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NEW SERVICE DEVELOPMENT IN KNOWLEDGE INTENSIVE BUSINESS SERVICES: DYNAMIC LINKS BETWEEN KNOWLEDGE BASE, PERFORMANCE AND INNOVATION

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Chapter 1. Introduction

Knowledge–Intensive Business Services (KIBS) rank among the most innovative sectors in the European Union's Community Innovation Survey (CIS) (Miles *et al.*, 2017). The growth of the sector is connected with the shifting of society to the 'knowledge-based economy', i.e. an economy which is directly based on the production, distribution and use of knowledge and information (OECD, 1996). Actually, for many years knowledge has been recognized as the driver of productivity and economic growth, thus leading to a new focus on the role of information, technology and learning in economic performance (OECD, 1996).

Despite the growing importance of the sector, the research on KIBS is still fragmentary. Scholars underline that many gaps still exist starting from lack of agreement on basic definitions and finishing with a scarcity of empirical verification of the conceptual notions and interpretative models (Menor *et al*., 2002; Pina and Tether, 2014). The difficulties start with a lack of agreement on the definition of some cornerstone concepts of this research field: the definition of KIBS sector, which sectors and consequently which companies can be referred to knowledge - intensive activity; the lack of agreement on definitions of new services and innovation in KIBS in general.

Despite the lack of agreement on the basic definitions of the sector, the term 'knowledge-intensive' indicates that knowledge is the core element in the sector. Knowledge influences the structure, the activity and the outcomes of the sector.

According to the Oxford dictionary, the term knowledge is defined as "facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject". The definition is a topic of continuous debate among philosophers in the field of epistemology. The definition by Plato is accepted as classical while not definitive, it specifies that a statement must meet three criteria in order to be considered knowledge: it must be justified, true, and believed. In psychology knowledge is defined as "awareness of the existence of something and information and understanding of a specific topic of the world in general which is usually acquired by experience or learning" and in general "knowledge is to understand a specific topic or the world in general" (Psychology Dictionary).

The scientists find difficulties in finding a common definition also because the term knowledge assumes different meanings in different languages: knowledge has been outlined as a "cluster concept that points out relevant features but that is not adequately captured by any definition" (Gottschalk-Mazouz, 2008).

Since the possibilities of knowledge definition are limited by human subjective vision of the world, the scientists especially in cognitive sectors of psychology concentrate on the study of cognitive processes of knowledge acquisition. There is as well no agreement on the exact number of acquisition processes, in most cases they are defined as: perception, communication, association and reasoning.

The scientists as well undertake continuous attempts to classify knowledge. Among the most common types of knowledge it is possible to highlight: Scientific, Communicating (symbolic), Situated, Partial. The difficulties in defining cognitive processes are complemented by the fact that humans are affected by emotions in cognitive processes which are difficult to define.

Despite the abstract definition of knowledge, due to its extremely complex and changing nature, it is possible to affirm that the change in the knowledge can lead to the change in the human activity and consequently the results of this activity. Taking as a base the classification of cognitive knowledge processes scientists in social and managerial fields attempt to classify knowledge in a work activity.

The purpose of this thesis is to try to understand through empirical research how companies that belong to the Knowledge-Intensive Business Service (KIBS) sector implement their New Service Development (NSD) processes. The study adopted the case study method given the complexity and the exploratory aim of the research (Yin, 2003; Eisenhardt, 1989). In particular, the NSD processes of twelve companies were analyzed collecting information through various sources, but especially by interviewing the companies' key informants. The main questions concerned how they understand the NSD processes implemented in their companies.

The inspiration for the present research, and the final choice of the specific topic, were drawn from the articles written by Pina and Tether from 2014 to 2016. The authors, in fact, were among the first ones who concentrated on KIBS companies at the individual level, and not at the sector and geographical level (Asheim, 2007, 2012), as the unit to analyze their knowledge base. Having undertook a large review of the research on KIBS sector, especially concerning basic concepts and the connection between the knowledge base and the innovation produced by the companies, they underlined the lack of qualitative research on the issue, and suggested as a topic for future research the study of the dynamic links that exist between the knowledge base of a company and its performance and innovation. Introducing the term 'dynamic links' the authors meant that the performance of the company can change with the time, while previous researchers studied the problem taking into account static models.

Due to international use of English language and difficulties in translation and understanding of common terms, it is needed to immediately provide the definitions of the terms used in the title of the thesis, which are the object of the study, to assure that the readers have clear vision of the proposed topic, besides the main terms 'KIBS', 'NSD' and 'knowledge base'.

The term 'Dynamic' is used according to the Oxford dictionary as follows 'characterized by constant change, activity, or progress of a process or system'.

The term 'Performance' is used according to the Oxford dictionary in its second meaning that is 'the action or process of performing a task or function'.

The term 'Link' is used according to the Oxford dictionary as follows 'relationship between two things or situations, especially where one affects the other'.

The analysis of the NSD process started from studying the process of service development in the service sector, globally understood. Since KIBS companies are considered complex, unstructured, highly customized and value-added service activities that consist of "the accumulation, creation, or dissemination of knowledge for the purpose of developing a customized service or product solution to satisfy the client's needs" (Bettencourt *et al.,* 2002) most researchers, in fact, consider that KIBS companies do not use any systematization in their activity. The second goal was to understand if the companies try to look for new ideas or new knowledge to develop new service offerings and how they look for these ideas. The last goal was to understand if the differences in the companies that can be expressed in the differences of their knowledge bases can affect the NSD processes in the companies and their performance and innovation in general.

The structure of the thesis is as follows. The next chapter contains a literature review analysis on the topic with research gaps. The chapter is divided according to the research streams in the topic. The third chapter is dedicated to the description of the research questions and research method. Chapter four contains the case studies description and their analysis. In the fifth chapter the research results are presented and discussed while the last chapter presents the conclusion of the research work; in particular the main results and theoretical and practical implications of the work are summarized, and suggestions for possible future research are provided.

Chapter 2. Literature review

2. 1 Understanding KIBS sector

Despite the growing importance of the KIBS sector (Miles *et al.,* 2017), and a substantial body of literature on the sector (Scarso, 2015), several research questions are still open. In particular, there is a lack of common definitions and understanding on basic concepts, starting from the definition of KIBS companies in general, finishing with the New Service Development process.

'Knowledge Intensive Business Services', or KIBS, were identified in 1990s by Ian Miles and colleagues (Miles *et al.,* 1995). In particular, the authors defined KIBS firms as "private companies whose job consists of collecting, generating, analysing, and distributing knowledge with the aim to provide solutions to problems that their client firms are not able or willing to deal with by themselves" (Miles *et al.,* 1995).

According to Miles (2005) the KIBS sector includes various kinds of services such as computer services, R&D services, legal, accountancy and management services, architecture, engineering and technical services, advertising and market research services.

In the last years, scholars and policymakers have put large efforts to better define and understand these industries (Gallouj and Weinstein, 1997; Pina and Tether, 2016).

Different scholars proposed different definitions of KIBS and their distinguishing characteristics. To overcome the lack of agreement about the definition of the sector (Richard *et al*., 2009), Pina (2015) undertook a systematic review of literature. She used the terms 'professional service firm', 'knowledge intensive service' as keywords to locate the papers to be included in the review. After limiting the review with the articles included in the guide of academic journal quality (ABS, 2010), the researcher selected the papers that included the key definitions: innovation, knowledge, competition and performance (Pina, 2015).

Using exclusively papers published in peer-reviewed academic journals, 130 relevant articles on the topic were analysed in the research (Pina, 2015). At the end of the analysis, the author summarized the definitions given by the most significant scholars investigating KIBS (Table 1).

Table 1: Some of the definitions summarized from the work of Pina (2015)

Authors	***Definitions***
Miles *et al*., (1995)	Services that involve economic activities which are intended to result in the creation, accumulation or dissemination of knowledge.
Den Hertog (2000)	Private companies or organizations; relying heavily on professional knowledge, i.e. knowledge or expertise related to a specific (technical) discipline or (technical) functional domain; and, supplying intermediate products and services that are knowledge based.
Muller and Zenker (2001)	Firms performing, mainly for other firms, services encompassing a high intellectual value-added.
Bettencourt *et al.,* (2002)	Enterprises whose primary value-added activities consist of the accumulation, creation, or dissemination of knowledge for the purpose of developing a customized service or product solution to satisfy the client's needs.
Toivonen (2006)	Expert companies that provide services to other companies and organizations.
Leiponen (2006)	KIBS consist of transferring knowledge and skills to clients' organizations.
Muller and Doloreux (2007, 2009)	KIBS are mainly concerned with providing knowledge-intensive inputs to the business processes of other organizations, including private and public sector clients.
Consoli and ElcheHortelano (2010)	Intermediary firms specialized in knowledge screening, assessment and evaluation, and trading of professional consultancy services.

The author arrived to the conclusion that no standard definition of KIBS has emerged in the literature, and that many studies followed a pragmatic approach which consists in resorting to 'standard industrial classifications', and in considering KIBS firms those belonging to the following sub-sectors (Pina, 2015): computer software, business and management consultancy (and related activities); research and development; legal services; accounting and related services (including book-keeping and auditing); architectural and engineering consultancy, advertising and market research and, less frequently, specialist design consulting. The researcher noted as well that some knowledge-intensive business services such as merchant or investment banking are almost never included, at least in a theoretical field (Pina, 2015).

Furthermore, the author identified the most cited distinguishing characteristics of KIBS (Pina, 2015):

1) *Knowledge as an input, process and 'product'* (Toivonen and Tuominen, 2009). The lack of agreement on basic definitions resulted in the fact that the terms 'product' or 'service' or 'project' were usually replicable in different studies (Pina, 2015).
2) *They usually provide customized solutions.*
3) *This kind of service usually involved a deep interaction with client, so that client' co-production is regarded as a distinctive feature.*
4) *Intangibility of results.* Such characteristic are objected by some researchers since many outputs are of material nature (e.g. models, prototypes, written acts etc.).

At the same time, the researcher made a fair note that few scholars have focused on the differences among KIBS belonging to different sub-sectors, and how these differences affect their conduct (Von Nordenflycht, 2010; Tether *et al.,* 2012; Consoli and ElcheHortelano, 2010).

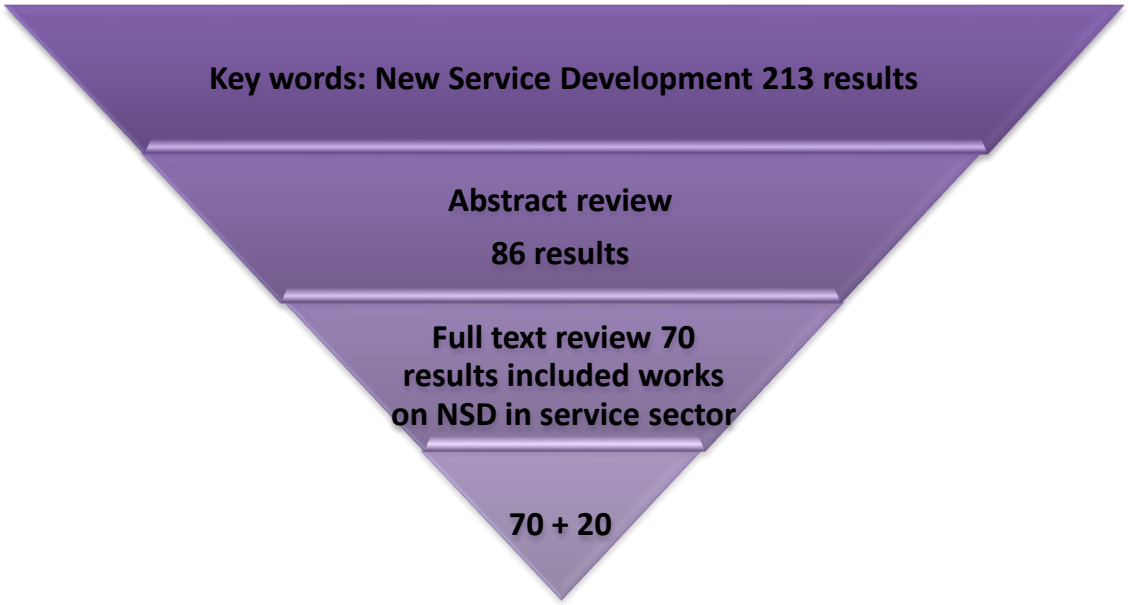
More than half of studies examined by the researcher focused on one sector of KIBS, while just 30% focused on four or more (Pina, 2015). The most studied KIBS sectors include computer services, the professional and the technical ones (Scarso, 2015).

Taking into account the existing definitions and the main distinguishing characteristics of KIBS defined by the scholars (Pina, 2015) the present research analyses KIBS first of all as the activity based on intense use of knowledge with the aim to classify the knowledge bases of KIBS.

Following the interesting review undertaken by Pina (2015), the literature analysis, which is at the basis of the research work described in this thesis, started with the choice of papers to be analysed. In this regard, the following criteria were used: papers published in scientific peer-reviewed journals, in English language, and without limitation of time. The search of the papers was made in 2015, and considered the two main databases of peer-reviewed literature: SCOPUS and Web of Science. At the beginning, both terms "New Service Development" and "Knowledge Intensive Business Service" were searched in either the title of the paper, or in the abstract, or in the keywords, but the number of found articles was scant. Nevertheless, this effort has not been useless since the results showed that the topic of "NSD in KIBS companies" was poorly investigated. For this reason, a further search was performed by limiting the choice of the term just to the following one: "New Service Development". This second search in SCOPUS produced 213 articles, which after abstract review were reduced to 86. The main criterion used to select the papers was that the NSD process or any aspects of the process had to be central in the study, not auxiliary. The majority of articles were dedicated to the study of NSD models in the service sector. The analysis of full text led to a further reduction of the papers to 70.

The work of Pina and Tether (2016) helped to better specify the topic of the research, which was modified from the analysis of NSD in KIBS in general, to the investigation of the dynamic links that exist between the knowledge base of a company, and its performance and innovativeness. The specification of the topic led to the extension of the articles to include in the review, since it was necessary to study also articles dedicated to knowledge bases in KIBS and innovation. Hence, the literature review was enriched with the papers systemized in the work of Pina and Tether (2016) dedicated to the definition of KIBS, knowledge bases in KIBS, performance and innovation in KIBS. Further 20 papers were added to the literature review. Since the number of articles dedicated to the study of innovation problems in KIBS is quite large, while the works dedicated to knowledge bases are few the classification introduced in the work of Pina and Tether (2016) helped to identify the works dedicated to the study of innovation in KIBS in connection with knowledge bases in the companies (Figure 1).

Figure 1: The selection of papers in SCOPUS database



The approximate distribution of the articles among the journals is summarized in Table 2.

Figure 2 shows the trend of distribution of the analyzed papers published from 1990 until 2015. The number of articles dedicated to NSD in KIBS published on the topic before 1990 is scant, that is why it was not included in the figure.

