature has not yet solved. Some compare the situation to a race: the greater the length of the pioneer's lead, the more likely it will win the competition. Only if the later entrant has extraordinary talent it can reduce the distance with the pioneer and hope to win. Others, however, describe it more like a geographic exploration: pioneers run a huge risk dealing with unexplored territories, which will then be colonized by others that, in turn, will create economic well-being. Whether the pioneers get the glory or are forgotten, in any case the followers will be the ones to get the economic benefits[144].

The main first-mover advantages presented in the literature are related to:

- Image and reputation: pioneers enjoy a positive reputation, linked to their image of innovators, which they often maintain for years. Imitators, on the contrary, are

[142] *Ibid.*
[143] Schnaars, S.P. *Managing Imitation Strategies.* Cit.
[144] *Ibid.*

likely to be considered just copycats, with negative consequences for the appeal of their products.

- Brand loyalty: consumers build their habits around the first product they try, which becomes the standard against which all other products are compared. If this product satisfies them, they do not have any reason to change. Hence, if the pioneer is able to understand the market and propose a product with the attributes considered most important by consumers, it can occupy the most favorable position on the market before competition starts. It will then leave few alternatives to its followers: to take a lower positioning or to copy its product, accepting the reputation of *"me-too"* product.
- Technological leadership: the first-mover often has a head start in the technology used. While its follower try to catch-up, it can pursue next-technological generation, maintaining its leadership position.
- Access to distribution: in several markets, distribution channels accept only a limited amount of brands and pioneers are often able to find room for their products, only by virtue of being first. Conversely, late entrants face the opposite situation.
- Experience effects: there are cost advantages positively correlated to the cumulative production, which give the pioneer a price advantage that later entrants cannot easily match.
- Patents: they help the pioneer to create barriers to entry, locking out later entrants and reaping all the economic benefits coming from an innovation.
- Switching costs: like patents, they can be used as barriers to entry. Pioneers can build mutually beneficial relationships with their customers, which help to keep them loyal. Long-term contracts, familiarity or lack of incentives to switch, they all penalize later entrants.

All these advantages can be challenged, proving that the first-mover advantage theory is not always so strong. Pioneers indeed are vulnerable to the actions of their followers. Much of the literature about first movers comes from databases containing information only about successful companies, which neglect all those pioneers who failed. They consider pioneering a successful strategy after studying only successful cases, hence they are not representative. Other criticism made to these studies is the fact of being focused on peculiar products or markets, like cigarettes or drugs, which again are not

representative. For these reason, more recent studies used a sequential market entry approach, which proved much more supportive of imitation and later entrance[145]. Innovation and great efforts are not always accompanied by great rewards, and revenues often do not compensate the risks. In many cases, instead financial risks fall solely on the pioneer, while the rewards spread to all the others.

The main benefits found for followers are then opportunities related to:

- Savings on R&D expenses: in the end, imitation is less costly than innovation. Its cost have been estimated to be the 65%-75% of the cost for the development of an innovative product[146]. The imitator can avoid a great share of the innovator's expenses in R&D, as the product itself reveals a lot of information that the innovator had to discover on its own. Often they are able to copy the innovator's product even before its official launch, thanks to information leakages.
- Avoiding products with no potential: later entrants are able to avoid committing their resources to product for which there is no demand. They can move when the market potential of an innovation becomes clear, reducing their risks and lowering their costs considerably.
- Gaining share with heavy promotion: later entrants may attempt to compensate for their late start by spending much of their resources in marketing, fueling a market that they have not contributed to create. Some studies[147] have shown that followers can overcome the first mover advantages if they have a superior product and can spend more on advertising. Hence, investment in market research, advertising, promotion, sales force and distribution seem to be more influential than experience in technical areas.
- Lower costs of educating consumers: the pioneer, when launching a new product, has to commit a great amount of economic resources to convince consumers to try it. Moreover, costs increase exponentially when the innovation introduced is radical, as it is necessary to spend a lot, over long periods, before consumers become familiar with it. During this time, the costs will be high and the profits low, with the additional risk of creating a demand that could be stolen by competitors.

[145] *Ibid.*

[146] Mansfield, E., Schwartz, M. and Wagner, S. (1981). *Imitation Costs and Patents: an Empirical Study.* The Economic Journal, vol. 91, n. 364 (Dec., 1981), pp. 907-918

[147] Urban, G.L., Carter, T., Gaskin, S. and Mucha, Z. (1986). *Market Share Rewards to Pioneering Brands: an Empirical Analysis and Strategic Implications.* Management Science, n. 32, pp. 645-659

- Technological leapfrog: an innovation rarely leaves the lab well formed. Much more often, the new product or service evolves following the market that it wants to serve. Despite first-mover advantage supporters advocate that the pioneer can gain a competitive advantage mastering the technology, in fact technology can be both an opportunity and a limit. The first-mover usually chooses the most advanced technology available on the market at the time of entry, but this choice can quickly become obsolete, leaving the pioneer in the difficult situation of having to change a technology in which he invested heavily.
- Sticking the pioneer with an obsolete standard: always according to the supporters of the pioneering advantages, being first mover allows to set standards to which followers will then have to adapt. While it is indisputable that once standards have been defined, these affect the entire category, it is not as certain that they are defined by the pioneer. In fact, those who adopt a *"wait-and-see"* strategy are able to enter at a time when the demand for the new product is better defined, with a product targeted to the most interesting segments. As a result, standards are often defined by companies that enter after, but with a superior product.
- Benefits from market changes: often when an innovation is launched on the market it is not fully formed, and the same applies to the market itself. The market evolves, as consumers of the product or service at the beginning do not have the same needs of the ones that enter later. For example, the first buyers of a new technology may be expert users who will use it for complex purposes. Later, the same technology could be used by the mass market. As a result, the pioneer's product is likely to become obsolete for the new needs to be met, shifting from a premium product-positioning strategy to what is often an inferior market position. When the market stabilizes and its needs become clear, followers can enter offering instead a product designed to meet them more closely.
- Use of shared experience: when an enterprise carries out a business close to that proposed as innovative by the pioneer, it can enter the market with a similar product, by exploiting its experience with similar production activities. In addition, the imitator in this case may also have a consolidated experience in design or marketing activities related to the sale of similar products or services, which would enable it to develop the market created by the pioneer, becoming the leader.

The choice between imitation and innovation is therefore a complex process, as much as the one between early or later entry. The literature proposes various theories in this regard, all followed by data in their favor. We can conclude, then, that there is no precise and certain way to know when a strategy is more appropriate than the other, as their output is influenced by many factors, internal and external to the enterprise and the market itself.

3.3.5 Imitation strategies

Imitators, when they enter in a market already guarded by an innovator, can gain a competitive advantage using different strategies or a combination of them.

One of the most successful imitative strategies is to mimic the innovator's product and to sell it at a lower price. This can be done in two ways: selling exactly the same product at a reduced price, or selling a lower quality product at a considerably lower price. Both these strategies aim at attracting consumers that otherwise would be unwilling to buy the product.

The imitator can offer lower prices compared to the innovator for different reasons related to its cost structure. First, by copying it can avoid much of the costs related to R&D. Moreover, it can also take a free ride on the promotional expenses of the innovator and on the demand it creates. Some imitators create the perception that they sell exactly the same product at a lower price, offering a less expensive alternative to the leading national brands. Another reason is given by the imitator's timing of entry: if it has the fortune to enter in a moment when the market has grown larger and more price-sensitive, it can gain all the benefits coming from those not interested in top-of-the-line products. Imitators can have good opportunities also in those markets where imitation is far more complicated and could seem a ruinous strategy, like those where technology changes fast and the imitator is not able to keep the pace of the innovator. By the time the imitator moves in, the innovator has moved to the next generation technology. In this cases for the imitator can wait until the pace of innovation slows down. When this happens, and dominant design is selected, radical innovations are substituted by incremental ones. In this situation, price competition becomes more important, and an opportunity for late entrants opens.

Another strategy used by imitators is to *"imitate-and-improve",* which is closely related to the concept of creative imitation. In this situation, later entrants do not copy the pioneer

product faithfully and do not compete on prices. They seek rather to offer superior and improved products on the market, hoping that consumers will prefer them.

A situation that allows the adoption of this strategy is the *"technological leapfrog":* the imitator enters the market with a second-generation product, superior to that of the pioneer, which hence becomes obsolete. The pioneer, who has invested in an outdated technology, finds itself in an unpleasant lock-in situation due to sunk assets, experience and emotional ties, which is hard to abandon. When the imitator is presented with the opportunity of a technological leapfrog, the speed with which it responds to the entry of the pioneer passes into the background. The real success factor in these cases is represented by the effective opportunity to enter the market with a better product. This happens often, as it is almost impossible for the pioneer to do everything right at first try: new markets and new technologies at the beginning are often poorly formed, and each of their changes opens up opportunities for imitators. The latter, however, to implement this type of strategy must be careful to remain technologically up-to-date through ongoing R&D programs.

The last strategy an imitator could use is based on its market power. There are cases in which the market share of an industry leader is threatened by the advent of an innovative pioneer. Market leaders have three forces that can then use to counter the pioneer: first, they have the marketing power to promote their imitative product. They can thus count on a known brand name, on a positive reputation, and on an existing consumer base to help their product spread. Second, they also have privileged access to distribution channels, where they can easily position their product. Finally, they have the financial resources needed to make their business grow. They can then enter the market after the pioneers and still manage to surpass them.

It can then be concluded that the traditional vision that attributes to the first mover and the innovator unquestionable advantages, compatible with a competitive advantage, is often overvalued but not for that incorrect. There are several markets where being the first to innovate guarantees the leadership in the market, such as in the case of medicines or other patented products. Nevertheless, there are also many different cases in which first entrants came in last and last entrants came in first.[148]

Imitation is not necessarily a risk reducer: often it simply substitutes it. The innovator

[148] Schnaars, S.P. *Managing Imitation Strategies.* Cit.

investments in R&D can end up in a product which does not work or which is refused by the market. The imitator instead may incur in different risks, like reaching a market already flooded with other imitators, discovering midway that it is not able to replicate the innovation or failing to sell it at a profit. Moreover, the imitator faces the risk of incurring in legal expenses and reputational loss, with the consequent attribution of a copycat image. Finally, the imitator faces the same lock-in risk faced by every innovator.

3.4 Collaboration and external relations in innovation and imitation strategies

As already pointed out several times, one of the key aspects of KIBS is their propensity to collaboration with clients and other external partners in the creation and development of new services.

Different networks and innovation models can coexist in the same firm, which can decide from time to time to collaborate with one or more different actors and be more or less the protagonist of the innovative process[149]. This is coherent also with the concept of "*open innovation"*, which views innovation as the outcome of interactive and iteractive processes across the value network, where customers and other stakeholders are often invited to co-innovate[150]. The entities belonging to the value chain, in a perspective of open collaboration, exchange dynamically knowledge among each other's, to synergize internal and external resources for innovation. This concept has been developed with reference mainly to the manufacturing sector, but can be applied also to the service one.

In the past innovation was considered the result of the effort of a lone entrepreneur, or of a genius, working in his laboratory. Today, this early Schumpeterian model has been replaced by the idea of different actors working together in a process of trial and error, to reach the successful economical exploitation of a new idea[151]. Innovators, then, tend to join in teams and coalitions based on *"swift trust",* inlaid in communities of practices and embedded in a dense network of interactions[152]. Today's changes in the economic environment have brought a change in the understanding of value creation also in

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[149] Cabigiosu, A. *L'Innovazione e la Progettazione nei Servizi Knowledge-intensive.* Cit.

[150] Chesbrough, H. (2011). *Open Service Innovation. Rethinking Your Business to Grow and to Compete in a New Era.* Jossey-Bass A Wiley Imprint, San Francisco, CA
Chesbrough, H. (2003a). *Open Innovation.* Harvard University Press: Cambridge, MA
Chesbrough (2003b). *The Era of Open Innovation*. Sloan Management Review. Summer: pp.35-41

[151] Laursen, K. and Salter, A. (2006). *Open for Innovation: the Role of Openness in Explaining Innovation Performance among U.K. Manufacturing Firms.* Strategic Management Journal, n. 27, pp. 131-150.

[152] Brown, J.S. and Duguid, P. (2000). *The Social Life of Information*. Harvard Business School Press: Boston, MA

services, which is now seen as the result of the interaction in a network of stakeholders, such as suppliers, customers, partners and intermediaries.