Figure 2: Distribution of articles over the years

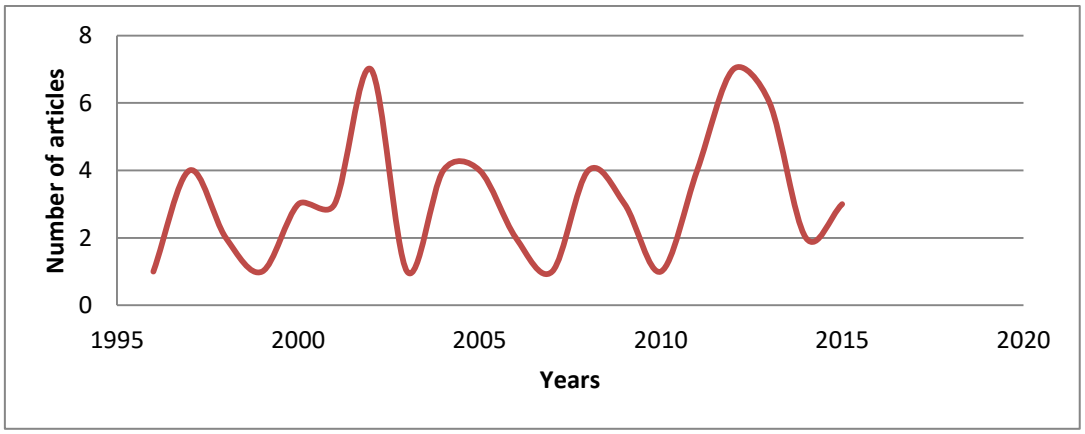
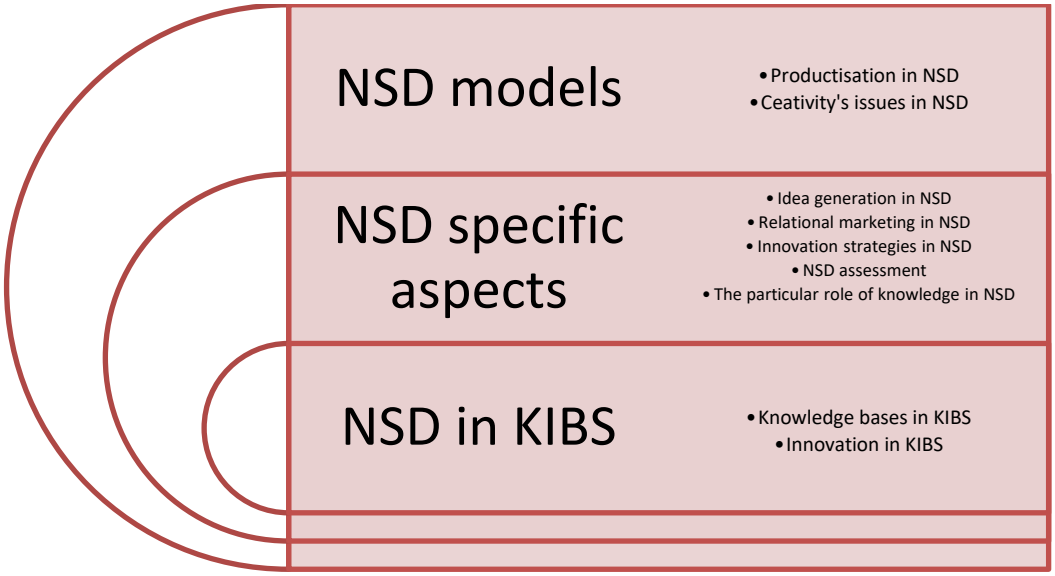


Table 2: The journals where the articles were published

Title of Journal	№	*Title of Journal*	№
Journal of Knowledge Management	9	Marketing Intelligence & Planning	1
The Service Industries Journal	9	Journal of International Marketing	1
Journal of Product Innovation Management	8	Journal of Marketing Research	1
Service Business	3	Journal of Services Marketing	1
Int. Journal Services Technology and Management	3	Journal of Service Research	1
Int. Journal of Technology Management	2	Journal of Management Studies	1
International Journal of Innovation Management	2	Journal of Business Research	1
Journal of Operations Management	2	Int. Journal of Work Innovation	1
Journal of Business & Industrial Marketing	2	Journal of Retailing	1
European Journal of marketing	2	Knowledge and Process management	1
Journal of Service Management	1	Journal of High Technology Management Research	1
International Journal of Service Industry Management	1	California Management Review	1
Int. Journal of Service and Standards	1	Industry and Innovation	1
Knowledge Management Research & Practice	1	Journal of Evolutionary Economy	1
Journal of Economic Geography	1	Scandinavian Journal of Management	1
Creativity and Innovation Management	1	Academy of Management Executive	1
Long Range Planning	1	Technovation	1

In the following pages the main findings of the literature analysis will be illustrated. They are subdivided according to specific research streams under investigation, since the analysis allowed to identify different kinds of studies: those dedicated to developing models of the NSD process in general, which also include studies of productisation and creativity issues; studies concentrating on particular aspects of the NSD process as idea generation, implications of cooperation with clients during the process, innovation strategies in NSD, the NSD process assessment, and the role of knowledge inside the NSD process; and studies specifically devoted to the topic addressed by the PhD research project: innovation and knowledge bases of KIBS companies (Figure 3).

Figure 3: Research streams identified in the topic



2.2 NSD models developed in literature

From the literature review it is possible to conclude that through the opposition and combination of "manufacturing-dominant logic" (Levitt, 1972) and "service-dominant logic", scholars arrived to the idea that the development process in services had to and could be systematised.

Initially, they borrowed the models of the NSD process from the manufacturing sector, and most studies, with some variations, included the following steps: idea generation, development, piloting and commercialization. This model was later criticized since it did not consider the marketing impact. Among the major differences between product development and service development some researchers pointed at the involvement of customers in service development process, especially during the phases of purchasing and delivering of the final service (Alam, 2000; Sundbo 1997). This is the reason why customer involvement plays more crucial role in the new service development process than in the development of tangible products (Martin and Horne, 1995).

In this regard, Edvardsson and Olsson (1996) suggested that the concept development should start with the analysis of the target market and the customers' needs.

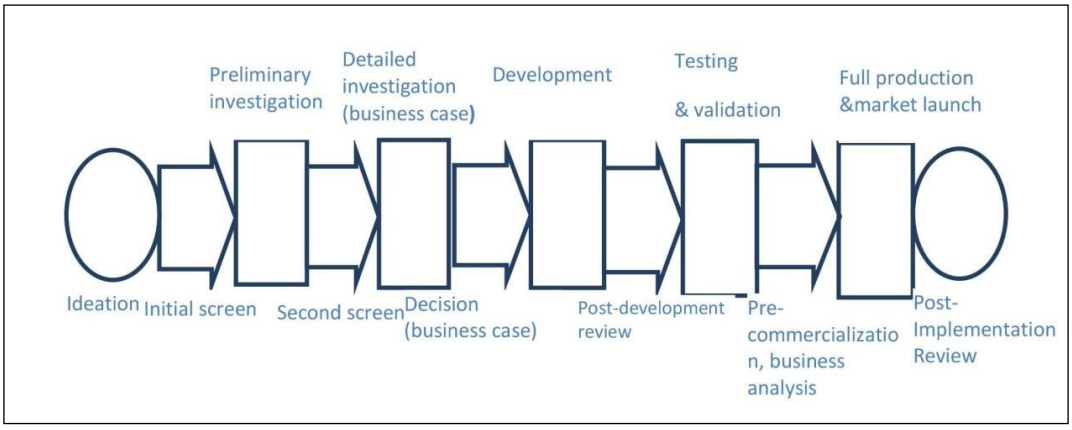
Cooper and Edgett (1996) were among the first scholars to highlight the importance of having planned steps in service development. When developing frameworks for representing the NSD process of KIBS companies, many authors took inspiration from those formulated for the service sector in general, especially that of Edvardsson and Olsson (1996) who divided the overall NSD process into: concept, process and system (Figure 4). During the phase of development new concept, the idea for the new service should be subjected to commercial assessment taking into account customers' needs. The process phase should involve the specification of activities needed to generate the service, while in the phase of the service

system development the authors include: training of the employees and customers, physical/technical equipment and organisation improvement (Edvardsson and Olsson, 1996).

Figure 4: Model of the service development process (from Edvardsson and Olsson, 1996)

A more detailed model was developed by Cooper (2000) and consisted of several consecutive steps (Figure 5). Each stage is preceded by a gate or go/kill decision point (Cooper, 2006). On these points the senior management organizes meetings with the teams to decide whether to proceed with the project. While the gates in the model are the points where the senior management should receive information about achieved results to make the go/kill decision (Cooper, 2006). The model received a widespread success among companies; such multinationals like P&G, Microsoft, Siemens are applying the model (Cooper, 2006).

Figure 5: A Stage –Gate model for NSD (from: Cooper, 2000)



Particular attention deserves the work of Menor *et al*. (2002), where the most significant NSD models existing at that time were analysed. They were among the few scholars to underline that any discussion on NSD must begin with a definition of what a "new service" means. In this regard, the authors presented and discussed some of the definitions of a new service offered by

the literature (Table 3). They also noticed that NSD process as a formal development process was proven to be a competitiveness driver (Griffin, 1997, Storey and Easingwood, 1999) but the research dedicated to its understanding is too scant (Menor *et al.,* 2002). The authors noticed that the description of the NSD process concentrated in conceptual works, while NSD performance – in descriptive.

Table 3: Some definitions of new services (from: Menor *et al*., 2002)

Definition	***Author***
Defined new services in terms of the product or service outcomes (or offerings).	Lovelock (1984), based on an adaptation of Heany (1983)
Extent of change to the existing service system or based on the operational process and participants.	Tax and Stuart (1997)
Services are essentially a series of interactions between participants, processes and physical elements, any changes to the service concept that requires different competencies from the existing operation can be considered a new service.	Johnston, 1999; Shostack, 1987
Recognizing the need to consider both the newness of the service offering (what service is offered?) and service concept (how the service is offered?), defines a new service as an offering not previously available to a firm's customers resulting from the addition of a service offering or changes in the service concept that allow for the service offering to be made available.	Menor (2000)

Remaining in the field of service innovation, it is useful to recall that some authors used to classify innovative service offering according to their level of newness, thus generally distinguishing between radical and incremental innovations, as well summarized by Johnson *et al.* (2000) and illustrated in Table 4.

Table 4: New services classification (adapted from Johnson *et al*., 2000)

New service category	***Description***
Radical innovations	
Major innovation	New services for markets as yet undefined; innovations usually driven by information and computer-based technologies
Start-up business	New services in a market that is already served by existing services
New services for the market presently served	New service offerings to existing customers of an organization (although the services may be available from other companies)
Incremental innovations	
Service line extensions	Augmentations of the existing service line such as adding new menu items, new routes, and new courses
Service improvements	Changes in features of services that currently are being offered
Style changes	Modest forms of visible changes that have an impact on customer perceptions, emotions, and attitudes, with style changes that do not change the service fundamentally, only its appearance

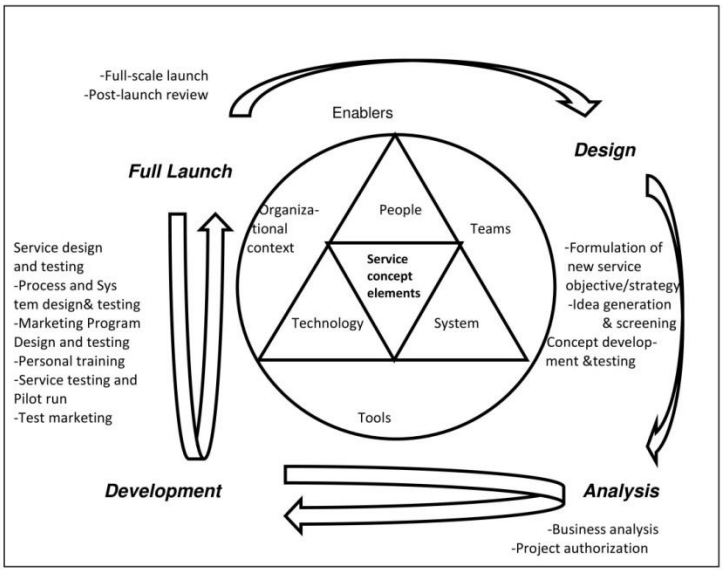
Coming back to Menor *et al.* (2002), they underlined that the terms "service development" and "service innovation" have been used interchangeably in previous studies (Sunbo, 1997; Barras, 1986). This application the author fairly notices as not quite correct, since the term service development is based on "the service management and marketing tradition and focuses on the idea of service quality" (Menor *et al.,* 2002) while the term service innovation derives from "the economics and business strategy tradition that focuses on entrepreneurship and technological development" (Menor *et al.,* 2002). In this regards, they underlined the differences that distinguish the two concepts (Table 5).

Table 5: Differences between concepts 'service development' and 'service innovation' (from: Menor *et al*., 2002)

Service development	***Service innovation***
Focuses on understanding of service development practice	Focuses on developing abstract theories
Describing the tactical management of development activities	Describing the strategic implications of offering new services

Following the opinion of many researchers (e.g. Griffin, 1997) the authors (Menor *et al.,* 2002) noted that services tend to use less formal NSD processes than the manufacturing sector applying their NPD processes. This process in services is highly iterative and not-linear; its cycle represents a "progression of planning, analysis and execution activities" (Menor *et al.,* 2002). As an example they present the NSD process cycle adopted from Johnson *et al.* (2000) to which many subsequent works dedicated to service development study have been referred (Figure 6).

Figure 6: The NSD process cycle (from: Johnson *et al.* 2000)



At the end of their analysis, the authors (Menor *et al.,* 2002) put the dilemma if new services emerge "through formal development processes", or future additional research can "validate or discredit" the idea that new services happen as a result of "intuition, flair, and luck", the opinion characteristic for previous research.

In the conclusions of their work the authors summarised some research opportunities and questions that needed to be addressed by future research, as follows:

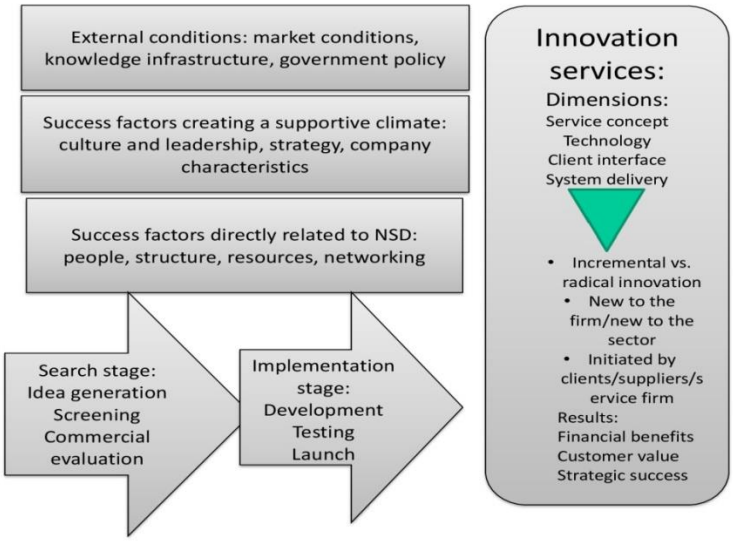
- Develop a more precise classification of new services (e.g. radical vs. incremental).
- Clarify the tactical and strategic differences in service development.

- Define the necessary stages for successful NSD process.
- Define the assessment of NSD process.
- Investigate the existence of common antecedents for NSD success.
- Develop techniques for more effective and efficient "tangibilizing" of service concepts.
- Analyse the effect of specific different characteristics of services on NSD process.
- Investigate how NPD tools, such as concurrent engineering and QFD, are applicable or modified to be applicable to NSD.
- Develop and apply the concept of architecture and modularity to NSD.
- Conceptualize and test DFI tools and procedures in NSD.
- Investigate the possible application of entrepreneurship models for e-services (quality, customer loyalty).
- Analyse NSD process in high speed services (e-services).
- Analyse the influence of outsourcing on NSD in e-services
- Analyse the dynamics of e-service NSD in the presence of competing physical-services.

Of course, the same questions concern NSD processes in the KIBS sector.

Another important contribution is that of de Jong *et al.* (2003) who developed a conceptual model of innovation that took into consideration the particular features of the service sector (intangibility, heterogeneity and perishability) as well as different types of innovations (Figure 7). However their contribution was mostly theoretical, so it needs to be tested empirically.

Figure 7: Conceptual model of innovation (from de Jong *et al.,* 2003)



Always with the aim of understanding the nature of the NSD process in the service sector Alam and Perry (2002) studied process in the case of financial companies. The value of this model is that it is one of the few models developed not theoretically but in practice, while the disadvantage is that it was elaborated basing on the results of an investigation concerning only one sector in a single country.

They found that the process was organized in 10 stages, as follows:

1. Strategic planning
2. Idea generation
3. Idea screening
4. Business analysis
5. Formation of cross-functional team
6. Service design and process/system design
7. Personnel training
8. Service testing and pilot run
9. Test marketing
10. Commercialization

The weight of the different stages depends on whether it is a small or a big organization. Nevertheless, the authors arrived to the conclusion that the most important stages run by all the companies are idea generation and commercialization, followed by idea screening and formation of cross-functional team, the least important test marketing. All the activities are performed in the sequential order, while small companies use more informal process and have a shorter process since they conduct parallel activities (i.e. strategic planning and idea generation, idea screening and business analysis, personnel training and service testing and pilot run) to reduce the time of the process. Their study also highlighted the importance of customer's involvement into the innovation process. The investigated companies, in fact, have constant meetings with the customers and during the process, they participate and contribute to the overall process, especially in idea generation, service design and service testing.

Summing up what emerged from the analysis of papers focused on modelling the NSD process, it must be underlined that practically all the models both in service sector and KIBS were theoretical, not enough verified in practice. The few models developed on the basis of empirical studies just derive from the analysis of an individual sector and a single country. Furthermore, the research on NSD contains a lot of gaps on agreement on core definitions for the process. Hence there is a strong need of deep empirical research aimed at exploring how NSD processes are performed in KIBS companies belonging to different sub-sectors and located in different countries.

The next two chapters are dedicated to special NSD models: productisation models and NSD models developed for creative services. These topics should be regarded separately as scholars pay special attention to these issues. The models developed for productisation of services are especially important to speed the NSD process, make it more repetitive and less money consuming, while models developed for creative services should take into account characteristic features of the creative process.

2.2.1 Productisation in NSD

An interesting topic that has been addressed by the literature on modelling the NSD process, especially in the case of KIBS companies, is that of "productisation", i.e. the activity where the service offering is made more "productlike" through the systematization of its components. Productisation is particularly important here since it can have key impact on the analysis of NSD process (Valminen and Toivonen, 2012; Salmi *et al*., 2008; Jaakkola, 2011). Scholars who used such notion underline the importance of a customer orientation way of a service offering by KIBS companies to stress out the need of 'concretization' of the service ideas (Cooper and

Edgett, 1996; Jaakkola, 2011). In particular, productisation should exploit the client-provider co-production relationships (Valminen and Toivonen, 2012) which, as said, are distinctive features of KIBS firms. Productisation should leave space to modify the service during the prototyping phase (Edvardsson, 1997), and this space should be devoted to take into account the changing customer's needs and feedback (Valminen and Toivonen, 2012). A similar concept is found in Salmi *et al.* (2008), where the structure of the service product is considered as compounded by: standard part, 'optional' modules (parts that could be modified according to the situation) and customized part.

The researchers underline the differences between the NSD process, as traditionally understood, and the productisation processes. NSD process includes so-called 'creative elements', i.e. idea generation, while productisation uses the existing knowledge for transforming the current services into service packages and products (Salmi *et al.,* 2008).

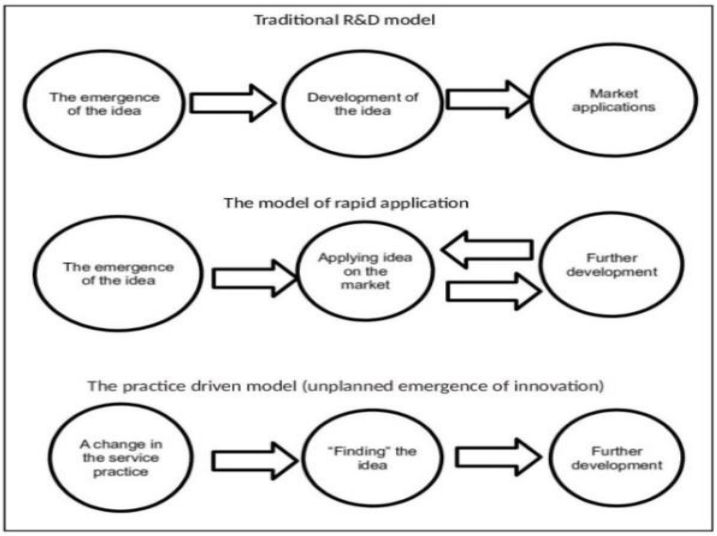
Some works about productisation define NSD process in a general manner, starting from the gathering of customer information and ending with the planning of marketing activities (Valminen and Toivonen, 2012). Salmi *et al.,* (2008) combine the existing models' stages into: idea generation, idea screening, evaluation or selection, concept design/development, test and introduction/launch (Voss *et al*., 1992; Bitran and Pedrosa, 1998), observing that different stages can overlap, or miss through combination of different stages into one more general. The authors also stress two important differences between NSD and NPD process:

- Service firms usually imitate new offerings rather than try to use "idea-generation techniques"; this characteristic is mentioned in many other articles devoted to NSD process.
- NSD process appears less systematic than NPD process (for example with no organization of pre-launch tests).

All researchers conclude that in the long-term, productisation can help to achieve increasing efficiency and competitive advantage (Valminen and Toivonen, 2012) since a more systematic approach should help to replicate the process more easily and reduce development cycle time (Salmi *et al.,* 2008). While they identify several problems for its implementation in KIBS, they affirm that co-production and co-learning are of primary importance in KIBS and that these issues are still to be developed in the service productisation process. Some special features of KIBS, like knowledge-intensity, strong supplier-client relationships, project-based nature of business, high intangibility of services and quick changing environment, can limit the possibilities to use productisation (Salmi *et al.,* 2008). But at the same time productisation models and strong customers relations can provide possibilities for developing alternative business models to gain competitive advantage. In general, scholars agree that there is the need of further investigation concerning the application of productisation models in such companies.

The model developed for KIBS innovation processes by Toivonen and Tuominen (2009) and presented in Figure 8 is closer to what happens in KIBS companies, as it takes into account that different companies can have different approaches, that the process is in general very fast, not always formalised, that the stages can change and overlap, that the new idea can emerge later in the process or can be changed. Still this model should be examined more in practice.

Figure 8: Different innovation processes (from: Toivonen and Tuominen, 2009)



Researchers do not agree on which model describes the process in a better way, agreeing that the research on this topic is at the beginning and more broad investigations are needed to test the models in different sectors and different countries. Conversely they look for gaps in the existing models. Stevens and Dimitriadis (2004) propose to introduce some changes in the existing models focusing on organizational learning as one of the conditions for success. Other authors view the whole process from the organizational culture perspective, which includes: market orientation culture, innovative supportive culture, learning culture and customer communication culture (Shunzhong Liu, 2009).

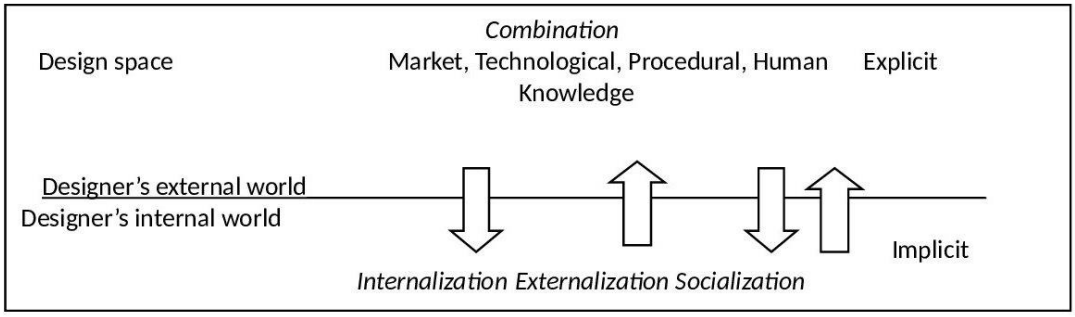
To sum up, the study of productisation models in NSD stresses interesting aspects of the process related to making it more efficient. However, this research topic contains the same gaps as the study of NSD models in general: the study of the models is at the beginning, most of them are developed theoretically or on a limited number of practical examples. More empirical research on these models is necessary in order to better understand in what conditions (e.g. kind of company, kind of service offering) a productisation strategy can be effectively pursued.

2.2.2 Creativity's issues in NSD

Issues of creativity in KIBS are addressed especially by studies devoted to creative companies and in particular to design, design consultancies and advertisement services companies. It is worth recalling that Gurteen (1998) defined creativity as about the generation of ideas and innovation, and as about putting them into action. Some scholars investigated the factors that affect creativity and innovation in such companies. For instance, on the basis of the findings of the research in UK design industries, Sunley *et al.* (2008) stated that the marketplace and the geographical location of the service company play a key role in developing the company's knowledge pools, since they act as a channel for learning and exchanging knowledge. But knowledge exchange should not lead to imitation the products from competitors, since this

behaviour can negatively affect the competitiveness of companies that is mainly based on delivering original products. That is why designers should produce radically new products to anticipate and influence new product meanings that integrate "aesthetics, symbol, emotion and function" (Verganti, 2006). Other studies (Fu Qui *et al.,* 2006, 2008) attempted to develop cognitive models of NSD process of design companies (Figure 9) where the authors made an attempt to classify different kinds of knowledge necessary for the creator (i.e. market, technological, procedural and human knowledge), and divided the designer's cognitive "world" into external and internal through combination of which he arrives to decisions and produces results. Schiuma (2012) proposed the design think approach for ideas development in creative service. Such approach consists of three stages: inspiration, ideation and implementation.

Figure 9: Cognitive knowledge processing in product design (from: Fu Qui *et al.,* 2008)



The creative aspects of NSD processes has been poorly studied, especially because they mainly refer to a specific kind of KIBS companies, the creative industries, that have been scarcely investigated by scholars. Nevertheless, notions and conceptual frameworks on creativity seem to be useful when analysing the idea generation phase of a new services, and future research should address such issue more deeply.

2.3 NSD different aspects

The next parts of the chapter are dedicated to various specific aspects of the NSD process studied individually in literature. These aspects do not concern the whole NSD process but either a certain part of it, or a particular factor that the authors consider may affect the process deeply.

2.3.1 Idea generation in NSD

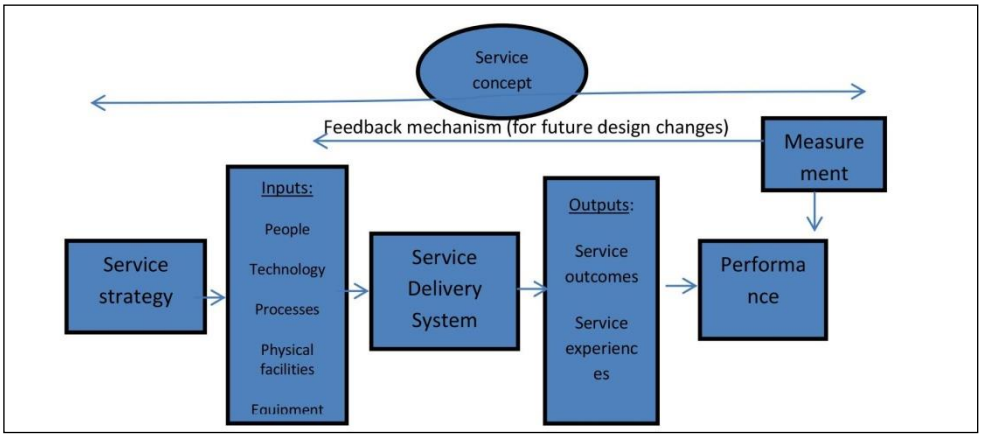
Papers that address the topic area of idea or concept generation during the NSD process deserve particular attention, since the stage of idea generation is the most important for KIBS companies due to the knowledge-intensive nature of their business, which implies that knowledge (and especially new knowledge) is the main input and output of their activity.

Edvardsson *et al.* (2000) defined the service concept as a detailed description of the customer needs to be satisfied, and of how it is achieved. While, Johnston and Clark (2001) defined it as a service operation consisting of several parts, which include:

1) service delivering;
2) service experience - the customer's direct experience of the service;
3) service outcome - the benefits and results of the service for the customer;
4) service value.

An important step in the research of the idea generation activity was to realize that it is not an isolated activity, but a continuous and integrated feature of the service development process (Kelly and Storey, 2000). In this regard, Meyer Goldstein *et al.* (2002) suggest that the service concept can be the key driver of the service design decisions at all levels of planning. Accordingly, they developed a model, where the concept is the central element of the entire NSD process (Figure 10).

Figure 10: Concept development model (from: Meyer Goldstein *et al.,* 2002)



Several scholars affirm that new services are often the results of the competitors' imitation favoured by the simplicity of copying (Easingwood, 1986; Scheuing and Johnson, 1989); they also distinguish between the search of ideas inside the company (e.g. creation process in the creative industries) and that outside it. Nevertheless, in many cases these activities can overlap.

The findings of a number of empirical investigations show that just few companies use systematic procedures "to generate and screen ideas" for new services. This is the case of a study involving some leading UK service firms of five different sectors (Kelly and Storey, 2000).

Combining two previous classifications, the authors categorize the investigated companies according to:

1) Type of service products. This dimension derives from the work of Johnson *et al.* (2000) that distinguish among:

- Core service products that are new-to-the-world or new to the company;
- Core service products that are improvements over existing products; or
- Supplementary and value-added services.

2) Approach to innovation. Here the authors used the strategic types introduced by Miles and Snow (1978) that define the strategic behaviour of the company on the market as follows:

- Prospector. A company assuming such behaviour aim at being first with new products, markets and technologies;
- Analyser. An analyser company seldom is the first on market, but frequently is a fast follower with a more cost-efficient or innovative product;
- Defender. This kind of company locates and maintains a secure niche by protecting his position.

The overall findings show that in general firms are not developing formal idea search methodologies, and NSD initiation strategies are largely informal processes. At the same time, companies using formal NSD strategies seem to be more satisfied with the results of their activity. The reason of this is that while the strategy of copying competitors' products is easy to follow, being truly innovative requires a more creative culture that could be restrained with a planned strategy (Kelly and Storey, 2000).

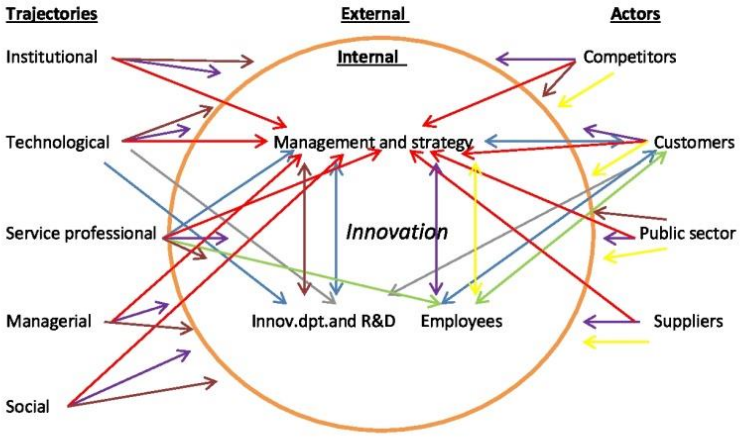
The authors also identify the most important sources of ideas for the companies' projects and proposed one of the most complete lists of such sources, as follows in a rank order: Marketing, Sales, Competition, Market research, Regulatory changes, Operations, Distribution channels, Customer service, Suppliers, Customer suggestion, Outside agencies, R&D, Overseas, IT Department. Nevertheless, they do not introduce any classification of the different kinds of resources, distinguishing for example between external and internal ones.

This shortcoming was offset in the work of Sundbo and Gallouj (2000) where the authors developed a theoretical framework illustrating the driving forces behind the innovation process (Figure 11). Among internal forces the authors indicate: management and strategy of the firm, employees and formalized R&D departments. The external forces are subdivided into 'actors' and 'trajectories'. With the term 'trajectories' the authors indicate "ideas or logics that diffused through time and through social system" (e.g. being a nation, an international network, professional network etc.). They identify five types of trajectories. The institutional trajectory is connected with general evolution of regulations; the technological trajectory with new technologies; the service-professional trajectory with general knowledge existing within different service professionals (e.g. lawyers etc.); the general management trajectory with new organizational forms; and the social political institutions, with the evolution of general social rules. These trajectories are diffused through actors which act as sources of innovation.

The different forces are not equally important, but their weight depends on which innovation pattern the company adopts, among the following ones:

1) The classic pattern (traditional R&D manufacturing model)
2) The classic pattern (neo-industrial: banks, insurance services, postal services)
3) The service-professional pattern (KIBS: consultancy, engineering)
4) The organized strategic pattern (product-service)
5) The entrepreneurial pattern (small firms with radical innovations)
6) The artisanal pattern (operational services: cleaning, restaurants, hotels etc.)
7) The network pattern (tourism, certain financial groups)

Figure 11: Driving forces behind service innovation (by Sundbo and Gallouj, 2000)



The innovation resulting from the service-professional pattern, that is the pattern followed by KIBS companies, is termed by the author as 'ad hoc'. They, in fact, affirm that 'formalized structures dedicated to innovation do not exist' in these companies. In such a case, innovation is a collective process that takes place inside the company: employees-professionals participate in the process and the individual expertise and competencies results to be the main driving force of innovation (Sundbo and Gallouj, 2000). The service-professional pattern is characterized by the fact that the traditional steps of production, selling and innovation take place simultaneously or are merged, and 'the client's problem is the starting point of the innovation process' (Sundbo and Gallouj, 2000). As sources of innovation the authors indicated three different kinds of problems, i.e. problems of strategic nature; corrective problems aimed at resolving procedural difficulties; or progressive problems aimed at improving a specific situation.