The increased mobility of knowledge workers makes difficult for firms to appropriate and control their R&D investments and the fast pace of knowledge development makes the advantages gained from internal R&D expenditure decline. For these reasons, many innovative firms today spend less on R&D and yet they are able to innovate relying on different external sources for knowledge and competences. Firms' boundaries are thus more porous and firms are embedded in loosely coupled networks of different actors, collectively and individually working toward the commercialization of new knowledge.

Cooperation among them let information and knowledge flow, to favor the diffusion of practices, ideas or methods, coming both from the inside and the outside of the network.

Considering knowledge, codification simplifies and makes imitation less expensive. Information can be organized, sorted, replicated, purchased and sold at a fraction of the costs needed to produce them. Advances, such as those in electronic communications, have reduced even more the cost of transmitting information, increasing its profitability, and encouraging further codification. This is particularly true in those sectors requiring recombination, reuse and cumulativeness of knowledge as KIBS could be[153]. Codification then transforms knowledge into a commodity, which can be bought, sold and obviously replicated. A feature of encoded knowledge is that once it has occurred, or once the sunk costs necessary for its realization have been sustained, it becomes cost-prohibitive to develop private knowledge in the same respect, using a private language[154].

Codification allows then to have efficiency gains, but at the same time makes reproduction and copying much simpler and more accurate, with the consequence that the more one system is codified and standardized, the easier it is to imitate[155].

In the case where firms cannot have easy access to codified knowledge, they turn to external sources to get what they need. Alliances and partnerships are therefore effective learning methods, which also allow the absorption of not only codified, but also tacit knowledge.

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[153] Kairu, K., Taipale, O. and Smolander, K., 2007. *Outsourcing and Knowledge Management in Software Testing.* 11th International Conference on Evaluation and Assessment in Software Engineering, April 2-3, Keele University, Staffordshire, UK

[154] Cowan, R. and Foray, D. (1997). *The Economics of Codification and the Diffusion of Knowledge.* Industrial and Corporate Change, vol. 6, Issue 3, 1 September 1997, pp. 595-622

[155] Shenkar, O. *Copycats – How Smart Companies Use Imitation to Gain a Strategic Edge.* Cit.

Co-operation in innovation can take different forms, presented in the five "Co-s" model[156]: co-ideation, co-valuation, co-design, co-test and co-launch, through which the network lead users, customers, partners and intermediaries co-innovate.

The process of acquiring and combining knowledge and ideas coming from different sources can be challenging for firms, as it calls for a delicate balance between multiple elements, such as the identification of the rationale for co-innovation, the coordination of the processes and mechanisms, the maintenance of policies to deal with conflicts between collaborating entities and of service quality and consistency.

Facilitating the necessary knowledge exchanges and collaborative learning processes between the members of the network is therefore crucial to co-innovate in the most efficient manner.

Two types of openness can be detected in the open service innovation model: *"outside-in"* and *"inside-out".* In the first, firms incorporate external ideas and technologies within their business, while in the latter firms open their ideas and technologies for other business to use.

KIBS, which consider co-operation as vital for their business, can therefore be considered as naturally immune to the *"not invented here syndrome",* and find it less difficult than other companies in other areas to open up to an external network of collaborations for new products development.

Researches about open innovation then argue that firms able to become more open to external sources will receive some benefits in their search for opportunities, in their learning activities and in choosing whether to adopt a new product or services[157]. Considering the similarities between innovative and imitative processes, they lead to think that interactions with the external environment are of some importance even in the case of imitation, where a certain degree of uncertainty is still present. Other's innovation, in fact, may entail a certain degree of uncertainty and ambiguity about their potential. An imitator's ability to detect the best opportunities to imitate is therefore influenced by the knowledge it absorbs from the actors with which it interacts.

For example,*"new-to-the-firm"* innovations are imitations of products or services that already exist in other industries, or in the same industry but in different companies. They

[156] Scerri, M. and Randhawa, K. *Service Innovation: a Review of the Literature.* Cit.
[157] Chesbrough, H. *Open Innovation.* Cit.

could be the result of different strategies or situations, like a customer, which during his co-production relationship, explicitly asks to benefit from a service offered by a KIBS' competitor, providing information about it and putting the firm in the condition to imitate his competitor.

But this is not the only situation that can lead to imitative outputs. In the case of KIBS, several people can collaborate for a long time on the same project, sharing information and working on complex issues. However, what in many cases can lead to an innovation that would not otherwise be possible, it also poses a risk to the knowledge owner. Its position becomes vulnerable in these situations, as it unintentionally makes available to the partner, not only contractual knowledge, but also other aspects of his business and skills, through uncompensated knowledge spillovers or leakages. Partners that initially do not represent a competitive threat can thus accumulate the skills they need to become one, or otherwise they could transfer accumulated knowledge to third parties, facilitating imitation of products, services, or business models.

Imitation is also facilitated by the increased mobility of workers. It is not rare for managers or technicians who have left their company to work for a direct competitor, putting their skills and knowledge at its disposal.

Some scholars, from the idea of industrial cluster proposed by Porter[158], presented the concept of *"imitation cluster"[159].* As for innovation, clusters support and foster innovation by facilitating the contact and the exchange of knowledge needed to incubate new ideas.

Like their better known counterparts, innovation clusters such as Silicon Valley, imitation clusters consist in several competing companies operating in close proximity. However, unlike innovation clusters, these often focus on technical schools or applied research centers and are organized in industrial groups such as cell phones in Shenzhen[160]. Businesses gain from observing each other, while peer pressure and rivalry, promote sharing of information. As their innovative counterpart, they offer several benefits to those who are part of it. These range from saving on search costs, access to external knowledge sources, and the exploitation of economies of scale. The latter are particularly important in the case of imitation, as based on the replication of codified knowledge.

[158] Porter, M.E. (1990). *The Competitive Advantage of Nations.* New York: The Free Press
[159] Shenkar, O. *Copycats – How Smart Companies Use Imitation to Gain a Strategic Edge.* Cit.
[160] *Ibid.*

These allow imitators to save on costs and increase productivity, which will then be translated into lower prices.

The birth and development of these clusters have so far gone unnoticed by the literature, as opposed to the innovation clusters, which have been a starting point for several research fields. In-depth studies on imitative cooperation are still lacking, so it is difficult to deepen the impact they have on the probability of achieving a successful imitation.

Generally, many questions about collaborative innovation and imitation in services still lack an answer, o present partial answers, also because of the lack of empirical evidence to support existing theses and assumptions.

With the next chapter we intend to advance the analysis of this aspect, with the presentation of the analysis of a sample of KIBS in the Veneto region.

4. EMPIRICAL ANALYSIS

After the theoretical introduction and the review of the literature underlying this work, we can now move to development of an empirical analysis about how collaborations affect innovative and imitative outputs in a sample of KIBS companies.

Firms have to invest time, money and other resources to find the best innovative opportunities, facing the uncertainty about the success of the project.

The idea, diffused in the past, of a lone entrepreneur that tries to match the innovation opportunities with market demand has been superseded by a newer model where different actors work together in an interactive process to bring about the successful exploitation of an idea[161]. In one of his works, Chesbrough (2003a) suggests that many innovative firms have shifted to an *"open innovation"* model, using a wide range of external actors and sources to help them to achieve and sustain innovation.

This change in the way firms go about searching for new ideas and information requires that firms commit themselves to build and sustain links with a wide range of actors inside the innovation system. Since firms build their knowledge and develop network of contacts on their specific and personal experience, is often difficult to determine the optimal search strategy.

Previous researches suggest that organizations that invest in broader and deeper external search may have a greater ability to adapt, to change and therefore to innovate[162]. However, the benefits of openness seem to be subject to decreasing returns, indicating that from a certain point on, additional search becomes unproductive[163].

Surprisingly, the studies that have tried to determine the optimal search strategy have given little attention at how openness can be effective also to imitate other's innovations. Exactly like innovation, imitation too implies a certain degree of uncertainty, which can be reduced accessing and absorbing knowledge through interactions with other actors. Drawing on the knowledge of trusted partners is useful to transmit and identify information about new ideas and products introduced in the market.

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[161] Von Hippel, E. (1988). *The Sources of Innovation.* New York University Press, New York Oxford

[162] Laursen, K. and Salter, A. *Open for Innovation: the Role of Openness in Explaining Innovation Performance among UK Manufacturing Firms.* Cit.
Shan, W., Walker, G. and Kogut, B. (1994). *Interfirm Cooperation and Startup Innovation in the Biotechnology Industry.* Strategic Management JournL, vol. 15, Iss. 5, pp. 387-394

[163] Laursen, K. and Salter, A. *Open for Innovation: the Role of Openness in Explaining Innovation Performance among UK Manufacturing Firms.* Cit.

This idea that information flows can lead to imitation can be found in institutional theory[164], as well as in organizational learning theory[165].

Contacts can then help imitation not only increasing the awareness related to certain technologies or practices, but also providing detailed information about costs and benefits of adoption at a greater level of pervasiveness than other information sources. Firms can thus exploit their relationships with external partners not only to acquire the knowledge they need, but also to better evaluate the possibility to adopt product or services already developed by their competitors. These links are, in fact, the channels through which news about technological innovations, new solutions to problems or new techniques, which have proven to be a failure or a success, move and reach companies belonging to the network.

Being part of a network of inter-firm linkages, in short, offers several advantages. First, companies can share their resources by combining their, often complementary, knowledge, skills and assets. Developing multiple competencies in different areas in fast changing situations (as in the case of KIBS) would be too complicated. Through collaborations, companies can enjoy economies of specialization without having to undertake much of the investment they would need by working alone. Second, when firms work together on the same project, the resulting knowledge is then available to all the participants. This means that all partners can receive a greater amount of knowledge from collaborative activities than from individual ones. Third, through collaborations on larger projects, firms can also reach scale economies in research. In fact, two firms combining resources can invest more than a single one, a particularly advantageous situation in cases where the innovation introduced is characterized by increasing returns[166].

Moreover, belonging to a network shapes not only innovation output, but also innovation inputs, such as R&D investments[167].

After having analyzed the main contributions on the subject, the purpose of this work is to study how differences in KIBS' external search strategies (and in particular, differences

[164] Di Maggio, P.J. and Powell, W.W. *The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Field.* Cit.

[165] Levitt, B. and March, J.G. *Organizational Learning.* Cit.

[166] Ahuja, G. (2000). *Collaboration Networks, Structural Holes, and Innovation: a Longitudinal Study.* Administrative Science Quarterly, vol. 45, pp. 425-455

[167] Brass, D.J., Galaskiewicz, J., Greve, H.R. and Tsai, W. (2004). *Taking Stock of Networks and Organizations: a Multilevel Perspective.* The Academy of Management Journal, vol.47(6), pp.795-817

in the number of partners, in the partner's domain and in the kind of relationships developed with them) influence the ability of KIBS firms to reach innovative outputs.
For the purpose of this work, external collaborative linkages are considered as voluntary arrangements between independent organizations to share resources[168].

4.1 Industry settings

KIBS have attracted more and more the attention of scholars in the last decades, thanks to their peculiarities and their role of increased importance in the *"knowledge economy"*.
The subject of this study is then a sample of KIBS companies in the Veneto region, one of the most developed both in Italy and Europe in terms of employment rate and GDP per capita[169].
The data cover a period ranging from 2006 to 2008. For this reason, a brief premise about the general situation of KIBS companies in Veneto during this time frame is needed.
In 2005, 18.4% of companies in Veneto operated in manufacturing, 35.4% in commerce and 5.5% in personal services. Only 7.1% of companies operated in the professional services sector, a percentage lower than the average of the other Italian regions[170]. However, this has grown rapidly after 2010, bringing Veneto to the top among the regions with the highest shares of professional services companies[171].
While traditional services have been privileged in the past, some developments in the dynamics of production systems have been observed, leading to a transfer of human resources to the knowledge-intensive services industry. This allowed Veneto to rank third in terms of growth in this type of business, thanks mainly to the contribution resulting from the rapid development of professional activities, which in 2005 accounted for 16% of the tertiary sector[172].
In 2009, there were 7,049 KIBS companies in Veneto. This number has been obtained crossing data from two sources: the Business Register held by the Italian Chamber of Commerce and the records of the Association of Professional Accountants, which allowed

[168] Ahuja, G. *Collaboration Networks, Structural Holes and Innovation: A Longitudinal Study.* Cit.
[169] Centro Studi Unioncamere, April 2010. *Rapporto Unioncamere 2010 – L'Economia Reale dal Punto di Osservazione delle Camere di Commercio"*. Available at: http://www.starnet.unioncamere.it/Rapporto-Unioncamere-2010_5A25 [Last Accessed: 07 Aug. 2017]
[170] Unioncamere (2005). *Rapporto Unioncamere 2005*. Milano: Franco Angeli
[171] Unioncamere (2008). *Rapporto Unioncamere 2008.* Milano: Franco Angeli
[172] Unioncamere del Veneto e Camere di Commercio del Veneto, Jan. 2007. *Il Veneto dei Servizi. Rapporto sulla Terziarizzazione dell'Economia Regionale.* Available at: http://www.ven.camcom.it/userfiles/ID205_Veneto_dei_servizi.pdf [Last Accessed: 08 Aug. 2017]

to obtain information about KIBS companies not registered with the Italian Chamber of Commerce.
These companies are the basis for the creation of the dataset used for this study.

4.2 Dataset

The dataset used in this work includes data taken from a KIBS study conducted by the University of Padua (Department of Economics and Management) in 2009, with the aim of defining the most important factors for competitiveness and change at the level of the single entrepreneur and enterprise.
For the realization of this study, 2,984 enterprises have been randomly extracted out of the 7,049 indicated above. The companies selected in this way were then contacted by phone from a specialized survey company, which collected the responses of 512 companies (with a response rate of about 17.15%). The number of fully-completed questionnaires is 238.
The survey company collected data by telephone interviews with KIBS' managers or entrepreneurs. This company was specifically trained on how to conduct the interviews, to be sure that every part of the questionnaire was clearly explained to the interviewees, in order to get complete and accurate answers. It was also explicitly asked the interviewer to speak with the entrepreneur/owner or with a top manager, so to the most knowledgeable sources in the firm. The interviews have been limited to only one member of the company, to avoid overlapping information issues that could lead to less accurate data.
The interviews were based on a broad questionnaire, created to be used for studies with different purposes in the scope of KIBS analysis. The questionnaire therefore contains various sections about firm's data, market strategies, entrepreneurship, organizational models, networking activities, relationships with other companies and customers, features of the services offered and innovative activity.
The dataset thus obtained is then designed for the analysis of a very wide range of KIBS firms features and contains a great amount of information about each firm. It was therefore necessary to select the principal variables necessary for the purpose of this work, which will be explained in the next paragraph.

The questions, the topics discussed and the scales used were previously tested in similar studies[173].

The sample is representative of the situation of Italian KIBS and homogenous from the point of view of the services offered. 30.5% of the sample consists of ICT companies, ranging from software production companies to database management or ICT consultancy firms. 30.7% of the sample belongs to the design and communications industry, ranging from advertising agencies to fashion or industrial design firms and graphic designers. Finally, 38.8% of the sample is made up of professional firms, which include the activities of accountants, lawyers, job counselors and other professionals.

In line with the Italian KIBS sector, the majority of companies in the sample are small businesses: 75% of the sample is then made by micro-enterprises, with an average of 7.28 employees each and 11 years of activity.

Considering the workforce of these companies, on average the 41% of the employees holds at least a three-year bachelor's degree, an evidence consistent with the idea of knowledge-intensive businesses.

Lastly, the sample confirms the overall growth of this sector: the average increase in employment is 11% in the three-year period analyzed, while the 40% of the companies interviewed reported a simultaneous growth of their respective market share.

The collected data allow then to explore the relationship between the openness of firms' external search strategies and their propensity to innovate their service offering or to imitate their competitors' one.

Cooperation with external partners is crucial in KIBS for the ideation and development of the services offered. It helps the enterprises to gain access to the knowledge they lack in a shorter time than autonomous learning, and could help them to decide which path to follow in the development of new products. Through these interfirm collaborative relationships, they can more easily seize opportunities in the market, serving markets that are not well-watched, or become aware of products and services developed successfully by competitors.

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[173] Corrocher, N. et al. *Modes of Innovation in Knowledge-intensive Business Services: Evidence from Lombardy.* Cit.
Hipp, C., Tether, B. and Miles, I. (2000). *The Incidence and Effects of Innovation in Services: Evidence from Germany*. International Journal of Innovation Managament, 4(4), pp. 417-454
Muller, E. and Zenker, A. *Business Services as Actors of Knowledge Transformation: the Role of KIBS in Regional and National Innovation Systems.* Cit.

To undertake innovative and imitative processes requires a lot of knowledge to deal with the uncertainty that these processes entail, knowledge often lacking in a single enterprise. The ability to innovate and/or imitate of the individual KIBS therefore depends on the information it can collect interacting with the various external actors.

While a branch of the literature, called collaborative innovation literature, studied how companies collaborate, the implications on the performance of cooperation with diversified partners, and the benefits they have on the innovative capabilities of the single enterprise, the same attention was not directed at what we could call *"collaborative imitation"*

The analysis of how these relations with external actors influence the propensity of a KIBS to innovate or imitate is therefore the object of this work.

Before describing the method used for the analysis and its results, however, it is necessary to examine the main characteristics of the sample by analyzing the dataset and, in particular, the variables used to describe the relationships with the various partners and as indicators of innovation and imitation.

4.3 Variables

For the analysis of the subject of this work it was first necessary to establish the reference variables. These belong to two different groups, each one with its own characteristics and roles: dependent variables and independent variables. In particular, the first group includes the indicators of innovative and imitative activity, while the second includes the variables related to the relationships with partners outside the KIBS firms. Relationships with clients are excluded from this analysis.

For the variables selection, reference was made mainly to the works of Laursen and Salter (2006).

4.3.1 Dependent variables: innovation and imitation indicators

Taking into account what has been analyzed in the previous chapters at a theoretical level, the dependent variables considered are listed below.

- Firm Innovation: the level of innovation was obtained by asking to the firms in the sample the number of *"new-to-the-industry"* innovations they introduced over the three years considered, from 2006 to 2008.

- Firm Imitation: the level of imitation was obtained instead by asking to the firms in the sample how many *"new-to-the-firm"* but not *"new-to-the-industry"* innovations, i.e. already present on the market, they had introduced in the three years of reference of the study.

A complete description of the variables is provided in Table 4. In the left column are listed the dependent variables used in this study. In the central column these variables are described, while in the right column are reported the relative questions included in the questionnaire used in order to obtain the necessary data.

In the questionnaire, the innovations regarding the offer (product innovations) and those related to productive and distributive processes (process innovation) are distinguished, but for the purpose of this analysis, the two variables have been combined into a single indicator of innovation or imitation. In the case of services, the distinction between process and product innovation is often blurred, due to the simultaneity between production and consumption and consumer's involvement. Moreover, this distinction does not influence the perception of a firm as innovator or imitator.

Variables	Scale and description	Questions
Number of Innovations	Continuous variable. The variable is the number of product and process innovations introduced by the KIBS firm in the last three years	- How many product innovations new-to-the-industry did you introduce in the last three years? - How many process innovations new-to-the-industry did you introduce in the last three years?
Number of Imitations	Continuous variable. The variable is the number of product and process imitations introduced by the KIBS firm in the last three years	- How many product innovations new-to-the-firm did you introduce in the last three years? - How many process innovations new-to-the-firm did you introduce in the last three years?

Table 41 - Dependent Variables, Questions and Scale

4.3.2 Independent variables: external search indicators

The external search indicators studied as possible determinants of imitative and innovative behaviors correspond to the variables related to the external partners and collaborators of the KIBS companies and to the relationships undertaken with them.

They were then used to reflect various dimensions of a firm's external search strategies.

- External search breadth: it is defined as *"the number of external sources or search channels that firms rely upon in their innovative activities*[174]*.* In this work, this variable refers to the number of different partners of each KIBS. The companies surveyed were therefore asked to indicate which of the listed partners partners (see Table 5), belonging to different domains, are part of their network. For each category the company claimed to have contacts in the network, was assigned the value "1", "0" otherwise. This variable then assumes values ranging from "0", when the KIBS firm has no external partners, to "8", which is the maximum number of categories to which different external partners can belong to. This measure has theoretical relevance as an external search breadth measure[175].
- External search depth: it is defined in terms of *"the extent to which firms draw deeply from the different external sources or source channels".* In this case, the variable measures in how many areas the collaboration between the KIBS and its external partners is extended (see Table 5). Whenever a KIBS firm confirmed that it was collaborating in one of these areas, the value "1" was assigned, "0" otherwise. This variable then assumes values ranging from "0", when the KIBS firm does not collaborate with external partners in these areas, to "4" when KIBS collaborates intensively.

  The focus of this variable is on the nature and content of a firm's relationship. Even in this case the measure has a theoretical relevance as an external search depth measure[176]. Despite the list of activities in which companies can operate as partners may not be fully comprehensive, it is broad enough to include all the most popular types of partnerships in the industry[177].
- External search size: this variable refers to the overall number of collaborators of the company. During the interview, companies were asked to indicate the number of collaborators in five geographical areas (Regional, National, EU, Continental, World). These data have then been summed and the value is normalized to a range from "0" to "1" (maximum collaboration level in the sample).

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[174] Laursen, K. and Salter, A. *Open for Innovation: the Role of Openness in Explaining Innovation Performance among UK Manufacturing Firms.* Cit.
[175] *Ibid.*
[176] *Ibid.*
[177] Love, J.H. and Mansury, M.A. *External Linkages, R&D and Innovation Performance in US Business Services.* Cit.

If the external search breadth variable captures the variety of partners in an enterprise, the external search size counts then the total number of relationships.

Variables	Scale and description	Questions
External search breadth	0-8 scale The variable counts how many different partners each KIBS has. 8 categories of partners are identified. Each category takes the value "1" when the KIBS firm answers affirmatively, "0" otherwise. The value of the variable is the sum of the affirmative answers given by the KIBS firm for each category.	Who are the main partners of your network? (Yes/No) - Consultants (Design, marketing and communication) - Consultants (ICT) - Engineering office, laboratories, test centers - Consultants (Professional services) - Government offices - University and other research institutes - Scientific parks - Others (Craftsmen, freelancer, accountants, lawyers..)
External search depth	0-4 scale The variable counts the areas of exchange with external partners. 4 areas are identified. Each area takes the value "1" when the KIBS firm answers affirmatively, "0" otherwise. The value of the variable is the sum of the affirmative answers given by the KIBS firm for each category.	Which type of collaborations do you have with external partners? (Yes/No) - Exchange of personnel - Sharing of technological solutions - Sharing of commercial solutions (clients, markets) - Creation of new products/processes
External search size	0-1 scale This variable counts the number of collaborators of the firm. In the questionnaire the respondent has to specify the number of collaboration in 5 geographical areas (Regional, National, EU, Continental, World). The sum of the 5 independent variables has been normalized in a range between 0 and 1 (maximum level of collaboration in the sample).	How many collaborators do you have at each level? (Indicate the number of collaborators) - Veneto - Italy (except Veneto) - EU (except Italy) - Europe (except EU) - World (except Europe)

Table 5 - Independent Variables, Questions and Scale

4.4 Qualitative Comparative Analysis

For this work, we decided to apply the Qualitative Comparative Analysis (QCA), an approach based on a configurational perspective.

Management research[178] has often recognized that organizational outcomes tend to depend on the alignment or conflict between interdependent attributes. From this awareness has been developed in the recent years a field of management research, named

[178] Siggelkow, N. (2002) *Evolution towards Fit.* Administrative Science Quarterly, vol. 47, pp. 125-159
Tushman, M.L. and O'Reilly, C.A. (2002). *Winning through Innovation: a Practical Guide to Organizational Change and Renewal.* Boston, MA: Harvard Business School Press

configurational theory. Indeed, building on the idea that an organization is a *"multidimensional constellation of conceptually distinct characteristics that commonly occur together"*[179], it claims that it should be studied as complex system, characterized by an assemblage or combination of parts, whose relations make them interdependent[180]. As a consequence, analyzing certain situations as if they were the result of distinct elements, acting in isolation, can lead to the risk of omitting or failing to capture important elements. The object of this work are the external relationships that KIBS built with different partners, which according to the available literature reviewed in the previous paragraphs, are an integral part of these firms. Their contribution to the ability of the focal firm to innovate or imitate is difficult to be evaluated using a simple correlation between search efforts, in terms of breadth and depth, and innovation output. For this reason, a configurational approach has been chosen. A configurational perspective, indeed, allows to recognize that causality is a complex issue, often characterized by three features:

- -Conjuction: the results rarely have a single cause, but they rather depend on the interdependence of different conditions. In the case of this study, this could be useful to analyze whether having different partners is enough to reach innovative output, or if deep relationships with them are needed too.
- Equifinality: more than one pathway can lead to a given outcome. For example, through this analysis we could understand if strategies based on high levels of breadth and low levels of depth can give the same results of strategies characterized by deep relations with a low variety of partners.
- Asymmetry: attributes that are recognized as causally related in one configuration may instead be unrelated or even inversely related in another case.[181]Through QCA we can then consider also situations where a certain attribute, like size for example, leads to negative results if combined with certain levels of depth, but leads to an opposite result when the rest of the configuration changes.