Nevertheless the authors noted that service-professional firms tend to move towards the pattern that they call 'the organized strategic innovation pattern' (Sundbo and Gallouj, 2000), which innovation process is guided by 'top management and the firm's strategy and less anarchic and free for the professionals' (Sundbo and Gallouj, 2000) (Figure 11).

Recent studies took into consideration the possibility to subdivide sources of ideas, which are generally considered sources of new knowledge, into internal and external ones.

This is the case of Svetina and Prodan (2008) who distinguish the sources of new knowledge between internal and external ones, whereas the latter are further subdivided into local, national, and international. According to the authors, internally, firms acquire knowledge through in-house research and development activities and by learning from continuous improvements in processes. External sources, instead, include: clients and/or suppliers (local/international clients and/or customers, cooperation with other companies, public institutions such as universities, public research centers, local government, and so on, knowledge gained from interactions with semi-public institutions such as chambers of commerce, industry associations, trade unions, and so on, knowledge provided by consultants and private research centers).

Similarly, Battisti *et al.* (2015) rank the external sources for the companies' innovation process, as follows:

- Clients or customers
- Suppliers of equipment, materials, services or software
- Competitors or others enterprises in the same industry
- Consultants, commercial labs or private R&D institutes
- Universities or other higher-education institutions
- Government or public research institutes

An interesting classification of search mechanisms of new ideas was developed by Chae (2012), who distinguishes three different search sources. According to the author new solutions can originate from three different "locations" or "facets of search": a) the supply side - resources (e.g. techniques, science, products); demand side - customer and market knowledge (e.g. customer activity chain); or diverse geographical markets. The combination of these resources with the distant and local search, i.e. the geographical dimension of the search leads to six-search mechanisms. Local search aims to exploit existing capabilities, resources, and markets, whereas distant search aims to explore new potentials (Chae, 2012), which is in other words: exploitation and exploration (Figure 12).

Figure 12: Six-search mechanism (from Chae, 2012)

For example, local supply side search exploits already existing technologies, products, services and knowledge bases, focusing on reusing and recombining existing knowledge leading to incremental improvements. Conversely, distant supply side search or exploration explores new technologies, science, consulting practices etc. Local demand side intensifies relations with existing customers, while distant demand side is aimed at broadening the market. Local spatial search is focused on deepening knowledge on the existing geographical field of the company's activity, exploiting cultural characteristics of customers, and distant spatial search conversely is aimed at search of new regions, new markets, new solutions (Chae, 2012).

Some other scholars address particular aspects of the search problem. The paper of Hammedi *et al.* (2011) deals with the reflexivity in the screening of new ideas. According to the authors, screening is devoted to eliminate unsuccessful ideas, while reflexivity takes into account changes in the environment to "evaluate new ideas". Reflexivity in the screening stage allows teams to learn from previous experiences (Alam, 2006; Hammedi *et al.,* 2011), errors and to assess and adapt new methods and procedures. Hammedi *et al.,* (2011) affirm that reflexivity makes great impact on efficiency in the early stages of the new product process.

To sum up, the review shows that the topic area of idea generation in NSD has been studied comparatively better than other aspects of the process, probably because it plays a central role in the process. Nevertheless, also in this case a limited empirical verification is available especially about how the different sources are used by companies with different characteristics. It is presumable, in fact, that companies having different knowledge bases or pursuing different product strategies resort to different sources where finding ideas for their NSD projects.

2.3.2 'Relational Marketing' in NSD

Another topic area identified by the literature review, and that has recently emerged, concerns the crucial role played by client-provider cooperation during the NSD process: the importance of customer-supplier relationships for the delivering of knowledge-intensive services, in fact, is acknowledged by almost every article dedicated to this issue (Toivonen *et al.,* 2008; Bolisani *et al.,* 2015). Nevertheless, it's essential here to separately focus on papers that specifically deal with the client cooperation, sometimes indicated as 'relational marketing', during the NSD process.

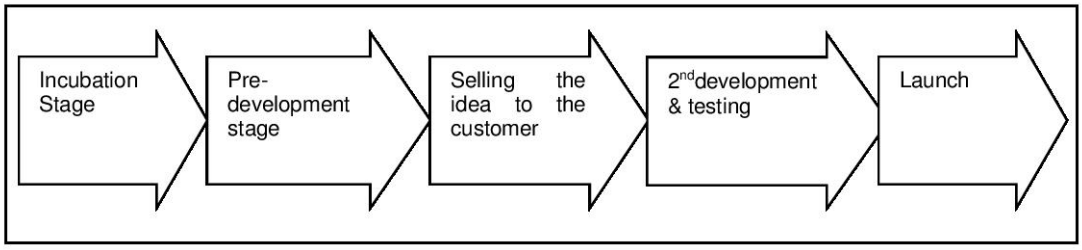
Marketing innovation is regarded by the analysed papers as a strategic asset since it is positively associates with the ability to achieve radical superior product, to uncover potential new demand and build competencies through collaboration with other firms (Hanvanich *et al*., 2003). Since client cooperation is a source of competitive advantage for the firm, and refers to the range of client collaborative behaviours that contribute to more optimal solutions, Bettencourt *et al.* (2002) propose to manage customers as co-producers, which means applying to them employee management practices as to partial employees as well as developing the clients' (out) sourcing skills (Toivonen *et al.,* 2008). The authors suggest that KIBS companies

should look for partnerships with clients who have similar business orientations and operating methods. Besides that, they suggest that the companies should make directed actions towards the definition of the projects and clients involvement in them in a precise way (resources, budget). They also are aware that these suggestions could meet with difficulties in practical terms. These recommendations coincide with some observations of Kuusisto (2011) that the intensity of customer interaction in innovation activities is not linked in a straightforward way to NSD, but this interaction and intensity should change upon the situation.

While many authors deal with marketing problems in general, few developed real marketing models, one of the examples of which is the model developed by Kuusisto (2011).

With the special focus on customer interaction within the development process, Kuusisto (2011) identified the stages in the development activities as illustrated in Figure 13.

Figure 13: A stages sequenced model (from: Kuusisto, 2011)



Customer can play different roles in the process as: initiation, evaluation (concerning internal marketing of the service in the innovating firm), development and testing, and launch. Important observations to the model are made in case studies. The author notices that a clear separation between testing, implementation, and launching of the service to a wider market customer does not exist: this observation coincide with the results obtained by previous research (Kelly and Storey, 2000). The new service idea can be incubated within the innovating firm, but a concrete customer "trigger" is needed to initiate the innovation as a formal project (Kuusisto, 2011). The study showed that not just the speed of innovation activities is important (Alam and Perry, 2002; de Jong *et al.,* 2003), but right timing is essential as well (Kuusisto, 2011).

Bolisani *et al.* (2015) subdivide the new service delivery process in several steps as follows: first contacts, preliminary analysis, formulation of supply proposal, negotiation and signing of the contract, technical development and delivery, and post-sale. The authors note that each step provides occasions to perform customer-oriented marketing activities, and that such activities allow to establish and maintain a strong relationships with the clients.

Due to close relations with clients that denote the delivery of knowledge intensive business services, the researchers pay special attention to the topic area of relational marketing in KIBS. Nevertheless this topic is underinvestigated in connection with the NSD process. Hence, future research should be devoted to better understand how the kind of relationship with clients can affect the NSD process. Also in this case there is the need to investigate companies belonging to various sub-sectors and operating in different countries.

2.3.3 Innovation strategies in NSD

Some scholars proposed to analyse the NSD process in strict connection with the innovation strategy that the company is pursuing.

In his regard, Liu (2012), referring to the four strategic types developed by Miles and Snow (1978) investigated whether differences in levels of NSD competences are linked to the strategic orientation of companies. Despite that the classification of Miles and Snow (1978) has already been introduced in the previous chapters of the present research Liu (2012) highlighted additional features in the strategic types significant for his research and in the work of Liu (2012) additional typology of Reactor was highlighted. The strategic types used by the author are as follows (Miles and Snow, 1978, Liu, 2012).

- Prospector: changes the marketplace by creating new products and services which establish new markets (or market niches) and/or respond rapidly to changing market conditions (including competitive actions).
- Defender: protects the marketplace from change through continuous improvement of production and service processes or continuous improvement of existing products or services.
- Analyser: waits for prospectors to create markets that it can enter by learning from prospectors' mistakes while maintaining key product lines and services.
- Reactor: lacks any real strategic approach to the market and changes only when forced to by the marketplace.

The study, that makes use of a statistical data concerning Chinese KIBS companies, reveals that Prospectors focus on product innovation and Defenders focus on process innovation. Hence a formal NSD process seems to be more important for these two strategic types for transforming an idea into a new offering (Menor and Roth, 2007). Analysers, instead, adopt a strategy that consists in imitating what competitors have developed, and in doing this they follow a less formalized approach.

Corrocher *et al.,* (2009), basing on the data of KIBS companies located in the Lombardy region in Italy, identified several innovation strategies that the companies employ if they do not rely just on their brand:

- conservative mode conforming to a product innovation mode, which closely resembles the features of the manufacturing sector;
- interactive mode, interacting with other firms and customers;
- techno-organizational mode achieving innovations through technology adoption.

As the most significant determinants in the firm competitive strategies the author determined: distribution, price, reputation and innovativeness, while size, customer location, and training of human resources as main determinants in defining cluster specificities (Corrocher *et al.,* 2009).

Rodriguez *et al.*, (2016) on the basis of Spanish KIBS sector subdivides the degree of openness of KIBS companies - open, semi-open and closed from the point of view of innovation strategy.

Among other classifications proposed in the literature and that are not termed exactly innovation strategies but deal with strategies that affect the company's innovation behaviour, it is possible to indicate: Murray *et al.* (2009) who define a two-stage strategic fit model, 'global model for KIBS sourcing' which consists of choosing whether the service activity is sourced domestically (i.e., onshoring) or from foreign suppliers (i.e., offshoring) with lower cost, better quality, or other benefits and Paiola *et al.,* (2013) who basing on the Porter's competitive strategies identify knowledge-based networking strategies: expansion, exploration, consolidation and exploitation on the basis of the ways in which the companies manage access to the related knowledge sources to successfully deliver their services and achieve competitive advantage.

The study of innovation strategies especially their connection with the NSD process in KIBS companies is still an under-investigated issue. The researchers propose different innovation strategies for the process in KIBS but these strategies need more precise classification and evaluation. There is a need of empirical study on the topic, with a particular focus on how the innovation strategy pursued by KIBS companies affect the way in which its NSD processes are implemented.

2.3.4 NSD assessment

With the identification of KIBS, and the recognition that they not only innovate but contribute to 'systems of innovation', the challenge of clarifying and measuring these entities and their contributions emerged (Miles *et al.,* 1995). This problem is important for the present research since it is aimed to investigate as well differences in NSD performance and NSD effectiveness in different KIBS companies. The results of literature review help to identify the main indicators that the researchers suggest for estimating KIBS performance effectiveness and NSD assessment.

It is worth recalling that NSD measurement or assessment occupies a special place in the study of NSD process due to extreme complexity to measure or assess its outcomes, especially those that are intrinsically intangible as knowledge.

According to Menor *et al*. (2002), NSD performance is a multidimensional construct that reflects both operational effectiveness and marketplace competitiveness (Cooper and Kleinschmidt, 1995). In their work, time, cost and quality of the service offering are typically viewed as the central objectives and operational outcomes of a development effort (Tatikonda and Montoya-Weiss, 2001). The measures of NSD outcome and process performance indicated by Menor *et al.* (2002) are summarized in Table 6.

Table 6: The measures of NSD outcome and process performance adapted from Voss *et al.* (1992) and Menor *et al*. (2002)

NSD outcomes	***NSD measures***
Financial measures	Criterion cost
Achieving higher overall profitability Substantially lowering costs for the firm Performing below expected costs Achieving important cost efficiencies for the firm	Average development cost per service product Development cost of individual service product Percentage of turnover spent on developing new services, products and processes
Competitiveness measures	Effectiveness
Exceeding market share objectives Exceeding sales/customer use level objectives Exceeding sales/customer growth objectives Achieving high relative market share Having a strong positive impact on company image/reputation Giving the company important competitive advantage Enhanced sales/customer use of other products or services	How many new services developed annually Percentage new services that are successful
Quality measures	Speed
Resulting in service "outcome" superior to competitors Resulting in service "experience" superior to competitors Having unique benefits perceived as superior to competitors Great reliability firm More user friendly	Concept to service launch time Concept to prototype time Prototype to launch time Time to adopt new concept from outside the firm

Studying the problem of performance measurement Pina and Tether, (2014) as well underline the difficulty for researchers to choose appropriate performance indicators, especially if the performance is considered dynamic: just few researchers, in fact tried to measure performance over time (e.g. Tether *et al.,* 2012).

The difficulty starts with the definition of productivity, one of the main performance measures, which according to Biege *et al.* (2013) generally is based on the OECD's (2001) definition of productivity, i.e. 'the ratio of a volume measure of output to a volume measure of input'. The researchers as well have divergence in defining performance and competitiveness in KIBS (Pina and Tether, 2014).

The majority of researchers use 'accounting measures' such as profitability, return on investment, return on sales, income per head, or income per partner, and market share. But more studies started to take into account more integrated approaches with combined measures, including financial, strategic and operational indicators (Ghalayini *et al.,* 1997).

Some researchers are trying to find the drivers of performance, but they define them differently depending on the investigated sector. According to the literature analysis by Pina and Tether (2014) the majority of papers dedicated to KIBS performance focus on a single driver of measuring performance. Some of the measuring criteria include: innovative business

culture (Santos-Vijande *et al.,* 2013), EFMQ excellence model (implementation of best management practices), balanced scorecard (performance improvement, based on resource-based view), and intangible assets monitor (performance improvement according to a knowledge-based strategic view) (Viedma Marti, 2004).

Other authors use methods derived from studies concerning manufacturing and service companies in order to develop NSD methods of assessment in KIBS. Prajogo (2006) through the comparative study of the relationship between innovation performance (in terms of product and process) and business performance (sales growth, market share and profitability) both in manufacturing and service firms affirms that service innovations are commonly more "rapidly implemented" but also more easily imitated compared to manufacturing.

A widespread method derived from manufacturing studies is benchmarking. Cooper and Kleinschmidt (1995) propose several factors that can accelerate new services success at the project level: process, organization, strategy, culture and commitment. Having a clear and well-communicated strategy is considered one of the most important conditions of achieving success. The main measures of new product performance assessment they identified from the rate of commercially successful NPD projects (which are defined by sales and profitability) to the overall success of the company related to competitors.

QFD (Quality Function Deployment) and TRIZ (Theory of the Resolution of Invention-Related Tasks) are other popular measuring methods. For example in Product-Service Systems (PSS) Kim and Yoon (2012) tried to use the methods for concept generation for new PSS. The authors found contradictions between product and service components. According to them the TRIZ knowledge-based tools can be applied to eliminate the contradictions. While QFD is widely applied because it is a structured approach to define customer needs or requirements and translate them into specific plans to produce products, meeting those needs (Tukker and Tischner, 2006).

Authors who tried to assess NSD processes in KIBS (Biege *et al.,* 2013) concentrated on difficulties in measuring service productivity in KIBS. The difficulties are connected with the nature of KIBS, which are characterized by the highest level of service "interactiveness" and service complexity.

The importance of a customer interaction in the assessment process is highlighted by Storey and Easingwood (1998), who introduced the term of "augmented service offering (ASO)" to indicate the service firm's reputation and the quality of the customer's interaction with the firm's systems and staff. Basing on the studies of financial services industry in the U.K., they identified the components of the ASO, and examined the relative contributions of these components to the success of new services. They see the success of NSD as the combination between the requirements of the new product, the resources of the firm, and the attractiveness of the marketplace.

A strategic knowledge benchmarking system (SKBS) developed by Viedma Marti (2004), combined resource and activity- based view on competitive advantage of the firm. SKBS drew inspiration from the extended SWOT analysis and built a strategic management information system in which core knowledge is the key variable. The author developed the eight factor framework for assessing knowledge embedded in products, services, processes, firm's core competences and professional's core competences. The author insists on the notion that the company should always aspire for "best in world" status and measure competitors according to the same status (Figures 14 and 15).