Configuration approaches are manifold, but the one used in this study is Ragin's Qualitative Comparative Analysis (QCA)[182]. This approach allows to *"conceptualize causal*

[179] Misangyi, V., Greckhamer, T., Furnari, S., Fiss, P.C., Crilly, D. and Aguilera, R. (2017). *Embracing Causal Complexity: the Emergence of a Neo-Configurational Perspective.* Journal of Management, vol. 43, n. 1, pp. 255-282

[180] Scott, W.R. (1988). *Organizations: Rational, Natural and Open Systems.* Peabody, MA: Price-Hall

[181] Meyer, A.D., Gaba, V. and Colwell, K.A. (2005). *Organizing Far from Equilibrium: Nonlinear Changes in Organizational Fields.* Organization Science, vol. 16, pp. 456-473

[182] Ragin, C.C. (1987). *The Comparative Method: Moving beyond Qualitative and Quantitative Strategies.* Berkeley: University of California Press.

attributes and outcomes of interest as sets and to examine relationships between attributes and outcomes through a set-theoretic analysis of subset relations"[183]*.* This is made possible by its use of the set-theoretic approach and of Boolean Algebra.

Management scholars, through this approach, are then able to identify how multiple causal attributes combine into distinct configurations to produce an outcome of interest (conjuction), assess whether multiple configurations are linked to the same outcome (equifinality) as well as the relative empirical importance of each configuration, and examine whether both the presence and the absence of attributes may be connected to the outcome (asymmetry)[184].

QCA was developed to face problems related to the study of comparative political science and sociological phenomena with sample sizes too small for regression techniques, but too large for systematic cross-case comparisons. For this reason, management research initially used QCA for macro-level analysis or as a supplement to conventional analytical techniques. Gradually, scholars moved to apply it as a standalone method focused on exploring causal complex relations. The QCA-inspired management studies today share a *"configurational way of thinking and theorizing about the complexity inherent in causation among management and organizational phenomena"*[185]*.*

4.4.1 QCA vs conventional correlation analysis

The basis of this configurational perspective differ from those of conventional linear regression approaches in how phenomena and causal relationships are conceptualized and analyzed.

QCA is based on the belief that organizations could be best understood from a systemic perspective and should be viewed as a constellation of interconnected elements[186]. This is what makes QCA particularly appropriate to the purpose of this analysis. It can in fact account for the complexity of interconnected elements that bring about outcomes jointly and synergistically, like external search breadth, depth and size.

Ragin, C.C. (2000). *Fuzzy-set Social Science.* Chicago, IL: University of Chicago Press
Ragin, C.C. (2008). *Redesigning Social Inquiry: Fuzzy Sets and Beyond.* Chicago, IL: University of Chicago Press.

[183]Misangyi, V. et al. *Embracing Causal Complexity: the Emergence of a Neo-Configurational Perspective.* Cit.

[184] *Ibid.*

[185] *Ibid.*

[186] Fiss. P.C., Marx, A. and Cambré, B. (2013). *Configurational Theory and Methods in Organizational Research: Introduction.* Research in the Sociology of Organizations, vol. 38, pp. 1-22

QCA has some main differences with traditional correlation analysis, that go beyond the mathematical tools at the basis (Boolean algebra versus linear algebra) that make it interesting.

First of all, it threats cases as set-theoretic configurations. In other words, cases are considered as combinations of theoretical attributes rather than a disaggregation of attributes that are analyzed in isolation from each other, as is done in conventional regression approaches[187]. Through the tools offered by Boolean Algebra, it enables researchers to consider all the three features of causal complexity: conjunction, equifinality and causal asymmetry. Indeed, the examination of conjunctural causation is enabled by the combinatorial logic of Boolean algebra, through the use of the operator *"and"* to capture the intersection of sets. Contrarily, linear regression models can capture conjunctural causation to a limited extent, through interaction effects. Nevertheless, the interpretation of interactions becomes challenging when more than two variables are considered. This approach may then allow us to understand which combinations of the variables considered bring the output of interest.

Likewise, the analysis of whether more causal recipe may lead to the same outcome (equifinality) is enabled by the operator *"or"*, which captures the union of set configurations. Contrarily, general linear regression models cannot uncover equifinality. This means that they cannot be easily used to understand if strategies characterized by different levels of breadth, depth and size can lead to the same outcome.

Finally, the assessment of possibility that the presence, as well as the absence, of any attribute may produce the same outcome, depending on the combination of the other attributes, is enabled by the operator *"not",* which indicates the absence of attributes. This is fundamentally different from linear regression, which do not consider asymmetry.

Another important characteristic that distinguishes QCA it is the use of calibration to measure cases' set membership in the attributes and outcomes of theoretical interest. Calibration should reflect meaningful standards (derived from the theory or other external knowledge) when possible, and captures variation directly relevant to the research question and the target set of cases. While uncalibrated measures (like those used in regression techniques) make it possible to know whether one case is relatively

[187] Ragin, C.C and Rubinson, C. (2009). *The Distinctiveness of Comparative Research.* In: The SAGE Handbook of Comparative Politics, pp. 13-34. London: SAGE Publications

higher or lower than another on a particular measure, it does not allow to interpret whether the variation on the measure is meaningful, as does calibration.

Measures in correlational approaches are constructed such that they vary around inductively derived central tendencies with no distinction as the whether the found variance corresponds to meaningful standards that distinguish differences in kind. This means that, if with traditional approaches we could determine if changes in the breadth level could make a firm more or less innovative, through QCA we can understand which configurations bring to high (or low) levels of innovation and imitation.

Calibration presents different challenges, among which we find the lack of theories to guide it. In these cases, researches have to rely only on substantive evidence turning, for example, to the study's sample, using then points from the cumulative data distribution function or from the frequency distribution.

Another main difference between linear regressions and QCA is how causal relationships are considered. in the first case it is considered as the covariation between independent and dependent variables. In QCA instead it is assessed through the necessity and/or sufficiency of attributes for outcomes of interest. QCA's approach enables to utilize two general analytical strategies to examine commonalities. One focus in on the necessity of the attribute(s) for observing the outcome i.e. the attribute must be present for the outcome to occur. While all the cases displaying the outcome would also display the attribute, not all the cases displaying the attribute must exhibit the outcome. The second focus is on the sufficiency of the attributes for the outcome: all cases possessing the attribute must experience the outcome, while there will likely be cases displaying the outcome but not the attribute. These concepts allow researchers to examine how multiple combinations of attributes may lead to the same outcome.

Finally, another important difference between linear regression models and QCA is how they deal with limited diversity. In the case of correlation-based approaches this problem is not considered, as they assume the homogeneity of population and sample. QCA instead considers the fact that the diversity of cases is limited *"by the attributes' tendency to fall into coherent patterns [...] because attributes are in fact interdependent and often can change only discretely or intemittently*[188]*",* and thus that sample and population could not present the same diversity. Despite thus, the logically possible combinations, which do

[188] Meyer, A.D., Tsui, A.S. and Hinings, C.R. (1993). *Configurational Approaches to Organizational Analysis.* Academy of Management Journal, vol. 36, pp. 1175-1195

not appear among the empirical cases (i.e. unobserved or counterfactual configurations), can inform researchers about the causal relations under study. Bringing the analysis to a more complex level, is then possible to examine the configurations that do not exist in the sample, through *"counterfactual analysis",* which is an evaluation of the outcome that an unobserved configuration would exhibit if it did exist. QCA uses then a Boolean chart, namely *"truth table"* to capture and examine all logically possible combinations of attributes, including those for which empirical evidence lacks.

4.5 Model and results

Being the analysis in question, focused on how search strategies impact the KIBS propensity to innovate and imitate, it was firts necessary to exclude those firms that have not provided complete information to all of these questions previously listed. From an analysis of other variable describing these firms and their activities I have not found a statistical difference between these observations. Surely, one of the limitation of this study is a deeper analysis of the missing value that could help to increase the robustness of the results.

After this step, the sample consists of the remaining 383 complete observations over the 512 of the full sample (corresponding to the 74.80%). It is still representative of the KIBS universe, as it contains 129 KIBS operating in the ICT (33.68%), 112 design and marketing firms (29.24%) and 142 professional services (37.08%), a composition which does not differ much from those of the full sample. Even with regard to the descriptive statistics, these vary only slightly in comparison with those of the full sample.

For each of the variables considered in the sample analysis, in Tab. 6 are presented the number of observations with valid answers, mean, standard deviation and minimum and maximum values taken from the variables. These descriptive statistics provide preliminary information about average levels and distribution of indicators within the sample.

Variable	Obs.	Mean	Sd	Min.	Max.
N. of Innovation	383	0.859	5.717	0	100
N. of Imitation	383	2.055	7.203	0	100
External search breadth	383	1.339	1.608	0	8
External search depth	383	1.188	1.233	0	4
External search size	383	0.016	0.060	0	1

Table 6- Descriptive statistics

As a first thing, we can see that there is a substantial difference between the average number of innovations and imitations introduced by KIBS companies in the sample. Imitations introduced in the time range going from 2006 to 2008 have in fact an average value that is more than double than that of innovations (2.055 imitations against 0.859 innovations). Hence, while companies claim to have introduced, on average, less than one *"new-to-the-industry*" innovation over the three years of reference, they report instead of having introduced, on average, more than two *"new-to-the-firm"* innovations (thus considered imitations) in the same span of time.

We can therefore deduce that, in accordance with what is claimed by the literature[189], even in our sample the imitative activity is more widespread than the innovative one.

Moving to the analysis of the independent variables, which are the indicators related to the external search, as a first thing we can notice that the external search breadth is quite low, compared to the one found by Laursen and Salter (2006) in their work (1.339 against 7.22). This situation could be explained by the limited dimension of these firms. As explained in chapter 2, the majority of KIBS firms in Italy is composed by micro-firms. This evidence is confirmed not only by our sample, where the KIBS interviewed reported to have, on average, 7 employees, but also by the work of Corrocher et al. (2008), based on a sample of KIBS coming from the Lombardy region, composed for the 93.4% by firms with less of 10 employees. Being that small, managing an increasing number of collaborators could be problematic for them. The same reason could explain why they present a limited external search size too (an average of 0.016, over a maximum of 1).

On the contrary, external search depth is higher in proportion: in fact, on a scale from "0" to "4" indicating different levels of collaboration, on average the KIBS in the sample claim to perform at least one of the activities indicated with their partners (1.188). KIBS firms seem then to prefer to maintain a limited number of relations with partners belonging to just few domains, but to share at least one activity with them.

These characteristic make the analysis of external search strategies even more interesting, in order to understand whether differences in breadth, depth and size influence the innovative or imitative outcome and how.

The choice of different knowledge sources and external search strategies by an enterprise

[189] Levitt, T. *Innovative Imitation.* Cit,
Shenkar, O. *Copycats – How Smart Companies Use Imitation to Gain a Strategic Edge.* Cit.

is partially influenced by the external environment, and, in particular, by the availability of technological opportunities and the level of turbulence in the environment[190].

But despite the importance of these environmental factors, the search activities of different companies in an industry are subject to a certain variety, depending on the different managerial choices of the present and the past[191]. The search strategies of each company have roots in past experiences and future managers expectations, so it is difficult for companies to determine the optimum search strategy in terms of breadth and depth. Considering each search channel as a single entity, which includes various institutional norms, habits and rules, it becomes clear that they need different organizational practices to make the actual search process effective. Companies must therefore invest time and resources to learn how to deal with a single partner, to develop a shared language and a shared knowledge base, to understand partners' habits and routines. For this reason, we can hypothesize that KIBS companies prefer to concentrate their resources and efforts on a small number of partners, to avoid *"over-search"*[192] phenomena.

Considering the same statistics sorted by the type of KIBS (ICT, design and professional services), we can notice that the situation changes.

Variable	Obs.	Mean	Sd	Min.	Max.
N. of Innovation	129	0.457	2.143	0	20
N. of Imitation	129	1.512	3.927	0	32
External search breadth	129	1.031	1.441	0	7
External search depth	129	1.240	1.351	0	4
External search size	129	0.007	0.012	0	0.068

Table 7- Descriptive statistics ICT KIBS

Variable	Obs.	Mean	Sd	Min.	Max.
N. of Innovation	112	0.170	0.613	0	4
N. of Imitation	112	2.339	10.257	0	100
External search breadth	112	1.241	1.337	0	7
External search depth	112	1.134	1.086	0	4
External search size	112	0.009	0.013	0	0.082

Table 8- Descriptive statistics Design KIBS

Variable	Obs.	Mean	Sd	Min.	Max.
N. of Innovation	142	1.768	9.095	0	100
N. of Imitation	142	2.324	6.583	0	50
External search breadth	142	1.697	1.868	0	8
External search depth	142	1.183	1.235	0	4
External search size	142	0.029	0.096	0	1

[190] Cohen, W.M. and Levinthal, D.A. *Absorptive Capacity: a New Perspective on Learning and Innovation.* Cit.
[191] Laursen, K. and Salter, A. *Open for Innovation: the Role of Openness in Explaining Innovation Performance among UK Manufacturing Firms.* Cit.
[192] *Ibid.*

Table 9 - Descriptive statistics PFs KIBS

As reported in Tab. 7, ICT firms present external search breadth and size values below the average of the sample (1.031 and 0.007), while the external search depth value is slightly higher (1.240). The dependent variables, however, are significantly lower than those of the sample: the innovations introduced in the three years of the analysis are in fact, on average, 0.45 (against 0.859 of the sample), while imitations stop at 1.5.

Even in the case of design and marketing companies (Tab. 8), the indicators for the external search strategy, are lower than the average of the sample (external search breadth, depth and size are respectively equal to 1.241, 1.134 and 0.009). In this case, while the number of imitations remains similar to the one of the sample (2.339), the number of *"new-to-the-industry"* innovations, introduced in the three years analyzed, drops dramatically to 0.17.

The situation changes, however, considering only companies offering professional services (Tab. 9). Indeed, these firms, even presenting independent variables values equal to, or above, the average values of the whole sample (respectively 1.697, 1.183 and 0.029), show an average number of *"new-to-the-industry"* innovation which is twice the one of the sample (1.768 against 0.859). The number of imitations instead is just slightly above the sample average (1.768). They are then the most innovative kind of KIBS in this sample.

To evaluate how different external search strategies affect the output, that is, the number of innovation or imitation introduced, we then started with the *"fuzzy-set"* analysis.

While originally QCA utilized a *"crisp-set"* approach[193] (known also as csQCA), it has now evolved to enable the use of *"fuzzy"* sets, which instead of allowing only two mutually exclusive states (full membership and full non-membership), incorporates degrees of membership, permitting membership scores in the interval between "0" and "1"[194]. By assessing the degree of membership, it now provides the precision of measurement valued by quantitative researchers.

This kind of Qualitative Comparative Analysis, through the use of truth tables, allows to see all the selected attribute configurations present in the sample, and their outcome.

As a first step in the analysis, it was necessary to decide what measures to calibrate and how. For each variable, was needed to decide which values to use as full membership

[193] Ragin, C.C. *The Comparative Method: Moving beyond Qualitative and Quantitative Strategies.* Cit.
[194] Ragin, C.C. *Fuzzy-set Social Science.* Cit.
Ragin, C.C. *Redesigning Social Inquiry: Fuzzy Sets and Beyond.* Cit.

threshold (fuzzy score = 0.95), full non-membership (fuzzy score = 0.05) and crossover point (fuzzy score = 0.5). These three benchmarks are used to transform the initial variable into fuzzy membership scores.

For the dependent variables, having no theoretical basis on which to define the values needed for the thresholds, the choice was based on the actual distribution of the variables in the full sample (512 observations), as suggested by the literature[195]. The distributions of the variables is presented in Table 1'. The number of missing present in the sample explains the differences in the number of observations for each variable. For both the dependent variables, the respective 5th, 50th and 95th percentiles were then chosen, which correspond to "0", "0" and "3" for innovation, while "0", "0" and "9" for imitation.

	N. of Innovations	**N. of Imitations**	**External Search Size**
Obs.	402	392	506
Mean	0.871	2.110	0.020
5th percentile	0	0	0
10th percentile	0	0	0
25th percentile	0	0	0
50th percentile	0	0	0.0068
75th percentile	0	2	0.0170
90th percentile	2	4	0.0340
95th percentile	3	9	0.0544
99th percentile	20	32	0.2721

Table 10 - Percentiles

As we can see from Table 10, just a small part of the sample presents values above "0" for imitation and an even smaller part for innovation. As a confirm of the low levels of innovativeness, we can see also that even if the "*N. of Innovations"* and "*N. of Imitations"* variables can take values between 0 and 100, the 95th percentile of their distribution corresponds to "3" in the case of innovation and to "9" in the case of imitation.

The same reasoning has also been applied to the independent variable for the external search size, which can already take values included between "0" and "1". This has been then calibrated using the values for 5th, 50th, and 95th percentile of its distribution, i.e. "0", "0.0068" and "0.0544".

[195] Misangyi, V. et al. *Embracing Causal Complexity: the Emergence of a Neo-Configurational Perspective.* Cit.

For what concerns the dependent variables related to the external search breadth and depth, it was decided not to proceed with calibration, but to maintain a division into classes. In this way, it was possible to maintain a greater variety and to get more attribute combinations. Moreover, maintaining the values expressed in classes, the interpretation of the truth tables results clearer.

The external search breadth variable, which can assume integer values between "0" and "8", was then recoded into five classes, representing the various breadth levels. It assumes the value "0" for non-existent breadth, "1" for low breadth (equal to "1" or "2"), "2" for medium-low breadth (equal to "3" or "4"), "3" for medium-high breadth (equal to "5" or "6"), and "4" for high breadth levels (equal to "7" or "8").

This step has been necessary in order to reduce the number of possible combinations of attributes, which otherwise would have grown exponentially, compromising the interpretation of the results.

The variable related to the exterior search depth instead, being already subdivided into five intensity classes, has not been recoded to maintain a good level of variety.

Two truth tables have then been created, using first the number of innovations as an outcome, and then the number of imitations. Truth tables allow to reconstruct the data as a matrix. Each logical combination of values on the independent variables is represented as one row of the truth table. Once this part of the truth table is created, each row is assigned an output value (which could be “1” or “0” on the dependent variable), based on the scores of the cases which share that combination of input values. Truth tables have as many rows as there are logically possible combinations of values on the causal variables.

To distinguish configurations that are subset of the outcome from those that are not, the determinant is made by using the measure of set theoretic consistency. In order to find a consistency threshold is often useful to identify any gaps in the range of consistency. Each configuration whose consistency level meets the consistency thresholds gets a “1” in the outcome column, “0” otherwise.

According to Ragin, values below 0.75 indicate substantial inconsistency[196]. After having observed the consistency scores in the sample and having analyzed any gaps, it was

[196] Ragin, C.C. (2008). *User’s Guide to Fuzzy-Set/Qualitative Comparative Analysis.* Available at: 0.842http://www.u.arizona.edu/~cragin/fsQCA/download/fsQCAManual.pdf [Last Accessed: 11 Aug. 2017]

decided to use as 0.85 coefficient of consistency, to ensure greater level of consistency than the minimum suggested.

The two truth tables have then been graphically re-elaborated, in order to guarantee and easier interpretation.

Every column of Tab. 11 and Tab. 12 represents then one of the configurations of attributes present in the sample (24 over the 50 possible combinations). Each attribute characterizing the configuration is indicated with a black dot (presence/high levels of the attribute) or a white dot (absence/low levels of the attribute). For each configuration are then indicated the number of observations and the relative inclusion score. Configurations, both in the case of imitation and innovation, are ordered from the ones presenting the highest inclusion scores to the lowest. Those presenting an outcome equal to "1" in the original truth tables (and thus presenting an inclusion score equal or above 0.85), have been indicated with a "*" and highlighted as high innovators or imitators.

As a first thing, we can see that a substantial part of the sample is represented by configuration n. 1. 150 of the KIBS analyzed (almost 39% of the sample) therefore does not have external relationships with different partners, like consultants, laboratories or government offices. This confirms what has already been suggested by looking at the descriptive statistics: KIBS in this sample show low levels of openness to external collaborations and tend to not have partners to share different types of activities. The output of this configuration consists in low performance levels for both innovations and imitations over the three years of the analysis. This result confirms what is claimed in the literature: the level of openness of an organization has a positive influence on the accumulation of knowledge needed to fuel both innovative and imitative activities and their performance[197].

We can also notice that in the sample are not present configurations with an inexistent level of breadth but with depth's and size's values equal or higher than "1". This obviously depends on the fact that to have a relation with a partner is first necessary to have at least a partner. All the configurations of attributes with these characteristics are then logically excluded by the two truth tables, as not even one firm presents these conditions.

After having dedicated some space to the analysis of the configurations excluded by this work, we can now move to the next step of this analysis.

[197] Chesbrough, H. *Open Service Innovation. Rethinking Your Business to Grow and to Compete in a New Era.* Cit.

By comparing the configurations that lead to the two different outputs, we can notice that the ones that lead to high levels of *"new-to-the-industry"* innovations are numerically inferior to those that lead to high levels of *"new-to-the-firm"* innovations (that is, imitation).

In fact, the number of companies present in innovative outcome configurations is 53 (13.84% of the sample), while those with imitative results are 144 (37.60% of the sample). The firms belonging to the first group, for the purpose of this work, will now on be named *"high innovators"* (compared to those indicated in the original truth tables with a "0" on the outcome column). According to the same criteria, firms belonging to the second group will be called *"high imitators".*

Again, we can confirm what has already been found analyzing descriptive statistics: imitation is a much wider phenomenon of innovation, which can be achieved by following different strategies. It is also interesting to note that the results are partially overlapping: all seven innovative configurations can also have imitative outputs. Conversely, of the twelve imitative configurations, five lead only to the imitation output.

By analyzing the configurations that bring to high levels of the two output of interest, we can see that they can be subdivided into three macro groups, to ease their analysis.

The first group consists in those configurations presenting low levels of external search breadth (value equal to "1" in the tables).

In the case of innovation, the configurations characterized simultaneously by low levels of external search breadth and depth, do not lead to the output of interest. Configurations number 15, 16, 17 and 19 (for a total of 48 KIBS), instead, presented as highly innovative configurations, are characterized by a low level of breadth (corresponding to the presence of partners falling within one or two of the areas described above), but also by intermediate or high levels of depth.

In three of the four configurations involved, the level of external search size is low, generally lower than the median of the sample used as a crossover point. As the external search size is the sum of the collaborators of an enterprise while the external search breadth consists in the number of categories of collaborators with which the enterprise has contacts in its network, a high breadth always implies a high number of collaborators (but not the opposite). Conversely, a low breadth does not necessarily imply a low number of collaborators.

Looking at the truth table concerning the output *"N. of Imitations"*, we can note first that this group coincides partially with that of the output *"N. of Innovations",* as three more configurations are added to the ones of the previous case (number 14, 18 and 20), for a total of 131 KIBS. Contrarily to what was happening for innovation, this group now presents all the depth levels used in the sample, even the low ones. External search size does no longer seem to be a discriminant: each combination of attributes is present, both with the attribute related to the exterior search size of "0" or "1". The only exception is the case where very low levels of both breadth and depth are simultaneously present (configuration number 14).

The second group found in these truth tables is instead formed by those configurations based on medium levels of external search breadth (value equal to "2"). In the case of the output *"N. of Innovations",* the group is made up only of configuration number 27 (2 KIBS). This is the only configuration, which leads to *"new-to-the-industry"* innovations, characterized by an intermediate level of breadth (i.e. with collaborators belonging to three or four of the categories indicated in the questionnaire). It presents at the same time a medium to high level of depth (equal to "3"). It is interesting to note that even in this case the value of the variable related to the exterior search size is low.

The same group in the case of the imitative output, is now more numerous (9 firms against 2), compared to the one already present in the case of the *"N. of Innovations*" output. In fact, configuration n. 30 has been added and presents both a high external search depth and size. Hence, even in this case, the configurations having a positive outcome are characterized by medium-to-high or high levels of external search depth and again, we notice that no configuration with low levels of external search depth has led to the outcome of interest.