Figure 14: The process of benchmarking inspired by SWOT analysis (from: Viedma Marti, 2004)

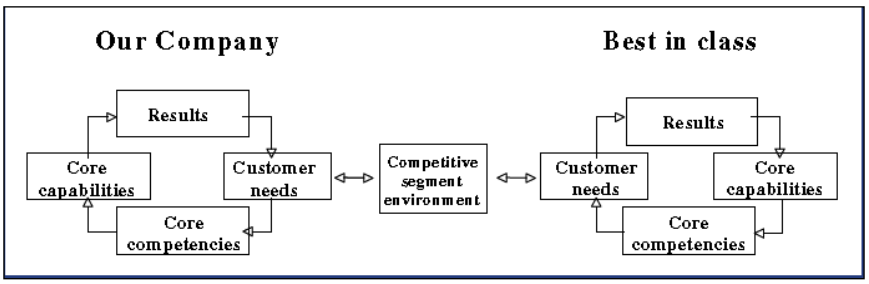
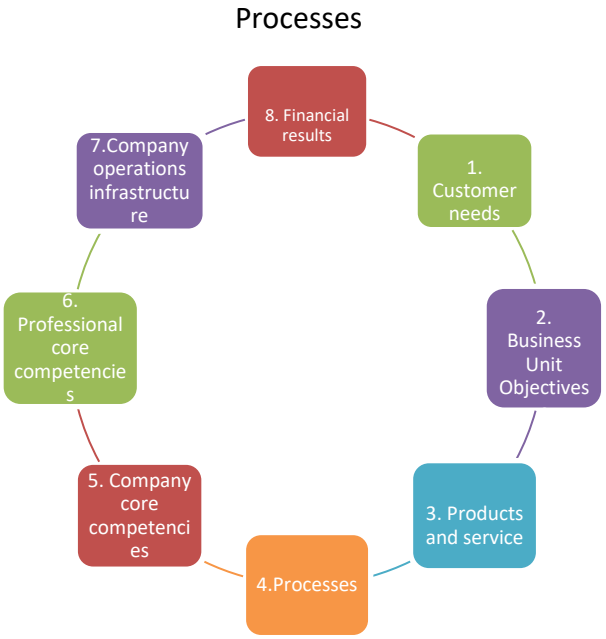


Figure 15: The eight-factor framework (from: Viedma Marti, 2004)



NSD assessment is an important issue for understanding a more broad issue of measuring knowledge-based outcome and performance in general. The topic is open for further research and the researchers still need to arrive to identifying common and precise measures for measuring performance. The study of NSD process can help to find ways in resolving this problem.

2.3.5 The particular role of knowledge in NSD process

Big part of the overall research about NSD is dedicated to the contribution of knowledge to the NSD process and to the business performance in KIBS companies. Several authors consider knowledge as one of the main factors in the NSD process (Prieto *et al.,* 2009; Herder *et al.,* 2003), since it is typically a knowledge intensive activity. Scholars often investigate the possible combination of different kinds of knowledge due to the presence of various knowledge types or strategies in the process of NSD.

For instance, Prieto *et al.* (2009) define the NSD process as the struggle between past and uncertain future requirements which raises the need to reconcile knowledge exploitation and knowledge exploration. According to Adams *et al.* (1998) and Becker and Zirpoli (2003), significant efforts are needed to combine the conflicting demands of knowledge exploration and knowledge exploitation. Bettiol *et al.* (2012) analyse the relationships between standardization and creativity in the service innovation processes of KIBS specialized in highly creative outputs (design and communication), which are characterized by informality and difficult standardization. They also investigate the difficulties in codifying creative activities, and conclude that knowledge management strategy of highly creative KIBS should be a mix of personalization and codification. Herder *et al.* (2003) identify two types of knowledge needed for the process of NSD: explicit and implicit.

Other authors consider different aspects of Knowledge Management in NSD process. Pitt and MacVaugh (2008) affirm that technologically successful companies achieve advantage through NSD when they are able to capture, embed, reconfigure, apply and diffuse knowledge. Bitran and Pedrosa (1998) take into consideration psychological aspects of clients' behaviour: they underline that one of the main difficulties of NSD is that human behaviour is difficult to predict or model. They also propose a model that includes the following steps: strategic assessment, concept development, system design, component design and implementation, while all the steps are united with feedback and learning.

The role of knowledge in the innovation process of KIBS companies was deeply studied by Gallouj (2002). Introducing different typologies he uses the definition of the nature of knowledge developed by Lundvall and Johnson (1994), in which four forms of knowledge are identified - know-what, know-how, know-why and know-who - and the definition given by Polanyi (1983), who contrasted tacit knowledge (sometimes known as implicit or embodied knowledge) with codified knowledge: "tacit knowledge is subjective and difficult to articulate and codify", conversely, "codified knowledge can readily be expressed in the form of signs and verbal or written symbols".
The role of knowledge is important to understand knowledge dynamics in the NSD process. The proposed theories of the role of knowledge deserve further systematization and elaboration. Deep study of the role and nature of knowledge in KIBS is necessary to understand the concept of knowledge bases presented in the next section.

2.4 NSD in KIBS

The last parts of the chapter are dedicated to the topics addressed by the research project: knowledge bases and innovation in KIBS. There are practically no research works dedicated to the study of the connection of the NSD process with the knowledge base of the company and its innovation. Before investigating this connection it is necessary to devote some reflections on the concept of knowledge base and on the innovation processes in KIBS companies.

2.4.1 Knowledge bases in KIBS

This topic deserves a particular attention since it is strictly related with the cognitive nature of KIBS companies. After realizing that knowledge can be of different types, some scholars attempted to classify the different types of knowledge (Table 7).

Table 7: Different classifications of knowledge proposed by researchers

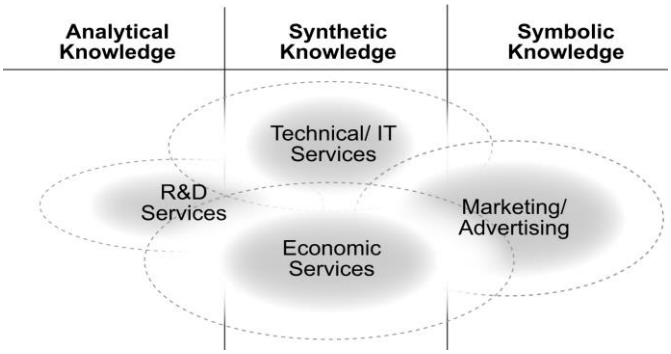
Classifications proposed in literature	***Authors***
Tacit and codified knowledge	Polanyi, 1967
'Know-what', 'know-why', 'know-how' and 'know-who'	Lundvall and Johnson, 1994
T-KIBS (technical service firms e.g. R&D and computer services) and P-KIBS (professional service firms, e.g. legal, accountancy services)	Pavitt, 1984; Miles *et al.,* 1984
'Modes of innovation' called 'supplier dominated', 'production intensive' and 'science based', based mostly on the study of manufacturing sector	Hollenstein, 2003; Jensen *et al.,* 2007; Tether and Tajar, 2008
Analytical ("science-based"), synthetic ("engineering-based") and symbolic knowledge ("arts-based")	Asheim *et al.,* 2005; Asheim and Gertler, 2005; Strambach, 2008; Tether *et al.,* 2012).

One of the most influential studies dedicated to the nature and classification of knowledge bases is the work of Strambach (2008) where he ascribes different sectors to certain knowledge types. According to the author "the acknowledged cumulative nature of knowledge" leads to the "formation of specific knowledge bases, often synonymously called stocks of knowledge that exist at multiple levels ranging from individuals to nation states". The accumulation of knowledge that results in competencies and capabilities the author designates as a certain kind of "metastructure" basing on the work of Malerba and Orsenigo (2000). This "metastructure" shape the ways of how knowledge is extracted, estimated, converted and implemented by agents for their objectives in vary circumstances and connections. According to the author both the knowledge base and the capabilities dynamically interact through learning processes, emerge with time and have interdependent nature due to the cumulativeness of knowledge.

Stambach (2008) distinguishes two types of knowledge bases: 'analytical' and 'synthetical'. This taxonomy has been drawn from the work of Pavitt (1984) who differentiated between supplier-dominated, production-intensive, and science-based industries. Basing on the previous analysis of Asheim and Gertler (2008), Strambach (2008) asserts that analytical knowledge base dominates in industries with science-based formal procedures documented in reports, electronic files or patent descriptions. At the same time Strambach (2008) notices that there are industries where innovation takes place mainly through the application of existing

knowledge or through the new combination of knowledge. For such industries knowledge base the author uses the term Synthetic. Following the analysis of previous researchers (e.g. Miles *et al.,* 1996) , that defined t-KIBS as services with high use of scientific and technological knowledge (R&D services, engineering services, computer services, etc.) the author concludes that this type of companies that are more dominant in Europe in quantitative terms – technical engineering and data processing services focus instead on synthetic knowledge. A third type of knowledge recognized in research on cultural or creative industries such as film making, music, fashion, theatre, publishing or advertising and design (Scott, 1997), the author defines as Symbolic type. At the same time he ascribes this type to KIBS subsectors such as marketing and advertising "dealing with ideas, symbols and socially constructed commodities" (Figure 16).

Figure 16: The focal points of KIBS sub-sectors in the different knowledge categories (by Strambach, 2008)



At the same time the researcher identified that KIBS 'support knowledge dynamics' and 'operate in all three knowledge phases' (Table 8) even with one knowledge dominant. The exploration phase corresponds to the search of new knowledge, while exploitation with the operation of knowledge, examination deals with testing and experimentation.

Table 8: Examples of KIBS activities in different knowledge categories and knowledge phases (by Strambach, 2008)

Phase	***Analytical***	***Synthetic***	***Symbolic***
Exploration	Contract research Contract development	Experimental engineering Pre-design	Market research Scouting Open space
Examination	Testing and validation	Feasibility studies Prototyping Design	Market estimation Proof of concept Strategic consulting
Exploitation	Patenting	Series-production readiness	Marketing campaign Branding

A big contribution to the study about the interconnection between the knowledge base of the company and its innovation process was given by the works of Pina and Tether (2014, 2016). The cornerstone of the research of Pina and Tether (2016) is the idea that KIBS companies

substantially differ in their 'knowledge bases', which they defined as the 'type', 'form' or 'mode' of knowledge at the core of the company's activities (Strambach, 2008; Tether *et al.,* 2012).

The problem put in front of the researchers is how to identify, define and evaluate the different knowledge bases.

Most researchers used in-depth case studies (e.g., Asheim and Coenen, 2005; Strambach and Dieterich, 2011; Liu *et al.,* 2013), and few quantitative survey (Martin, 2012; Tether *et al.,* 2012; Pina and Tether, 2016). The results of their research arrived to description of different knowledge bases and definition of their characteristics.

Specifically, 'analytical' knowledge can be related to activities based on scientific cognitive and formalised models, especially with a logical or deductive basis (Asheim, 2007; Asheim and Hansen, 2009). The main purpose of this 'know-why' activity is to understand and explain nature of the natural and social world (Manniche, 2012). According to researchers analytical outputs tend to be codified and formally documented, but not necessarily easy to understand (Pina and Tether, 2016).

Researchers underline that people involved in the development of this type of knowledge need to have and develop special skills and qualifications – such as abstraction, analytical capabilities, theory building and testing – often associated with research experience (Pina and Tether, 2016). According to researchers the results of the activity can be scientific discoveries or the development of considerably new products and processes (Asheim *et al.,* 2011).

When the researchers try to define the 'synthetic' knowledge in most cases they speak about activity of 'solving of specific problems' the 'know how' aimed at resolving practical problems (Martin, 2013; Pina and Tether, 2016). Some research pointed at clients and suppliers collaboration for resolving problems (Asheim *et al*., 2011; Asheim and Hansen, 2009). Following the definition, in applying this kind of knowledge it is important to arrive to a practical result. Since the main criterion of the knowledge application is know-how, it is important the results of practical work, testing or experimentation based on experience (Asheim *et al.,* 2011; Pina and Tether, 2016). Practical learning is crucial to developing this knowledge base. Asheim proposed that synthetic knowledge mostly produce incremental innovations, as the result of the combination of existing knowledge (Asheim *et al.,* 2011).

According to scholars, 'symbolic knowledge' is at the basis of creative processes. The researchers identify creative processes as based on artistic expression and creation of meaning mostly through visual features, symbols or cultural objects (Asheim and Hansen, 2009; Martin, 2013). 'Symbolic knowledge' is "arts based"; it is related to artistic expression and to the creation of desire and meanings. It has a strong orientation to the visual features of products and solutions through images, symbols and cultural objects. The researchers identified this knowledge base later than the previous two; one of the reasons of it was the growing importance of media, advertising and fashion industries. The creative process is mostly aimed at creating original products and such concepts like inspiration, imagination, and intuition play important role in the creation process.

To find the methods of evaluation, i.e. methods that can help identify the knowledge bases Pina and Tether (2016) undertook a vast statistical analysis on the basis of interviews and websites of the companies for identifying their knowledge bases using a rigorous approach. Applying NVIVO program they identified 800 most frequently occurring words on the

companies' websites. In particular they made a selection of those words "they felt associated most closely with each of the three knowledge bases" (Pina and Tether, 2016). Simultaneously applying UCINET program the researchers attempted to cluster the results. According to the results the most difficult to circumscribe were companies with the presumed synthetic knowledge base since they had the least possible combination of characteristic words, while companies with the presumed analytical and symbolic knowledge bases had more recurring words' combination.

The results showed that firms with analytical knowledge base were more likely to innovate, while with synthetic and symbolic less. The authors focused intentionally on product/service innovation since they deemed that "knowledge bases and related investments are more closely connected to product/service innovation than to process/organizational innovation" (Pina and Tether, 2016). The main differences appeared that companies with analytical knowledge bases were more likely to invest in R&D, while companies with symbolic base - in design. IT investments were important for all KIBS companies; no evidence emerged of geographical connection with the innovation.

After an analysis of the works of previous scholars (Asheim and Coenen, 2005; Asheim and Hansen, 2009, Manniche and Testa, 2010; Asheim *et al.,* 2011; Todtling *et al.,* 2011; Manniche, 2012; Tether et al., 2012) the authors proposed a summary of the main characteristics of the four differentiated 'knowledge bases' (Table 9).

Table 9: The main characteristics of the four differentiated 'knowledge bases' (from: Pina and Tether, 2016)

	Synthetic	***Analytical***	***Symbolic***	***Compliance***
Purpose of knowledge creation	Designing and/or providing practical solutions to client specific problems.	Provide rigorous understanding of natural or social phenomena.	Creating and/or manipulating expressive forms to elicit desire and/or achieve distinction.	Providing, assessing or reforming solutions so that they comply with laws and regulations.
Source of initiation	Identification of specific problems needing a practical solution	Identification of a need for knowledge or information requiring rigorous, objective analysis.	Identification of a need or desire for distinctiveness through expressive language or forms	Identification of a need to comply with, or circumvent laws and/or regulations.
Knowledge inputs, approach and requirements	Application of experience and heuristics developed through learning by doing, using and interacting, especially on similar prior projects. Inductive processes of trial and error, experimentation and practical work; Includes attending to 'field problems' and solutions are pragmatic and may be bricolaged.	Application of legitimated scientific models and methods usually grounded in mathematics and/or logic. Work follows deductive, rational processes with a strong orientation to objective findings. Requires an understanding of the application of scientific methods, but not necessarily oriented to further development of these	Development of artefacts and expressive forms imbued with sociocultural meanings, usually by means of generative and creative processes based on inductive and divergent thinking. Typically requires an appreciation of abstract symbolic languages and their socio-cultural meanings.	Application of knowledge and the likely interpretation of laws, regulations and required procedures to evaluate whether or not a proposal complies with these. Also offering advice to ensure a proposal is compliant. Requires formal (and of usually certified) knowledge of laws and regulations, and an ability to argue a case.
Type of knowledge created	Practical, based predominantly on intuition, experience without recourse to extensively documented materials.	Deterministic, based on scientific methods and codified data sources	Expressive, based on insight, subjective interpretation and conditioned by attitude to sociocultural acceptance.	Interpretive, based on extensively documented knowledge and the certified expertise.
Importance of client interactions	Requires strong client interactions throughout the project.	Client specifies requirements but rarely directly involved in execution.	Client interactions primarily for approval and alignment.	Client presents case and information, and considers compliant solutions.
Means of sharing, diffusing and retaining of knowledge	Knowledge held primarily in minds of those involved; shared through joint project experience	Knowledge codified into publications, patents and software algorithms. Techniques diffuse through replication	Signature styles associated with prominent individuals. Diffusion and learning through atelier methods. Successful forms liable to imitation.	Accepted and documented interpretations of judicial judgements, laws & regulations. Lobbying and influencing regulatory bodies
Outputs	Practical solutions, often including implementation. Written documentation is secondary.	Documented reports with findings. Guidance on how to use findings is secondary.	Creative symbols or forms, including graphics, models and prototypes.	Documented and/or verbal advice sometimes with guidance for implementation
Examples of outputs	Supply chain management, marketing & business restructuring	Market research reports, investment analysis reports, structural analysis	Brands, logos, distinctive product forms, iconic buildings	Building regulations reports, health and safety compliance reports, etc.