Output	HIGH INNOVATION PERFORMANCE							LOW INNOVATION PERFORMANCE																
Conf.	50*	38*	15*	17*	27*	19*	16*	44	14	34	18	25	13	23	20	30	33	36	28	24	26	46	1	40
External search breadth (=4)	●	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○
External search breadth (=3)	○	●	○	○	○	○	○	○	○	●	○	○	○	○	○	○	●	●	○	○	○	○	○	●
External search breadth (=2)	○	○	○	○	●	○	○	○	○	○	○	●	○	●	○	●	○	○	●	●	●	○	○	○
External search breadth (=1)	○	○	●	●	○	●	●	○	●	○	●	○	●	○	●	○	○	○	○	○	○	○	○	○
External search breadth (=0)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○
External search depth (=4)	●	○	○	○	○	●	○	○	○	○	○	○	○	○	●	●	○	○	○	○	○	○	○	●
External search depth (=3)	○	●	○	●	●	○	○	○	○	○	●	○	○	○	○	○	○	○	●	○	○	○	○	○
External search depth (=2)	○	○	●	○	○	○	●	○	○	○	○	●	○	○	○	○	○	●	○	○	●	●	○	○
External search depth (=1)	○	○	○	○	○	○	○	●	●	●	○	○	●	●	○	○	●	○	○	●	○	○	○	○
External search depth (=0)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○
External search size	●	●	○	○	○	○	●	●	●	●	●	○	○	○	●	●	○	●	●	●	●	●	○	●
N.	1	2	5	6	2	2	35	3	50	6	23	3	25	3	10	7	2	4	12	11	18	1	150	2
Incl.	1.000	0.962	0.901	0.880	0.880	0.868	0.850	0.843	0.842	0.833	0.827	0.825	0.807	0.799	0.796	0.794	0.792	0.773	0.746	0.735	0.723	0.715	0.564	0.500

Table 11 – Elaboration of the Innovation Truthtable

Output	HIGH IMITATION PERFORMANCE												LOW IMITATION PERFORMANCE											
Conf.	50*	46*	38*	15*	30*	14*	17*	16*	19*	20*	18*	27*	44	25	36	34	13	23	33	28	24	26	40	1
External search breadth (=4)	●	●	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○
External search breadth (=3)	○	○	●	○	○	○	○	○	○	○	○	○	○	○	●	●	○	○	●	○	○	○	●	○
External search breadth (=2)	○	○	○	○	●	○	○	○	○	○	○	●	○	●	○	○	○	●	○	●	●	●	○	○
External search breadth (=1)	○	○	○	●	○	●	●	●	●	●	●	○	○	○	○	○	●	○	○	○	○	○	○	○
External search breadth (=0)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
External search depth (=4)	●	○	○	○	●	○	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	●	○
External search depth (=3)	○	○	●	○	○	○	●	○	○	○	●	●	○	○	○	○	○	○	○	●	○	○	○	○
External search depth (=2)	○	●	○	●	○	○	○	●	○	○	○	○	○	●	●	○	○	○	○	○	○	●	○	○
External search depth (=1)	○	○	○	○	○	●	○	○	○	○	○	○	●	○	○	●	●	●	●	○	●	○	○	○
External search depth (=0)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
External search size	●	●	●	○	●	●	○	●	○	●	●	○	●	○	●	●	○	○	○	●	●	●	●	○
N.	1	1	2	5	7	50	6	35	2	10	23	2	3	3	4	6	25	3	2	12	11	18	2	150
Incl.	1	1	0,962	0,915	0,898	0,891	0,891	0,884	0,868	0,867	0,857	0,854	0,843	0,837	0,834	0,806	0,804	0,799	0,792	0,752	0,737	0,732	0,729	0,59

Table 12 – Elaboration of the Imitation Truthtable

Finally, the last group is characterized by medium-to-high and high levels of external search breadth (equal to "3" or "4" in the truth tables). In the case of the output *"N. of Innovations"*, this group consists of configurations 38 and 50 (for a total of 3 KIBS). These are the most complex situations characterized both by medium-high or high breadth and depth levels. Configuration number 50 in particular, with a value of "4" for either the external search breadth or depth, represents the highest level of openness to external relationships present in the sample.

In the case of the imitative outcome instead, this group includes three configurations: the number 38 and 50, already present in the case of innovation, and number 46, exclusive of imitation (for a total of 4 KIBS). Again, the additional configuration has a depth lower than the other configurations, but not low.

Considering the external search size in particular, this is always high in these groups. Unfortunately, beyond certain levels of breadth, this cannot be a discriminating factor, as a high level of breadth always implies a high number of collaborators.

4.6 Discussion

After having observed the QCA results, we can now go on trying to give them meaning, analyzing the behavior of the three groups in the light of the literature discussed in the previous chapters.

Starting from the first group, we can see that, in the case of innovation, it includes configurations characterized by low external search breadth and intermediate or high external search depth levels. The external search size instead, in all cases except one, is low. We can thus hypothesize that KIBS firms included in this group are companies that have a limited number of partners, but which also achieve high levels of collaboration with them.

As suggested by the review of the available literature, to have an efficient and advantageous exchange of information and knowledge, there is a need for a relationship based on mutual trust, a shared knowledge base and a common language. To achieve these essential elements, companies must invest time and resources. The strength of a tie can then be considered as a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie[198].

[198] Granovetter, M.S. (1973). *The Strength of Weak Ties.* American Journal of Sociology, vol. 78, Iss. 6, pp. 1360-1380

At the same time, it is necessary for KIBS to find the right balance between external search depth and breadth, to avoid over-searching and resource waste situations[199]. Firms may then decide to concentrate their resources on a limited number of ties, building strong relations from which they can draw on information intensively.

By observing this group in the light of available literature, we can hypothesize also an alternative scenario. Burt (1992) in his work argues that businesses should design their network to maximize *"structural holes"* among the actors involved and selecting collaborators with many other partners[200]. In this way, through a single direct tie, the enterprise can connect with a multitude of other actors through its partner, and develop indirect ties with them.

An interfirm tie can then become a communication channel between a KIBS and many other indirect partners. Each partner in fact brings in the relationship with the focal firm his knowledge and experiences from the interactions he has with his other partners. The firm's links give it access not only to the knowledge held by its partners but also to the one held by its partner's partners[201]. Each additional actor that the company achieves, through direct and indirect ties, represents a source of information, which fuels the network's information-gathering device function.[202]

The degree to which an enterprise benefits from its indirect ties depends on how many direct relationships it has: usually the benefits are greater for businesses with few direct ties. This happens primarily because the benefits of additional knowledge are greater for those companies that have scarce external sources. Secondly, companies with many direct relationships may find limitations in the use of information coming from their indirect ties, since when a company has numerous connections, the information that reaches it through its network often also reaches many others. The latter can represent potential competitors for the company.

According to the *"structural holes"* theory, ties are redundant when connecting the same actors. Structural holes are instead situations in which two actors are connected to the same focal firm but are not linked to each other and therefore represent a gap in

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[199] Laursen, K. and Salter, A. *Open for Innovation: the Role of Openness in Explaining Innovation Performance among UK Manufacturing Firms.* Cit.

[200] Burt, R.S. (1992). *Structural Holes: the Social Structure of Competition.* Cambridge, MA: Harvard University Press

[201] Gulati, R. and Garguilo, M. (1999). *Where Do Networks Come From?* American Journal of Sociology, vol. 104, pp. 1439-1493

[202] Freeman, C. (1991). *Networks of Innovation: a Synthesis of Research Issues.* Research Policy, vol. 20, pp. 499-514

information flows. Actors on both sides of the gap have access to different information pools. To have a network full of structural holes means then to have access to mutually unconnected partners, and consequently to different information flows. Maximizing these gaps can reduce redundancy in relationships and build an efficient, information-rich network[203].

Literature, however, has not found an agreement yet on this theory, as it contrasts with all that has been said about the benefits of deep relations and densely tied networks. The benefits of resource-sharing come from firms willing to share their knowledge and skills and lead joint-project to achieve economies of scale. All of this presumes the existence of trust relationships, shared norms of behaviors, knowledge and combined skills. Other studies indeed found that a high number of structural holes in a network hinders firms' innovative capabilities[204].

Both the *"structural holes"* theory and the *"over-search"* one explain the low number of collaborators and justify the innovative output, thanks to a greater variety of information or to a relatively lower complexity and higher efficiency. Unfortunately, we cannot know who are the partners of the firms in this group and the number of indirect ties they have. It is therefore difficult to confirm which one of the two theories better explains the situation.

Looking at the tables from the point of view of imitation instead, the number of available configurations is higher. At the same time, the configurations under analysis now present all the possible levels of external search depth, with the only exclusion of "0".

We can therefore deduce that while for innovation it was necessary for partners to have at least medium-intensity relations, in the case of imitation, the exchange of information and knowledge may also occur in more superficial relationships. This may be related to the greater complexity that companies face in intoducing with *"new-to-industry"* innovations, which require to the whole industry to deal with a new set of knowledge and capabilities. In the case of *"new-to-the-firm"* innovations, the lower complexity allows KIBS to maintain a more extensive web of relationships without incurring the risk of over-searching. This lower complexity affects also the level of search depth needed to obtain the outcome of interest. We can then notice that, while for innovation KIBS need to build

[203] Burt, R.S. *Structural Holes: the Social Structure of Competition.* Cambridge, Cit.
[204] Ahuja, G. *Collaboration Networks, Structural Holes, and Innovation: a Longitudinal Study.* Cit.

deep relationships with their partners, for imitation lower levels of interaction are enough.

It is important to note that in cases where the external search breadth is low, but not the external search size, we are dealing with situations where the KIBS in question has different partners within the same field. In these situations, the effort and resources needed to undertake a new relationship are lower than those needed the first time. Although the two partners must establish mutual trust, the KIBS firm has already developed at least a basic knowledge in the field, which facilitates not only the relationship in which it was acquired, but also the others in the same field.

In the end, we can deduce that introducing an imitation, or something already known in the market, requires to KIBS to exploit different relationships, more or less intense, with their sources, but its lower complexity allows to still manage and exploit the amount of information and capabilities resulting from them, without incurring in efficiency loss.

In the second group, the one characterized by an intermediate level of external search breadth, it is interesting to note that, in the case of innovation, only one configuration with an intermediate breadth level gives the output in question.

Innovative companies in this configuration collaborate with three or four different types of partners, with which they pursue several activities. In this case, the analysis of the configurations that do not lead to the innovative outcome could be more interesting. In fact, these are characterized mainly by low depth levels. We can then assume that these configurations could be facing over-searching phenomena. They could be in a situation in which the complexity brought by an increase in the number of partners does not allow them to manage efficiently these relationships and the relative information flow. Co-working with actors from different fields, with different backgrounds and engaged in various activities, entails growing complexity, which can be difficult to handle. For this reason, the efforts devoted to innovative activities may be wasted or, in any case, not lead to the hoped-for results.

This hypothesis can be confirmed and deepened by comparing the results obtained with the descriptive statistics. On average, companies in the sample have a breadth of 1,339, which is included in the first class. We can therefore assume that moving to a higher level of breadth (equal to or greater than 2, and then to partners belonging to 3 or 4 domains) implies a level of complexity that makes managing these relationships difficult for usually

small businesses. The KIBS in the sample used in fact presents an average number of 7 employees.

Companies that fall into configuration 27 are those that have therefore learned to manage for innovation a larger number of collaborators with which they have been able to build non-superficial relationships.

Evidence coming from the truth table about imitation support this theory: even in this case, firms with low depth levels are not able to reach the outcome of interest. This reconfirms the theory that KIBS companies, who claim to collaborate with partners from three or four different domains are not always able to cope with the resulting complexity. The output of interest is instead reached by those companies able to build relations implying the sharing of resources, information and processes.

Finally, in the third group, we can find those companies presenting high levels of both breadth and depth. These firms could be defined as *"expert collaborators"*, as they proved to be able to maintain complex relationships with several different actors, from which they are able to draw the knowledge they need to innovate.

What unites all these different realities is the fact that they present medium-to-high depth levels. From this, we can suppose that in order to introduce *"new-to-the-industry"* innovations, it is necessary for them to draw from their own external knowledge sources consistently.

In the case of imitation the situation instead is slightly different. The configuration that is added to those present for innovation, presents a difference with them: an intermediate depth level, which implies not so close relationships with the collaborators.

We can then deduce again that while to get both *"new-to-the-industry"* innovations, it is necessary to have very close relationships with all the benefits that come from it, for *"new-to-the-firm"* innovations, more superficial relationships are enough, when they are accompanied by a variety of different partners.