The issue of knowledge bases in KIBS is a quite complicated topic. The abstract nature of knowledge makes the identification of knowledge bases on one part hard to define and on the other – hard to evaluate. These problems result in the lack of empirical research works that could identify and evaluate knowledge bases. These topics remain open in the literature dedicated to KIBS. The identification of precise methods of knowledge bases definition, evaluation and classification is a challenge and goal for future research.

2.4.2 Innovation in KIBS

The topic of innovation is probably one of the most studied by KIBS scholars (Scarso, 2015). According to Pina and Tether (2014) the majority of empirical studies on innovation in KIBS companies use the Schumpeterian definition of innovation, i.e. a "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one" Schumpeter (1942). Combining this definition with the recent studies identifying KIBS as innovators and as co-producers of knowledge (e.g. den Hertog, 2000; Larsen, 2001; Muller and Zenker, 2001; Hu *et al.,* 2013), innovation in KIBS is usually sees as an evolutionary process based on the creation and (re-) combination of knowledge (Jennings *et al.,* 2009; Muller and Zenker, 2001). It is worth recalling that innovation can assume different forms, according to the nature of its outcome. In this regard Pina and Tether (2014) identified four different types of innovation, whose characteristics are summarized in Table 10.

The majority of papers dedicated to innovation in KIBS are concentrated in product/service innovation (Pina and Tether, 2014), while marketing and organizational innovations have been less investigated.

Table 10: Types of innovation studied in literature (revised from Pina and Tether, 2014)

Types of innovation	***How were these innovation types measured? (examples from 53 papers)***
Product	• Introduction onto the market in previous three years of any new or significantly improved products (goods or services) with new element valuable in the market • Number of a firm's patents granted at a particular time
Organizational	• Introduction in previous three years new or significantly improved management techniques or organizational structures or employee work practices (e.g. knowledge management, quality circles, delivery, innovation management practices that enable/hinder innovative behavior etc.) • Creation of new practice areas and new forms of organization • Type of profit sharing system (based on individual performance)
Process	• Introduction any new or significantly improved production processes or supply of goods and services during previous 3 years • Use of ICT, Technologies for service, production/delivery, modes of service production
Marketing	• Introduction over the last three years significantly modified or 'revolutionary' marketing strategies and concepts (e.g. marketing methods)

The majority of the analyzed papers identify innovation asking respondents in companies whether their company introduced 'any new or significantly improved product/ service/ process/ organizational/ marketing innovation in the last 3 years'.

The authors as well identified that the majority of empirical studies on innovation in KIBS are quantitative and used the database of OECD's Oslo Manual based on measures characteristic for manufacturing sector, which can create duplicate results with NPD base.

Other researchers e.g. Gallouj (2002) proposed to distinguish the innovation process from a service provider point of view and from the client firm's point of view.

When the service provider is part at the process the stages of the innovation process he identified as:

1) gathering of information and ideas;
2) research (whether basic or applied);
3) design and development (including testing or experimentation);
4) production of the solution;
5) marketing of the solution (or its pseudo-marketing when it is to be diffused within an organization).

At the same time the provider can be called to intervene in one or several stages of the process, or to become in charge of the consistency of the whole process. The author as well gives examples where several different providers can be invoked to accomplish their specialist services: "marketing consultants upstream of the innovation, R&D laboratories, legal consultants downstream of the solution etc." (Gallouj, 2002).

The author affirms that from the client firm's point of view the process of innovation can never be a linear one: various stages may be removed, some may overlap (that is take place simultaneously) or merge with each other. He proposes an example of services, where production and marketing are frequently interchangeable.

The idea of the author is that KIBS produce innovations internally and through their clients. He subdivides 'new fields of knowledge' innovation into: 1) new products, 2) new markets and 3) new sources of raw materials.

The categorization of service innovations is less clear than the traditional division to product and process innovations. Based on a generalized model of service innovation, Gallouj and Weinstein (1997) suggested a typology of six service innovations types: radical, improvement, incremental, ad hoc, recombinative, and formalization innovations. Radical innovation involves developing a completely new service from scratch. Improvement and incremental innovations introduce new elements to existing services, or improve selected characteristics of the service. Ad hoc innovations are characteristic of services and consist of adaptations made to existing services during delivery to meet unique customer requirements. Similar to architectural innovation, recombinative innovations create new customized services by combining existing services in novel ways. Finally, formalization innovations make services "less hazy" by specifying service characteristics and, where possible, standardizing service elements.

Despite the fact the topic of innovation is one of the most studied in KIBS the researchers underline the lack of qualitative studies that could describe in depth the process of innovation on KIBS and that can be missed in quantitative studies.

2.5 Summary

On the basis on the examined literature, it's possible to conclude there are many gaps in the research about NSD in KIBS. This is due to the fact that even the research about NSD in the service sector still presents many open issues, as underlined by several scholars, starting from agreement on basic definitions and finishing with the gaps and lack of scientific base in different stages of the process. Similarity of the processes with the service sector gives a possibility to try to apply the existing models to the analysis of such companies. The most notable and unexpected results of the literature review is that many models have been developed just theoretically, but they have been not tested enough in practice. Most models have been developed on the basis of the analysis of companies of one or maximum two-three KIBS sectors and usually located in a single country. There are practically no works comparing the approaches to the NSD process adopted in different KIBS sectors, and comparing the experience of different countries.

Important research gaps were indicated in the works of Pina and Tether (2014,2016) who pointed at the lack of qualitative studies that could describe in depth the process of innovation in KIBS and that can miss in quantitative studies. They as well proposed the topic 'dynamic links between knowledge base, performance and innovation' as one of the topics that deserves investigation since these links were not studied in literature before. The topic is very complex and vital. It can contribute to the study of several problems: the problem of the knowledge base identification, performance measurement and innovation and their connection with the company's knowledge base.

Chapter 3. Research questions and method

As underlined in the previous chapter, the literature review revealed that there is still a long way to go in the research about KIBS, and particularly about the NSD processes in such a sector. Most of the developed NSD interpretative frameworks are theoretical and not tested enough in practice. At the same time practically all the researchers pointed at the scarcity of empirical research in this topic.

These results show the strong necessity to undertake an in-depth qualitative research aimed at investigating more deeply how the NSD process is carried out by KIBS companies of different kind and located in different counties. This was the aim of the research project whose results are described in the present thesis. To do so, the case study methodology was adopted, since it seemed to be particularly suited to conduct such a study and deemed to be especially appropriate for the exploratory phase of an investigation, when the principal questions "why" and "how" have to be answered to start delineating the distinctive traits of a phenomenon (Yin, 2003; Eisenhardt, 1989).

The majority of past research works dedicated to knowledge bases in KIBS examined them at the regional level, taking as units of analysis entire clusters, regions, industries or systems (e.g. Asheim and Coenen, 2005, 2006; Coenen and Moodysson, 2009). Just a small part of studies used as a unit of research (Yin, 2003) an individual firm (Tether *et al.,* 2012; Pina and Tether, 2016).

Since the specific aim of the PhD thesis was to investigate how the NSD processes are affected by the specific knowledge base possessed by a firm, the NSD processes of individual companies were chosen as the unit of analysis.

At the same time previous researchers concentrated mostly on the study of one or two-three KIBS sectors usually in a single country. That is why the selected cases concerned twelve companies chosen among almost all the KIBS sub-sectors and located in different countries: this allowed, on one hand, to show the influence of different activities on the NSD processes and, on another hand, to classify these activities according their knowledge bases on the basis of the results.

The selection of companies for the research was verified according to the modern classification of companies belonging to KIBS sector (Schnabl and Zenker, 2013). The other parameters such as size, level of maturity, corporate governance, companies' structure were taken into consideration as parameters affecting the NSD process. Large multinational companies and medium-small were selected for the research in almost equal parts.

The majority of companies are leaders in their sectors; some are multinationals with offices around the world. The leading position of these companies allowed assuming that they developed effective processes leading to achieving competitive results. If the companies are not leaders in the sector their position on the market is described in the research.

The research was international: the studied companies are based in the United Kingdom (London), Italy (Rome, Milan) and Russia (Moscow). The United Kingdom occupies the leading position in many knowledge-intensive services and the choice of the companies based in London providing most innovative services is quite natural. Italy holds a leading position in several specific KIBS sectors; it helps to compare innovative companies in two countries with

different business cultures. The inclusion of one company from Moscow in the selection allowed to compare the NSD process of the company located in a quite different environment that is considered less innovative compared to the United Kingdom and Italy. This kind of selection helped to investigate different NSD process affected by different environments.

The interviews were held in these countries. From December 2015 till February 2017 fifteen companies were interviewed and twelve of them were chosen for the research (Table 1).

Table 1: List of the investigated companies

Company name	Field of activity	Size	Location of interview
1.Umberto I Clinic, University of Rome Sapienza, Associazione Italiana per l'Educazione Demografica	Medical research in andrology	More than 1000	Rome
2. Istituto di Sessuogia Clinica in collaboration with Umberto I Clinic	Research in psychology, sexology	20	Rome
3. Politecnico di Milano	Online education, FLEX EMBA	More than 100	Milan
4. Alfresco (offices in US, Australia, Europe and India)	IT, innovative IT developer for leading corporations	400	London
5. VIP telecom service	IT, Internet, mobile services	60-70	Moscow
6. FTI Consulting (office in 29 countries) Employing 16 Nobel laurates	Multinational leader in consulting	More than 4,600	London
7. Conte (part of multinational Admiral group)	Online car insurance, the best employee and the best website	500	Rome
8. LETO (included in the list of the best 50 digital UK companies)	Digital marketing	15 in London, 26 in other offices	London
9. Omniauto	Leader in the sector of online media in Italy	50-60	Rome
10. MKV design (works for lux hotel chains, e.g. Marriott, Sheraton, Grand Hyatt etc.)	Leader in interior design and architecture	20	London
11. P+P studio	Graphic Design	4	London
12. Law firm	Civil law	4	Rome

The period abroad at the Southampton University which lasted for 3 months was used to find the companies based in London for conducting interviews. Data and information were collected by means of semi-structured interviews, visits to some companies, observations, notes, questionnaires, study of documents connected with the companies' NSD processes, companies' web-sites (Yin, 2003; Miles & Huberman, 1994). All the interviews were recorded and transcribed. The outline of the interview is shown in the appendix to this chapter.

On the basis of what emerged from the previous chapter, three main research questions were addressed, as follows:

Research question #1: How do KIBS companies organize their service development processes?

- *Are there common stages in different companies?*
- *Which factors influence the process?*

Research question #2: Is the NSD process affected by the knowledge base of a company, and if yes, how?

- *Is there a connection between the knowledge base of a company and the NSD process?*
- *How is the NSD process systemized in companies with different knowledge bases?*

Research question #3: What are the forces driving innovation in KIBS companies with different knowledge bases?

- *Can the level of formalization of the service development and ideas search process affect the level of innovativeness of the final service?*
- *How is the final service affected by the knowledge base of the company?*

To answer the questions the managers responsible for the service/product development process in their companies were chosen for the interviews, or the Directors and founders of the companies.

The respondents usually started the interviews with the brief description of the company, its main stages of development, organisational structure, and main clients. Special attention was dedicated to the position of the company on the market, main competitors and competitive sides of the company.

The basic part of the interview dedicated to the NSD process in the company usually started with the question to the managers to describe in their own words the process of service development in their companies following with more specific questions about the process, such as the codification of the process, the main phases, the timing etc.

Since most previous researchers were using 'products' and 'services' as synonyms (Pina and Tether, 2014) the questions were developed regarding the New Service Development processes keeping in mind both products and services as the process outcomes. To avoid the misunderstandings with the concept 'New Service Development' (Menor *et al.,* 2002) the managers were asked if the company has been developing any new services according to their understanding of the term during the period of their experience.

During the interviews the respondents indicated differences between Service Development and New Service Development processes, the difference between the processes is in the new idea search stage. When the idea for the new service is found the process of service development becomes repetitive.

A special block of questions was dedicated to the description of the process of new ideas search in the company.

The managers were also asked to evaluate the level of innovativeness of the proposed services. The level of services innovativeness was not classified according to the existing classifications (Johnson *et al.,* 2000; Gallouj, 2002) since the goal of the research is not to classify the services'

innovativeness but to compare the more or less innovative services in different companies. The only two parameters taken into consideration regarding this question were the opinion of the respondents about the level of innovativeness of the companies' services and whether the service presents a new knowledge or an improvement of a previous one.

The interview as well included questions on the NSD assessment and future strategic plans in companies which can contribute to the underinvestigated topic of NSD assessment and KIBS performance measurement.

To arrive to conclusions all the results of case studies were summarized in tables by cross-case comparison with forming types and families (Miles & Huberman, 1994).

One of the goals of the research was to identify the knowledge base that the companies are using in their activity. To achieve this task, a separate part of research questions was dedicated to the type of knowledge the respondents are using in their activity. To understand better the process, the respondents were asked to describe the process of NSD from the cognitive point of view, i.e. which kind of knowledge sources they are using in the process, is the process formalized and transcribed, which kind of specialized knowledge they are using in the process, is it codified or tacit.

The links between the knowledge base of the company and its NSD processes were not studied in the literature previously. The study of these links can help to identify which type of knowledge companies are employing in its activities. It can contribute to the debate about the methods for the knowledge bases identification.
The literature review revealed that the knowledge bases definition is still an open issue. Researchers propose different definitions of the existing knowledge bases, and some also propose to introduce new knowledge bases. This complicates the application of the existing definitions in the research. To avoid the influence of definitions of knowledge bases done by previous researchers and to try to determine different knowledge bases just through differences of their NSD processes the meaning of terms of the existing knowledge bases: 'analytical', 'synthetic' and 'symbolic' was deducted from the Oxford dictionary. The meanings of the terms were indicated in their direct meanings in the native language without any additional interpretations. The research results were aimed to show whether the NSD processes of the investigated companies correspond to the Oxford definition of the existing knowledge bases. And after this analysis the terms' definitions were compared to the ones proposed by other researchers.

The method turned out quite effective since first of all the results were not influenced by previous definitions and second it confirmed the assumptions of some researchers (Pina and Tether, 2016) that the existing classification of knowledge bases can be incomplete since it does not take into account all differences between KIBS companies. This result allowed to confirm the existing assumptions about the necessity to introduce a new knowledge base to the existing classification.

Chapter 4: Findings of Case Studies' Investigation

In the following chapter the investigated cases are illustrated and analyzed. The description of every case is divided accordingly into several parts. The general introduction of the company, its brief history, organisational structure and main clients are described in the first part. In the second part the position of the company on the market is outlined, as well as its main competitors and competitive sides. The third part is dedicated specifically to the description of the NSD process in the company, while the fourth to the NSD process assessment and strategic innovation plans of the companies. In the last part of every case the studied data is analyzed with the aim to define the knowledge base of the company.
The order of the companies' description is chosen according to the similarity in their activities. The first two cases are dedicated to the organisations dealing with medical research, the NSD process in these organizations corresponds to the process of planning and conducting a new research project. The third case concerns the company providing online education degree courses, based in the leading Italian University. The fourth and fifth cases regard the IT companies, while the next two the professional and financial sectors: consulting and insurance. The eighth case is dedicated to the digital marketing company, and ninth to the online media company. Design sectors explored through interior design, architecture and digital design are presented in cases ten and eleven accordingly. And finally the last case is dedicated to the description and analysis of the legal company, the name of which is not indicated for the reasons of confidentiality.

At the end of every NSD process description the stages of the process are presented schematically under the form of square figures. To highlight the idea generation stage, as it is in most cases the most important part of the process, it is presented in the polygon figure. The stages that can be skipped depending on the project are presented in the cycle figures. If during the process the stages are overlapped they are marked with arrows.