In the end, we may assume that, while for innovation deep relationships are needed in order to reach the desired outcome, in the case of imitation, in some circumstances, having weak relationships with partners may be sufficient to introduce innovations not yet present in the company but already known in the market.

This hypothesis is confirmed by empirical evidence both in the first group and in the third. In both cases, imitative combinations have lower depth levels than their innovative counterparts.

The second group instead presents a more complex situation: here, the exclusively imitative configuration has a higher depth level.

4.7 Case studies

The final step of this work is a more in-depth analysis of three business realities, one for each of the three different groups identified during the Qualitative Comparative Analysis. These cases are the result of the integration of data collected during the questionnaire with the information available on the company website and other online sources.

Of the selected companies, two belong to the ICT sector, while one is a Professional Firm. These firms have been chosen for two different reasons: they are part of those configurations that present both innovative and imitative output and they are considered particularly interesting.

For the first group, Dacos S.r.l, an ICT company with several years of experience has been selected. The peculiarity of this enterprise is the fact that it is located in the Technological Science Park of Venice, and therefore operates in an environment specifically designed to foster contacts and synergies.

For the second group, Smart Parking Systems S.r.l. was chosen. This company instead, at the time of the questionnaire, had been operating in ICT for only a few years. At the time, it did not yet have an extensive network of partners, but it was itself the result of a close collaboration between two well-established companies.

Finally, for the third group, Bep S.r.l. has been selected. This company is a Professional Firm that, since 1999, works with the aim of guiding the innovative processes of its customers. It has been chosen not only for its very high levels of breadth and depth, but also for its explicit projection towards open innovation.

4.7.1 Case 1: Dacos S.r.l.

For the first group of high innovators and/or imitators, those presenting low levels of external search breadth, has been chosen a company based in Venice, which has been in the IT field since 1982 and in the ICT since 1997. Born as a software house, today it offers integrated solutions for both software and hardware.

Dacos S.r.l. offers then both products and services to its customers. In its product portfolio offers customizable, modular and flexible management software, web interfaces for complete document management, and alternative storage software for tax purposes.

As far as services are concerned, it offers itself as a consultant in several areas: management, IT security, system assistance and financial services. Each of these areas includes various activities, ranging from telephone and remote assistance to staff training. Finally, this KIBS also offers design, implementation, maintenance and management of complex IP networks.

Dacos S.r.l. today presents itself as an actor able to offer innovative solutions tailored to its customers, starting from a careful analysis of their needs, and then partnering with them in the project concretization. The results of these collaborations are not only evolved software, but integrated systems for improving the efficiency of their clients' management processes.

At the time the questionnaire was submitted, the 14% of the staff consisted in young people under the age of 30, 28% of people under the age of 40, and finally, the 58% had 40 years or more. In total, 15% of the staff had a Master's Degree, while the remaining were in possession of a high school diploma.

In answering the questionnaire, this KIBS defined itself as part of a network of companies operating in the same sector but with complementary specialties. It had relations with ten consultants in the sector of ICT, design and communication, located mainly in Veneto. It presented then an external search breadth level of "1", for the purpose of this analysis (corresponding to collaborations with partners belonging to one or two domains), and a high level of external search size. With these partners, Dacos S.r.l. was engaged in new products co-development and activities of commercial information exchange. Its external search depth value was then "2".

As a result, the company claims to have introduced, during the three-year period (2006-2008), two *"new-to-the-firm"* process innovations and two *"new-to-the-industry"* process innovations.

A practical example of the results of these collaborations can be found in one of the products offered by the company to its customers: customized apps. To offer them, this KIBS collaborates with Japp S.r.l., a company from Reggio Emilia specialized in the realization and distribution of mobile applications for the business world. This second company, as its core activity, offers a wide range of applications, from those designed to simplify the work of the company, such as catalog or showcase apps, to application dedicated to the end-users download, which allow the company to send direct notifications and messages.

As the world of mobile application is newly developed and constantly evolving, it is understandable that even an expert company, with years of experience in the ICT industry has decided to rely on a specialized external partner to develop this part of the business. This is coherent with what has been stated in the previous chapters about KIBS: collaborations are a fundamental source to obtain the knowledge that for different reasons, like the lack of resources due to their small dimension or economies of specialization, they do not develop internally.

Another peculiar element of this company is the fact that it is located in the Technological Science Park of Venice, one of the most important at the national level. This park, called Vega, is an important node in the network involving universities, research centers and the regional manufacturing sector.

Vega's goal is not only to promote and develop scientific research initiatives, but also to facilitate the transfer of knowledge and encourage the technological growth and competitiveness of the firms it supports. It therefore offers several services to the hosted companies, such as co-working spaces, to facilitate relationships and support their innovative development. In addition, there is an incubator dedicated to start-ups in the ICT, Digital Manufacturing and Green sectors.

It is therefore a fundamental meeting point for the realities operating in the Veneto region, where not only knowledge and experiences meet and contaminate each others, but they also feed the innovative capabilities of individual businesses.

Through the Vega science park, companies can then get in touch with different realities.

It can thus be the central junction in a network of different actors, through which companies can develop indirect ties among each others.

The importance of indirect ties is represented by the information advantages they offer. Firms that develop direct ties with other companies already engaged in relationships with other external partners, are in turn linked to the latter through indirect links. They do not therefore relate directly to a multitude of partners, but can still benefit from knowledge leakages. In cases like the one in the example, the benefits are even more evident, as through the Science Park companies can come into contact with other firms, institutions, universities and research centers. The range of actors that can be reached is therefore very wide. Managing the complexity resulting from so many relationships with different actors would require a tremendous effort that many businesses are not able to handle.

On the contrary, companies hosted or incubated in realities like the Vega Science Park, can benefit from many of the advantages of having multiple partners, but avoiding the relative drawbacks. This one in particular, has been able to achieve both innovative and imitative outcomes.

4.7.2 Case 2: Smart Parking Systems S.r.l.

Among the companies belonging to the second group, we have Smart Parking Systems S.r.l., a KIBS that deals with surface parking through a computer software and aims to create a technology capable of transforming the management of public spaces in a resource for the Public Administration and the citizen.

It was born in 2002 in Verona, as a result of the collaboration between Intercomp S.p.a., an electronic boards and personal computer manufacturer and Vehicle Sense, an American company. The collaboration between these two realities lead to the patent for the first smart parking system in the world.

The project now lives its own life, as a company separated from the founding firm. Intercomp S.p.a. in fact continues to deal with the production of branded hardware solutions for industrial automation, computerization of hospital lanes, digital signage and information technologies for the office.

The system offered by this KIBS is based on the installation of sensors underneath the road surface, which allow the detection of the presence of cars parked in the car seats. These sensors communicate with a central server, where a software handles not only payment transactions, but also processes and analyzes in real time all the inputs related to the stalls. The processed information are then made available to the interested parties. These could be parking stewards, who will have information about, for example, out-of-date car parks, users, who through a dedicated application will be able to pay their stops and see the available spaces directly from their smartphones, and finally Public Administrations, who will have the opportunity to take advantage of this vast amount of detailed information for the development of mobility policies.

At the time of the study, this company was registered as part of the "ICT" category.

In the questionnaire, the network in which this KIBS operated was defined as a network made up of companies working in the same sector but with complementary specializations. Consistent with its activities, the firm indeed stated that it had relationships with specialized consultants in ICT, technical studies and public bodies, thus

presenting a level of external search breadth equal to "2". With these collaborators, the company exchanged technological and commercial information and was engaged in joint product creation activities (external search depth value equal to “3”).
As a result of these collaborations, the company confirms that it has developed one *“new-to-the-firm”* product innovation and one *"new-to-the-industry"* product innovation over the three years considered.
This system, originally implemented in Veneto in the areas of Villafranca, Chioggia and Treviso, has been exported all over the world, reaching even some areas of Sao Paulo (Brazil), New Jersey (USA), Geel (Belgium) and many more.
Thus, over the years, this company has been able to collaborate with many Italian and foreign companies and institutions. Each collaboration is a learning opportunity for KIBS, useful to assimilate new knowledge that, combined with the existing one, will generate new knowledge that will be used in future projects.
An interesting element of this case is the fact that it had initially few collaborators, but it was actually the result of the collaboration between an Italian company specialized in technological hardware and an American producer of real-time parking information systems.
Intercomp S.p.a. in fact, was born in 1983 and since then is committed to the creation and development of hardware technologies, even tailor-made. It offers its customers industrial automation tools (such as PC panels), office equipment (such as PCs and other customized tools), digital signage (such as multimedia tables, totems or interactive kiosks) and much more.
From this we can deduce that the company, through the initial collaboration with its American partner, has assimilated all the knowledge and skills necessary to develop the Smart Parking System project, integrating them with the advanced technical skills already present in the founding company itself. Collaboration with different territorial realities have then allowed to further develop the knowledge base of this KIBS, enabling it to reach even very complex realities.

4.7.3 Case 3: Bep S.r.l.

Among the companies belonging to the third group, both in terms of innovation and imitation, we find Bep S.r.l. This company, born in 1999 and operating in Padua, offers

customized services to accompany and drive innovation activities in their clients' growth processes.

Their goal is to facilitate the meeting between technological demand and supply, simplifying the sharing of knowledge and experiences within a network, aiming at reaching sustainable innovation within their territory. They then accompany companies in innovation processes, with the aim of making it an every-day practice.

This KIBS is a meeting point between different realities and aims to offer its services to a wide range of actors. These include companies operating in various sectors, especially SMEs, which often do not have the resources to innovate independently, and academic spin off or start-ups, which are already heavily oriented towards innovation but lack the practical tools and skills to bring their innovations on the market. To these are added universities and research centers, with applied research orientation and local institutions that need support in planning policies for local innovation.

The services it offers are manifolds. First, it assists its clients in all patent deposition operations, from the search for patent documents of interest to the technological and economical evaluation, thanks to collaborations with leading universities in the industry. Secondly, Bep S.r.l. aims at helping companies to become fully aware of their potential and technological know-how, also through the collection, analysis and linking of information produced by the company itself.

Finally, it looks at the technological landscape to find the tools needed by their client companies to improve their offer. This also includes scouting and technology transfer services, linking Universities, Research and firms in one, extended network.

In the questionnaire this company falls under the category "Professional Firms".

During the period of analysis (from 2006 to 2008), the staff grew up, adding an employee to the initial three associates. Coherently with the characterizing knowledge-intensity of KIBS, 50% of the staff is also made up of people holding at least a Bachelor's Degree.

At that time, it had relations with all 8 types of partners indicated in the questionnaire (consultants in design and ICT, technical and professional studies, public bodies, universities and research centers, science parks and other professionals), for a total of 10 collaborators distributed throughout the country. With these partners, they had relationships involving the sharing of staff and the exchange of technical and commercial information. Moreover, it conducted joint product creation activities. It therefore declares to have maximum levels of both external search breadth and external search depth. In

addition, this company claims to have introduced, in the period indicated, a total of 20 *"new-to-the-firm"* innovations and 20 *"new-to-the-industry"* innovations.

Today, the main activity of this KIBS is to support the management of its client's firm in the implementation of projects, products and processes innovation, by linking SMEs, universities and research.

Consistently with the set of configurations it belongs to, it operates by managing the dynamics of innovation (both inside the company and with its clients) with a network logic projected to open innovation. This KIBS represents an example perfectly in line with the concept of *"bridge of innovation"*, as its activity consists in bridging gaps in other's innovation processes. Thanks to its interactions and strong relationships with different partners, it can accumulate knowledge from different areas, and facilitate their transmission from one point to the other of the network in which it operates.

5. CONCLUSION

The purpose of this work was to analyze how different external search strategies can influence innovative and/or imitative outputs in the service sector, and in particular in KIBS (Knowledge-intensive Business Services) firms. Its aim was therefore to explore, conceptually and empirically, how relationships that are differently configured in terms of external search breadth, depth and size can lead companies in this field to be more or less innovative or imitative.

The reference sector, that is, the KIBS one, was chosen for its recognized innovative potential and for its importance in the development of Regional Innovation Systems.

Several scholars have theorized and demonstrated the positive relationship between external links with different partners and collaborators and the innovative performance of an enterprise, but there is sill a limited availability of analysis about the impact that these ties may also have on imitation.

To reach the goal, it has been first necessary to review the literature available in the various areas touched by this work. After the analysis of the KIBS sector and its peculiarities, the focus has been moved on knowledge and on the importance of collaborations in its generation and transfer. A review of the studies about innovation and imitation in services has then be proposed.