Case 1: Associazione Italiana per l'Educazione Demografica

1.1 Company introduction: brief history, main services and clients, organisational structure

It is a multi-structure research organisation performing research activities for public and private bodies. The interview for the research was held with a doctor specialized in andrology, full-time Professor and constant researcher in Sapienza University of Rome, leading doctor in the department of Urology of Sapienza University, member of Commission of Academics of doctorate research in reproduction Biotechnology (Collegio dei Docenti del Dottorato di Ricerca in Biotecnologie della riproduzione umana) of the University and Andrology surgery ("Andrologia chirurgica ricostruttiva ed implantologia protesica"). The Professor is constantly working for Umberto 1 clinic and Associazione Italiana per l'Educazione Demografica (AIED). The professor has performed his research activity in the field of andrology since 2001. The research is conducted in the public hospital Umberto I for the University and for the Association AIED. The main clients of the research are in most cases the hospital, the University and private clients. The research is conducted on the basis of his practical activity in the hospital and the Association.

The Sapienza University which holds the highest places in the ratings among Italian universities proposes a variety of PhD research courses and is undertaking a substantial research activity. The researchers of the University received Nobel prizes several times throughout its history including the ones in Medicine. The faculty of Medicine was founded in 1303 at the very beginning of the University foundation. In 2010 the faculty was divided into faculty of Pharmacy and Medicine, Courses of Pharmacy Biotechnology; the Faculty of Dentistry and the Faculty of Medicine and Psychology. The research in the University is promoted on a constant basis and financed by the internal funds of the University in collaboration with national and international research institutes, including industries and private commercial organizations. Professors performing a continuous research activity are contemporaneously the medical practitioners of the Policlinic Umberto I.

The Policlinic Umberto I of Rome is the polyclinic of the Faculty of Medicine and Surgery of the Sapienza University of Rome. It is the second largest public hospital in Italy with around 1200 posts. The hospital was founded in 1902.

The organization of the hospital consists from:

- Strategic Direction divided into general, administrative and health direction
- Health supporting departments: pharmacy and technical services
- Main departments: internal and specialist medicine, medicine of infectious diseases, general and plastic surgery, cardio, stomach, vascular surgery and organs transplantations, general surgery, hematology, oncology and dermatology, neuroscience and mental diseases, urology, diagnostic services, emergency and anesthesia, and dentistry.

The 3rd studied research body, for which the Professor is performing his research activity, is the Italian Association of Demographic Education (Associazione Italiana per l'Educazione Demografica (AIED).

The Association has a notable place in the Italian health system. It was founded in 1953 by journalists and scientists, of various political orientations, whose aim was to overcome the religious influence on national health. According the official website of the Association they set out various objectives, among which are:

- Educate people about responsible procreation and sexuality, promote courses and training for cultural and social growth;
- Support initiatives for improving the quality of life;
- Fight against discrimination among men and women;
- Organize social and scientific research with the Universities;
- Follow government laws on contraception, abortion, sexual and andrological information, social-health prevention, and respect of minorities and propose adequate corrections in case of doubtful regulations.

AIED is a non-profit organization, which operates through its national corporate bodies-National Congress, National Board of Directors, National Chairman, National Executive Body and its Sections. The organization is collaborating with other associations, committees, public and private bodies, both Italian and foreign. There are in average constant 60-80 doctors in the

Association in Rome, while in all Italy around 1000. The Association has offices in most Italian cities including the biggest ones such as Milan, Naples, Verona, Genova, Pisa etc.

Besides medical research it is involved in important social projects in health education and information.

The Association offers a number of clinical services in different fields: gynecology, andrology, obstetrics, dermatology, diagnostics, infertility, cardiology and others. The clinic laboratory is providing necessary exams for the services including bone density exams, vulvoscopy, hysteroscopy, laser surgery etc.

1.2 Position on the market: main competitors, competitive advantages

The Association is undertaking substantial research projects in the designated fields in collaboration with the leading Italian Universities (e.g. Sapienza) and main hospitals, in particular Umberto I clinic. Due to this collaboration the level of the researchers' qualification and the level of the provided services are very high, based on vast research experience. Constant research work secures the Association with solid competitive advantage compared to other state and private medical organizations.

The research results received inside the structure are published in the leading scientific journals and presented on the Association website. On the website it is also possible to find the history on health issues, modern treatment practices, some results of the research works and advices to young people on their life as a part of the Association educational programs. There is a special service providing psychological support for the youth.

Recently the organization has introduced a new service, English speaking doctors for non-Italian patients, differentiating it from many other medical centers. The service is offered in the Rome office of the Association, resulting from the needs of a big city inhabited with different nations. The website of the Association provides vast information on pregnancy and birthing, starting from the general scientific description of the process, and finishing with the diagnosis of pregnancy and the manual for the future mothers translated into Italian, English, Albanian, Arabic, Bengali, Chinese, French, Indian and Romanian.

As a result the Association acquired a number of advantages indicated on their website:

- "Vast Experience", the Association has been operating on a national level for almost 60 years.
- "Non-Profit Orientation": AIED was created with the goals of improving society. They are trying to maintain the costs of their medical and psychological services at modest levels. Despite the non-profit organization the Association underlines the importance of constant notable financial investment to the modernization of the structure and maintenance of the "most up-to-date analytical and diagnostic equipment" for the most advanced research.
- "Strong Commitment to Serve You and Society": 'AIED's goal which renders the Association unique with respect to all other Italian medical institutions'.

The Association is connected not only with the leading Italian research institutions and organizations but with many international bodies, including World Health Organization, Center for Reproductive Rights, International Planned Parenthood Federation an others.

1.3 NSD process description

The interviewed doctor has undertaken a lasting research activity for the Association, Policlinic Umberto I and Sapienza University. Basing on solid theoretical and practical experience he shared his experience in initiating and developing research projects.

In most cases the research is undertaken in collaboration with 3-6 researchers of the same organization normally without any auxiliary collaboration with the researchers from other research centers. The principal technical equipment indicated by the doctor necessary for the research activity is a computer. Codification in files is compulsory for all procedures of the research.

The ideas for the new research arrive both from concrete needs of the patients resulting from pathological situations not enough studied in the past and from cases of difficulties in finding therapies. Personal interests of the researcher in certain research fields can as well affect the choice of the idea for the research. The doctor could not answer if there are exchanges of ideas for the research between different departments of the Association since it has not happened during his experience.

In some cases the researcher needs an authorization from other structures, such as Ethics Committee, for the research initiation, in some cases the research activity can be undertaken freely.

The process of any research initiation should be based on a theoretical background. The researcher is following the predefined rules in performing the research process in a repetitive and systematic way. The steps always depend on the topic of the research. In his activity the respondent has chosen mostly cases or tests research methods, following a predefined protocol to inscribe and control the studied cases (Figure 1).

In one of the examples of the undertaken research, the doctor asks his patients to answer a number of questions. The answers of the patients should be “yes” or “no”, or the short description on the pointed questions in maximum three lines. The questions are mostly about physical conditions of the patients, but there can be also questions, concerning the opinion, the thoughts and ideas of the patient about the studied problem or his sensations about it. In some cases the doctor could also ask the partner of the patient to participate in the research if in his opinion it could clarify the problem and help to resolve it.

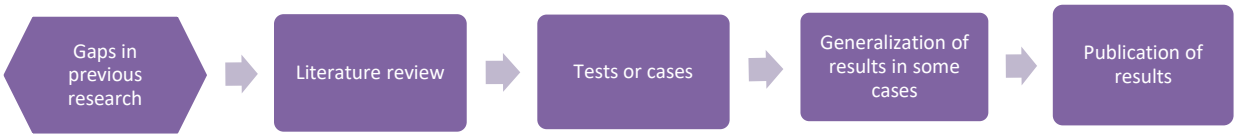
The duration of the research is always different depending on the problem and the topic of the research; there are not clear requests for the time. There are no departments as well that control the time frames of the research development.

If the research is conducted in a team, the person formally responsible is the person who is in charge inside the department, for example a director. But concretely the person who projected the research is responsible for its conduction. When the research requires specialists from

other departments it is possible to extend the research and collaborate with other departments of the hospital.

The main knowledge the doctor tends to use in his research activity is the knowledge in the fields of Urology, Andrology, and Sexology. The conduction of the research according to the doctor is based both on the experience from the previous activity, and theoretical scientific knowledge. According to his opinion, usually he is using both types of knowledge, tacit, based on his work experience and intuition as a researcher and codified, expressed in literature. But estimating the percentage range between these types, the degree of using codified type of knowledge overcomes the tacit one.

Figure 1: The main stages of the NSD process



1.4 New services assessment, innovation strategy

In some cases the results of the research can be generalized but in some cases it is not possible depending on the topic. If the results are generalized they are indicated for compulsory publication in scientific journals.

In the near future the doctor is planning to undertake a number of research projects. Just for some cases, extremely complicated, time and resource consuming, the researcher is obliged to estimate the costs of the research, but in general he has the freedom of not calculating the costs of the research, since the cost is not relevant for the structures he is working for. In his experience the research had never been interrupted for the lack of investment even if it was long lasting. The organization creates appropriate conditions for the scientific activity since the researchers can undertake research projects without estimating in advance the time and the costs of the process. The possibilities provided for the researcher coincide with the formal strategy of the Association introduced on its website: to continue its research, seminars, debates, etc. that demonstrate the 'group's commitment to modernize, pursue Italy's social, civil and cultural progress'.

1.5 Case discussion: definition of the knowledge base

The main kind of knowledge the respondent is using in the research process is the scientific knowledge applied in his field of activity: Urology, Andrology and Sexology. The doctor is basing the research process primarily on a codified knowledge and is following a strict codified research process determined by scientific rules and procedures that cannot be changed. The results must be as well codified. The goal of the process is to arrive to the maximum objective results. The objectivity is achieved through taking into account all the necessary data through

its analysis. This type of knowledge is more close to the definition of 'analytical' term which is determined in the Oxford dictionary 'as relating to or using analysis or logical reasoning'.

Tests or cases method that the respondent doctor is using in his research activity is appropriate for conducting analysis based on logical reasoning defined by the term. At the same time the doctor stressed that in the research activity the degree of use of the codified knowledge overcomes the tacit one, which means that in the research process the doctor is relying basically on codified results of previous research works rather than on his personal experience or intuition. This contradicts with the definition of synthetic and symbolic kind of knowledge, mostly based on experience and tacit knowledge. The definition of the timeframe for the research performance is not compulsory since it is difficult to estimate the time for the scientific process. During the interview the term 'analytical' according to the Oxford dictionary 'as relating to or using analysis or logical reasoning' was proposed to the doctor to contemplate if this kind of approach is close to his research activity and the answer was positive.

It is possible to conclude that the research process is based basically on the type of knowledge more close to analytical.

The stages of the research process help to determine in a more precise way the kind of knowledge the researcher is applying and the general knowledge base of the activity.

According to the answers of the interviewed doctor the hint for the new research initiation is mainly given by the problems not enough studied in the past in his field of medical activity or problematic cases needed further practical investigations: that corresponds to the classification developed by Pina and Tether (2016), where they identified the purpose of knowledge creation distinctive for the analytical type of knowledge as 'to provide a rigorous understanding of natural or social phenomena' and as a source of initiation, the 'identification of a need for knowledge or information requiring rigorous, objective analysis'. The type of knowledge created they identified as 'deterministic, based on scientific methods and codified data sources' with knowledge inputs and requirements as 'an understanding of the application of scientific methods' which as well corresponds to the procedures the interviewed doctor is using in the research activity based primarily on codified sources, predefined and systematic. The outputs of the research are usually 'documented reports with findings, guidance on how to use findings is secondary' and 'knowledge codified into publications, patents and software algorithm' according to Pina and Tether (2016) which as well correlates with the answers of the interviewed doctor that the research protocols and results must be codified in files. The results which can be generalized in some cases should be published.

The classification of the research activity as the analytical type of knowledge is as well confirmed by other researchers (Strambach, 2008, Asheim and Gertler, 2005) who stressed that an analytical knowledge base 'dominates in industries in which science-based knowledge is highly important. Where processes are formally organized and the output tends to be documented in reports, electronic files or patent descriptions'.

Case 2: Istituto di Sessuologia Clinica

2.1 Company introduction: brief history, main services and clients, organisational structure

The interview held at the Istituto di Sessuologia Clinica based in Rome is another example of a knowledge intensive research. The interviewed Professor graduated in Psychology at Sapienza University of Rome and is a consultant of sexology at the Institute. He has performed his research activity since 2010 and is an author of a number of scientific articles in national and international scientific journals. From 2015 he has coordinated a youth sector of the Italian Federation of Scientific Sexology and from 2013 he works for the Clinic Umberto I in Rome in the psycho-sexology department as a consultant in collaboration with the professors from the department of Urology of the Sapienza University. The Professor is as well involved as a reviewer of articles dedicated to sexual dysfunctions in F1000 (an open research publishing platform) and participates in the creation of the journal "Clinical Sexology".

The Institute of Clinical Sexology is a scientific-cultural association that deals with the research and education in medical psychology and sexology with specialists in different areas as psychology, sexology, andrology, gynecology, endocrinology, psychiatry and psychotherapy, working in collaboration. The Institute is collaborating with the World Association of Sexual Health (WAS), European Federation of Sexology (EFS) and Federazione Italiana di Sessuologia Scientifica (FISS). In collaboration with these organizations the Institute is developing the education criteria for teaching, the code of the specialists working in the field and organizing the Union of Sexologists. In cooperation with the Italian Society of Scientific Sexology (SISS) the Institute has organized different meetings and conferences dedicated to the problems of AIDS and sexual dysfunctions to promote the clinical research and proposals.

At the moment of an interview 20 constant researchers and collaborators were working at the institute, comprising researchers in the clinical area, in education and research area, in andrology-urology and gynecology.

Most of the researchers of the Institute graduated from the Sapienza University of Rome and in many cases the research is elaborated in cooperation with the University. The results of the research activity received in the Institute are compulsory for publications and are presented on the official website of the Institute.

From 1998 the Institute is organizing the Education School in Sexology which deals with the education of doctors, psychologists, and other specialists in the sector, as well as courses for ASL (L'azienda sanitaria locale) in psychology, general medicine, urology/andrology and gynecology. The Institute as well has arranged the courses dedicated to sexual education. With the help of the Institute educational projects in schools and courses for the sanitarian workers in contact with AIDS sick people were organized; as well as two years educational courses for sexual consultants. A four years school dedicated to Clinical Sexology is functioning in the Institute structure for a substantial period of time.

Besides this the Institute is conducting the Center of Medical Psychology dedicated to sexual pathologies with the team of specialists in psychology, sexology, andrology and gynecology, addressed to singles, couples and teenagers. The Center is following an integrative approach for every case of sexual dysfunctions, problems in couples and teenagers.

In the clinical center the Institute is proposing psychotherapy in a group, psychodiagnostics, psychiatrist consulting, therapy of mental diseases, gynecological, senological, andrological,

urological visits, autogenous trainings, Uroflussometria, Iontophoresis-therapy for Induration (plastic), echographia, Eco-color Doppler of testicles and many other services.

2.2 Position on the market: main competitors, competitive advantages

The high level of the specialists' qualification working for the Institute and their vigorous research activity resulting in numerous publications and collaboration with other clinical and research organizations ensures the Institute with highly productive research activity.

The website proposes a number of publications written by the researchers of the Institute. Some examples of which are: The EFS and ESSM Syllabus of Clinical Sexology, L'approccio integrato in sessuologia clinica (Integratvie Approach in Clinical Sexology), Standard per l'educazione sessuale in Europa (Standards for Sexual Education in Europe), Introduzione alla psicologia giuridica (Introduction to Juridical Psychology), Psicologia e AIDS (Psychology and AIDS) etc. The researchers as well make publications in the Journal of Clinical Sexology and international scientific journals.

2.3 NSD process description

The interviewed doctor is working in the clinical department of the Institute with eight other collaborators. The group is collaborating with other Universities and research centers. The research is held for the clients of the Institute in collaboration with the specialized hospitals.

According to the doctor all the research activities as well as every research process are compulsory for codification. The research can be performed either with the use of tests or statistical methods, while when the biological data is necessary, it is collected by doctors in the hospital structures with the help of the necessary equipment.

The researchers are constantly searching and formulating the research topics basing on the needs and the problems of their patients, but the definition of the research topic is affected by the availability of patients and the approval of the "Ethical committee".