As far as the empirical analysis is concerned, given the complexity of the subject, a configurational approach has been chosen, using the tools offered by Qualitative Comparative Analysis.

To distinguish innovators from imitators, it was decided to consider *"new-to-the-industry"* innovations as proper innovations, while *"new-to-the-firm"* innovations were considered as imitations. As seen in the third chapter, the former are radical innovations that affect not only the company that introduces them, but the whole industry in which it operates. They therefore influence technological, productive and organizational standard and require companies to develop not only new knowledge about the innovation itself, but also important managerial and organizational skills to manage the change. The risks that companies take to bring these innovations into the market are considerable, as they may require enormous resources for their development, offer initially poor performance and be rejected by a market adverse to changes.

Regarding *"new-to-the-firm"* innovations instead, they are adopted by a company after having altered the skills of other companies in the industry. The company then uses existing opportunities available for example in other markets and adapts them to its own. They therefore imply lower levels of novelty and consequently lower complexity and risk. It is important to point out, however, the objective difficulty in assessing what is an innovation and what is an imitation. First of all, managers and entrepreneurs are not likely to declare to be imitators, Secondly, the two concepts are not diametrically opposed and separate, but rather are the two extremes of a continuum, ranging from breakthrough innovations to mere copies. If it is easy to distinguish between these two extremes, the same is not true when scholars have to deal with creative imitation. Likewise, the concept of innovation is relative.

In this study in particular, it was decided to use in the concept of *"new-to-the-industry"* and *"new-to-the-firm"* to deal with these problems and to distinguish innovators and imitators.

The variables chosen as indicators of external search strategies instead were the breadth of the search for partners from the point of view of their domains, the depth, i.e. the intensity of the relationships and the size, i.e. the total number of collaborators.

A sample of 383 KIBS has been used, in which 24 different configurations (out of the 50 possible) of the variables of interest were identified. Of these, only 7 bring companies to high innovation performance. Conversely, the configurations that lead to high imitation performance are 12, of which 7 are the same ones that lead to innovation.

The analysis of these configurations has highlighted, as a first thing, the reluctance of KIBS in the sample to develop collaborative relationships with external partners. In fact, 39% of the sample (150 companies) declares no relationship with any kind of collaborator.

At the same time, innovation results are not particularly noticeable either. The 7 configurations that lead to high innovation performance involve only 53 companies, less than 14% of the sample. The situation changes, however, considering companies that have high imitation performance. These are in fact 144 (almost 38% of the sample), distributed in the 12 configurations identified.

These results are in line with what has been found in literature: imitation is a much wider phenomenon than what is stated, and often, given its creative connotation, it is considered as innovation itself.

Analyzing in detail the configurations leading to high innovation performance, the first thing to note is that four configurations over seven have low breadth levels, one has an intermediate level, and the remaining ones have high breadth levels. As far as the levels of external search depth are concerned, they reach always at least an intermediate level, and never fall below 2, a level still above the average of the sample. Lastly, with respect to the third variable, low levels of external search size appear to be discriminating for high innovation performance.

But observing the configurations that lead to high imitation performance, these, besides being more numerous, have slightly different configurations, even though more than a half correspond to the previous ones.

Even in this case, most configurations have low to medium breadth levels, while the remaining ones are divided between intermediate and high levels. The main difference with innovation is that in this case the configurations cover all levels of depth greater than 1, while the variable size is no longer a discriminant.

Given the results thus obtained, the next step was to give them a possible explanation. The companies in the sample, as shown also by the descriptive statistics, do not seem to be inclined to engage in a wide range of collaborative relationships.

These findings are in contrast with the literature analyzed, which sees KIBS as being potentially open to collaboration. KIBS' services in fact, have been considered as the result of an intense cooperation between them and their partners. The latter often are their own clients, which are deeply involved in the development of new services. The term *"co-production"* has in fact being used in these situations. In other cases, KIBS develop relationships with other actors, to compensate the difficulties that such small and specialized realities can meet in updating their offer.

One reason behind these results could be then the lack of clients, which represent an important external source for KIBS, among all possible collaborators considered in the analysis.

Another possible explanation can be given observing the average size of these firms. In fact, the KIBS in the sample declare to have, on average, about 7 employees, a data consistent with the fact that Italian KIBS consist mainly in micro-enterprises. We can therefore deduce that managing the complexity resulting from an increasing number of collaborators, with all the consequent informational inputs, could be too much to handle for them.

In fact, in order to have effective exchange of knowledge in a relationship, the various actors must develop a basis of mutual knowledge, trust, shared language and information. To achieve this, all parties involved need to invest time and resources to create the prerequisites for effective communication and to maintain it. Being resources scarce, most companies chose to concentrate them on a limited range of external partners, often belonging to just one or two business areas. Hence, those who claim to have innovative outcomes maintain with their partners medium to high intensity relationships, characterized by the exchange of resources and information.

This is confirmed also by the fact that considering all the configurations with an intermediate level of breadth, only one has an innovative outcome.

These empirical evidence finds support in the literature, which argues that companies and managers should find the right balance between external search breadth and external search depth so as to avoid over-searching phenomena and to best exploit their external channels to gather all the information they need.

An alternative explanation to the limited number of external partners can be found in the theory of *"structural holes"*. According to this theory companies through a single actor can get in touch not only with the partner itself, but also with their partner's partners. In this way, they develop multiple indirect ties, useful to reach multiple knowledge sources though only one relationship. By diversifying the partners, choosing actors not in contact with each other (i.e. by inserting *"structural holes"* in their partners' network) it is possible for the enterprise to come into contact, through a single link acting like an information collector and processor, with multiple entities and their knowledge.

Both of these theories may therefore explain why the majority of companies in the sample have relationships with a limited number of partners. Unfortunately, however, the data available in the dataset does not make it clear whether the choice actually depends on strategies to avoid over-search, to exploit *"structural holes",* or both.

However, a feature that characterizes innovative configurations is external search depth, which usually takes intermediate or high levels. This means that businesses share different activities with their partners. This sharing allows an intensive exchange of information and knowledge, which, if used effectively, can lead to the development of *"new-to-the-industry"* innovations.

The main differences between the external search strategies leading to innovation and those that lead to imitation are two.

First, imitation can be achieved through a greater number of configurations, which thus correspond to a greater variety of paths, and to a greater number of companies involved. This finding then confirms the hypothesis of literature, that imitation is generally more widespread than innovation. In fact, even what is often termed as innovation could be an evolution or a different application of something already on the market.

The second difference is the type of configurations involved. While configurations characterizing innovation also bring to imitative outputs, imitative configurations show different features: they have lower depth levels than the ones previously analyzed, while the external search size loses its discriminating factor.

This in short means that companies with high imitation performances not only have relationships with multiple partners within the same industry, but the relationships themselves may be less articulated.

This can be explained by analyzing what is considered as innovation and what is imitation in this work.

For the purpose of this analysis, *"new-to-the-industry"* innovations are considered innovations, while *"new-to-the-firm"* innovations are considered imitation. The main difference between the two is that while the former are radical innovations that have an impact on the whole industry where the company operates (through new standards, new technologies, new processes), the latter are *"competence destroying"* only for the company that brings them to market.

This means that the level of complexity and uncertainty that companies face when they have to decide which path to follow are different.

In the case of *"new-to-the-industry"* innovations complexity and risk are very high, leading to a higher level of uncertainty. To this, businesses try to respond by building strong and deep ties with their partners. Through these links they seek to acquire those skills and knowledge that are lacking within the KIBS itself. This knowledge pertains to the market, the actors working there, the technologies available and much more.

We can therefore deduce that in order to develop an innovation, it is necessary to draw intensively from the sources that the enterprise has, assimilating not only explicit knowledge, easily transferable, but also tacit knowledge, which requires more complex interactions.

These relationships help KIBS also to diffuse information about their innovations, once developed, transferring information about it and making it more easily acceptable to the

market, which often in the case of *"competence destroying"* innovation is averse to changes. This opportunity can be particularly interesting in case of collaboration with suppliers and customers, which are the ones more affected by changes in a firm's offering. In the case of *"new-to-the-firm"* innovations, only the skills of the company that introduces the change are upset. Being the innovation already on the market, it is easier to find information about it, either through contacts with other companies or through reverse engineering processes. This makes the level of complexity and the relative uncertainty perceived as inferior to the enterprise.

For this reason, more superficial relationships seem to be sufficient to develop imitation. In fact, the company does not have to create new knowledge with its partners, but must assimilate information already available in the industry, which will have to be recombined and readapted.

The lower involvement of resources required by less demanding relationships makes KIBS free to engage themselves in more relationships with more partners belonging to the same industry without compromising their ability to exploit these sources effectively. From a general analysis seems then that innovation does not prove to be a dominant strategy in the KIBS companies of the sample being analyzed.

This feature may also be related to the particular relationship that these businesses have with their customers. Much of the services offered by KIBS are in fact the result of a customization through which companies offer personalized products tailored to the specific demands of their users. In this way, the products that are offered are often the result of a recombination of knowledge already existing in the company, integrated with new elements. It is a concept coherent with those of ad hoc innovation, presented in Chapter 3. A problem associated with this kind of innovation is that they are often not considered innovations, as lacking in the criteria of radicality and reproducibility required by the literature.

Finally, another important aspect to be considered in this analysis is related not to the characteristics of the sample itself, but to the time interval analyzed. The dataset refers in fact to the years between 2006 and 2008, since the questionnaire was collected in 2009. This time frame partially coincides with the boom in the economic crisis of the new millennium, which may have indirectly influenced the results.

As already explained, the environmental factors (political, economic, social) affect deeply the activity of a company. It can be hypothesized that even the companies in the sample

have faced a unfavorable situation, preferring to save resources to devote to existing production processes rather than dedicating them to research activities with their collaborators.

This study has shown, at least in part, how innovation and imitation are two complex and not distinct concepts, and how different external search strategies can influence the outcome of innovative efforts. External search indicators, namely breadth, depth and size, have been used, being considered as potentially influencing the type of communication and knowledge transfer with KIBS, and hence the innovative or imitative performance that the enterprise can achieve. With regard to the literature available, empirical evidence has been found to support the concept of over-search as well as structural holes theory, but above all to support the idea that deep and intense relationships are the basis of those inter-firm collaborative processes that lead to the effective introduction of innovations.

It can therefore be assumed that this study contains some empirical results that partially support the previous literature, providing additional information on collaborative innovation and imitation.

5.1 Limits of the analysis and future research developments

The research results may depend on specific country and regional factors according to where they are contextualized, as well as by the size of the KIBS businesses analyzed. Compared with other studies, this analysis is based on a smaller sample of companies than for example the one used by Laursen and Salter (2006).

In addition, the companies exhibit different features than those analyzed by other scholars. KIBS in the sample are smaller in size than the American ones, but also in comparison with the Italian ones studied by Corrocher (2008) in the Lombardy region. Although the latter is close as a territory and legislation to Veneto, the region from which the KIBS in this sample come from, the data are different: companies in Lombardy are in fact larger on average, at least in terms of employees and seem to innovate more. However, there are no data on the strategies of external search strategies with which to compare the results obtained.

Another limitation of this analysis is to consider only the relationships that KIBS have with their collaborators.

There is no distinction then between those partners who may also be suppliers, and customers, considered extremely important in this field, are not included in the analysis.

Another element that might be interesting for future studies concerns then the inclusion of the customer as possible partners in the analysis. In fact, these were excluded from the analysis, but given their importance in the innovative (and imitative) processes of KIBS, they could lead to interesting developments. Similarly, suppliers could also be considered in the analysis, in order to also consider their contribution to KIBS strategies.

Finally, considering the time frame the survey refers to, it may also be interesting for the upcoming developments in literature not only to repeat the study on a sample more recent and potentially less influenced by the economic crisis, but also to analyze the possible relationships between the latter and the innovative and imitative strategies of the KIBS.

The results obtained with this analysis offer a first reading of how innovative and imitative outputs are influenced by various external search strategy configurations. KIBS managers need to be aware that the type of setup they provide to their network of contacts influences their ability to achieve their goals, as the time and resources that they decide to invest in their links could preclude them from reaching complex innovations.

However, as the literature has not yet dealt with the subject of *"collaborative imitation",* future studies can be devoted to deepen the analysis of this theme, both quantitatively with an analysis that encompasses a broader range of collaborators, as well as qualitatively, with analysis of case studies aimed at understanding how individual companies operating in this area structure their network of contacts to achieve the desired performance.

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