The exchange of ideas is important inside the Institute; it is organized on a constant basis in the structure. There is a coordinator in charge of the process whose responsibilities include the collection of contributions and ideas of the researchers and their clarification for the final conclusion. The final decision about the research initiation is taken by the scientific director of the Institute.

The timelines of research activities are not always predefined. The time depends on the concrete research topic, methods and specific features of different research activities. Depending on the project the researchers have flexible timing for undertaking investigations and completing research results.

The respondent could identify the main stages of the research process which included:

1. The analysis of the literature
2. Formulation of the hypothesis
3. The search of adequate tests
4. Distribution of tests

5. Scoring
6. Data analysis
7. Formulation of the conclusion
8. Preparation of the article with the research results for the publication

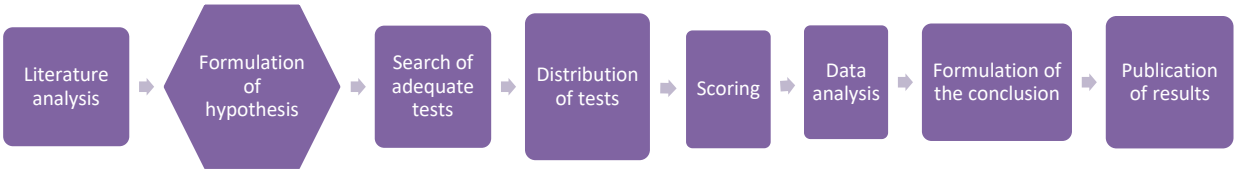
According to the respondent the sequence of the stages is respected and the stages cannot be skipped or overlapped. The doctor pointed out that despite the codified process the research activity processes are always different; they should adapt to the goal, the scope of the research, its specific features and the availability of the materials. In his activity the doctor is using the mix of knowledge in several fields which are: Andrology, Gynecology, Endocrinology and Psychology. According to the respondent normally the researchers do not need specialists from other fields of science (Figure 2).

The research results are based more on the results of previous scholarship and scientific knowledge than on the experience of the researcher. The doctor affirmed that the only kind of knowledge significant for the research process is codified and expressed in literature.

According to the respondent if the research is conducted in a team the responsible can be either the person who proposed the topic of the research, or the expert in the subject of the research, or also the researcher who dedicated the most efforts to the research.

In the opinion of the doctor it is easier to generalize the results of the research activity in medicine, while in psychology - more difficult.

Figure 2: The main stages of the NSD process



2.4 New services assessment, innovation strategy

Alike the previous case, where the researchers were free of not calculating the research expenses in advance, the researchers in this case are required to always foresee the expenses necessary for the research process; if the planned balance is exceeded the research can be interrupted.

For the future activity the doctor is organizing a number of new research projects some of which have already been initiated; some are in the phase of design. His plans correspond to the general strategy of the Institute to continue with the intense research activity and expand the range of the proposed services depending on the results of the undertaken research.

2.5 Case discussion: definition of the knowledge base

The main kind of knowledge the doctor is using in the research is the mix of scientific knowledge in several fields which are: Andrology, Gynecology, Endocrinology and Psychology. The doctor is relying in the research process primarily on codified knowledge and is following a strict codified research process determined by scientific rules and procedures which cannot be changed. The results are compulsory for codification. The goal of the process is to arrive to the maximum objective results. The objectivity is achieved through taking into account the necessary data and the analysis of this data. This kind of knowledge is more close to the definition of 'analytical' term which is determined in the Oxford dictionary 'as relating to or using analysis or logical reasoning'.

Tests and statistical methods that the respondent doctor is using in his research activity are appropriate for conducting analysis based on logical reasoning defined by the term. At the same time the doctor stressed that in the research activity the only significant kind of knowledge is scientific explicit (or codified), which means that in the process of research the doctor is relying basically on codified results of previous research works rather than on his personal experience or intuition. This contradicts with the definition of synthetic and symbolic kinds of knowledge.

According to the interview the results of research in natural sciences are easier to generalize, while in social – more difficult, this is because the results received on the basis of the material data compared to intangible are more substantial for achieving objective results. The time frame definition for the research performance is not compulsory since it is difficult to estimate the time for the scientific process. The researcher as well confirmed that the definition of the analytical kind of knowledge according to the Oxford dictionary is close to the approach he is using in his research activity.

It is possible to conclude that the research process is based basically on the kind of knowledge more close to Analytical.

The stages of the research process help to determine in a more precise way the kind of knowledge the researcher is applying and the general knowledge base of the activity.

According to the answers of the interviewed doctor the hint for the new research initiation is mainly given by the research topics in the field of medicine or psychology vital for the moment of the research the initiation corresponds to the classification developed by Pina and Tether (2016), where they identified the purpose of knowledge creation distinctive for the analytical type of knowledge as 'to provide a rigorous understanding of natural or social phenomena' and as a source of initiation 'identification of a need for knowledge or information requiring rigorous, objective analysis'. The type of knowledge created they identified as 'deterministic, based on scientific methods and codified data sources' with knowledge inputs and requirements as 'an understanding of the application of scientific methods,' which as well corresponds to the doctor's words that the research can be performed either with the use of tests, while when the biological data is necessary, it is collected by doctors in the hospital structures with the help of the necessary equipment. The outputs of the research are usually 'documented reports with findings, guidance on how to use findings is secondary' and 'knowledge codified into publications, patents and software algorithm' according to Pina and Tether (2016) which as well coincides with the answers of the interviewed doctor who stressed

the compulsory codification of all the research data and results and compulsory publication of research results.

The classification of the research activity as the analytical type of knowledge is as well confirmed by other researchers (Strambach, 2008, Asheim and Gertler, 2005) who stressed that an analytical knowledge base 'dominates in industries in which science-based knowledge is highly important. Where processes are formally organized and the output tends to be documented in reports, electronic files or patent descriptions'.

Case 3: Flex EMBA, Politecnico di Milano

3.1 Company introduction: brief history, main services and clients, organisational structure

The case is dedicated to the online Master programs held in the leading Italian University of Milan, Politecnico di Milano, in particular to the Executive MBA program.

The studied program is an 18-month Executive MBA program targeted to the managers and executives to incorporate international level of education to their work. The program is held on the basis of the digital learning platform developed with Microsoft technology.

The interview was conducted with the Associate Professor, honorary researcher of Politecnico di Milano, director of the ICT & Digital Learning Unit Politecnico di Milano School of Management, director of the MBA & Executive MBA Unit of Politecnico di Milano School of Management. He has led the project for the development and launch of the Flex EMBA since 2012 in Politecnico di Milano School of Management.

The program EMBA was organized in 1979. At the moment the program proposes a substantial number of courses from specialized masters to short executive. In the last 10-15 years around 1800 students has attended the program.

Starting from the boom of online books selling since 2012 an interest to online education has been growing. One of the reasons, according to the respondent, is the need of the customers for more flexibility in their life and time management. A number of students were not able to attend normal MBA programs. As a consequence in the United Kingdom and the United States a massive opening of online courses has been initiated. Online MBA ranking started to appear simultaneously. The growth rate of annual investment to digital tools in education reached of 7.9% a year over the period of 2012-2016. At the same time online enrollments started to anticipate traditional ones, "specifically, in higher education, online enrollments have grown 21%, whereas growth for traditional classroom instruction registered only 2% since 2002" according the official statistic data of the University.

The Politecnico di Milano (MIT) had undertaken the research to explore the situation on the market and to meet the students' needs. After preliminary benchmarking activity the University launched MBA with 40-90% of digital running. The program was proposed to corporations. After it the University organized the new EMBA run 80-90% digitally.

The program became a pioneer in Italy and for the University. In October 2014 the program was released and the results turned successful. Basing on high demand the University made a decision to launch the program with periodicity of 6 months rather than annually. At the beginning there were around 148 participants in the program constantly increasing with time.

According to the interviewed professor the reasons for this growing interest introduced in the presentation of the program became:

• Supply-side factors – improvement of digital technologies for education and learning

• Demand-side factors – radical connectivity and Internet of People

According to the opinion of the professor the changes in education are "inevitable"; the representatives of education should understand how these changes should be governed and how they should be integrated into the traditional education system. Digital changes require new challenges in education; they should consider individual needs of students and lead to the students' comfortable education and effective results. Digital learning can propose a lot of advantages: flexible and customized learning, material availability and a compulsory feedback compared to traditional face-to-face education.

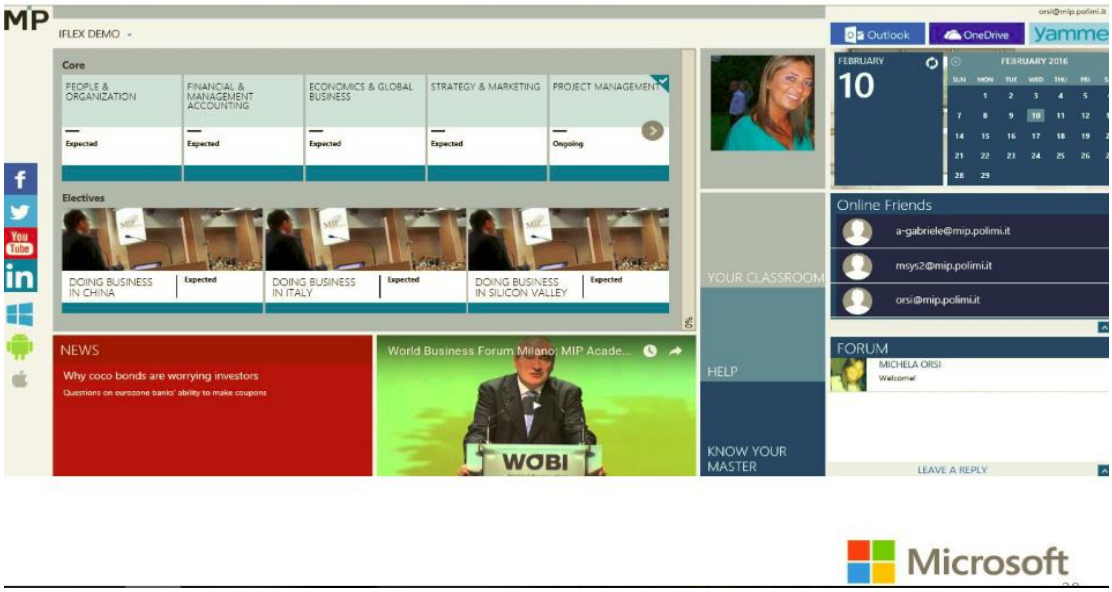
Future directions of research on digital technologies in learning and education, according to the interviewed professor should:

- Increase experience in new methods of teaching and new knowledge;
- Study the influence of the organizational factors to the educational process (course design, materials, interaction etc.);
- Study the influence of personal characteristics (age, computer knowledge etc.) of students on their satisfaction.

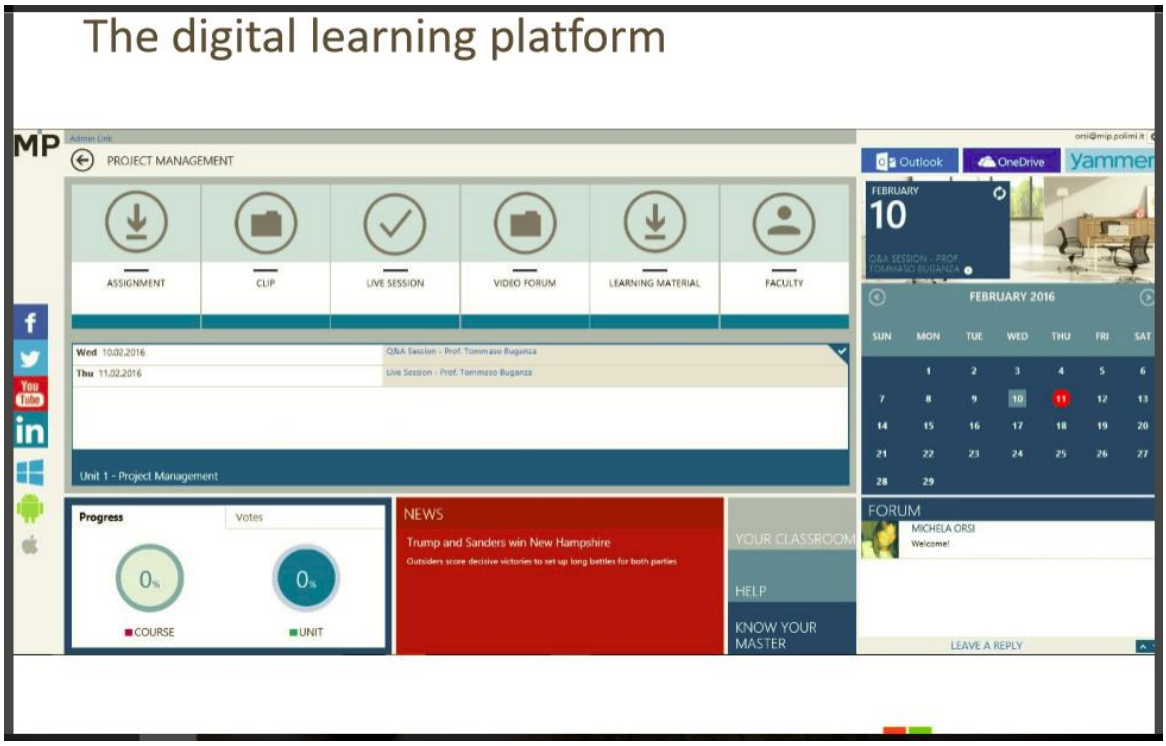
The new program made the professors learn from digital approach and brought new knowledge to the traditional programs. After the initiation of the online courses from 2015 the videos from the library of flex EMBA were used as well by other MBA programs.

In 2015 EMBA was transformed to a nonprofit limited liability firm with 40% of ownership of Politecnico di Milano, the other part was sold to private organizations: Vodaphone, Telecom, Sky, Microsoft etc. While in 2014 in cooperation with Microsoft the digital platform was developed. Through the developed platform the program can be approached with any device and browser, through Microsoft cloud and integrated with Microsoft tools (Picture 1,2).

Picture 1: Innovative digital learning platform



Picture 2: Innovative digital learning platform



According to the professor the main three pillars of the developed "The Smart Learning Approach" by the University include: digital, physical interaction and experience. Basing on these pillars there were developed tools for the education process on the platform which included:

• Video Clips mandatory for watching in the education process. Time required watching a 15 minute clip is 45 minutes. According to the official statistics of the program: at least 25% of the

students watch again the video clips to get prepared for the final test, 90% of the students watch the clip by the deadline established, 100% of the students watch the clips by one week before the end of each course. SCORM reports developed for the program allow knowing who watched the video clips, how much time, the frequency etc. Monitoring the interaction of students is an important part of the program that can improve students' preparation.

• Q&A and Live sessions are developed for the cooperation of students with each other and professors through online chats. According to the University information most students attend the lessons until the end and cooperate during the group work. Live sessions are monitored by the coordinator, who attends the whole sessions. Students can watch recorded live lessons, if they could not attend them.

• Forum, participation in which is compulsory as well, is constantly monitored by the coordinator, the content tutor, and the course director. 90% of students according to the data of the university use Yammer program for the purpose. Interactions, sharing of different experiences, Q&A can be monitored and tracked.

The organizers of the program are following the 'Organizational Inertia Theory' which investigates the processes in technological innovation. According to them the tendency in the innovation processes is moving from «know-how» (which is Specialization, Focalization, Depth which they call 'visual space') to «know-where» (which is Systemic vision, Ability to create interconnections, Ability to manage complex problems the so called 'acoustic space'). According to the interviewed Professor, 'the same trend applies to developing new knowledge, preparing class material and teaching professors for the lecturers'.

For the moment of the interview around 120 employees were working in the program, divided into - Core faculty: professors and agents and Extended faculty: managers and entrepreneurs.

The development of the new MBA pushed to the creation of the new division in the new department of the University working for the program: three responsible managers were introduced in charge of creating the program, developing the platform, video content, and working with professors to design the program. The new department led to the appearance of the so called 'ambidextrous organization'.

Structural ambidexterity, according to the Professor has two aspects:

1) Structural separation divided between organizational units devoted to: exploitation of current technologies and businesses and exploration of new, radical innovation opportunities

2) Tight integration between the exploitation and exploration units at the senior executive level

As a result five divisions were functioning at the time of an interview: MBA executive division, master division, executive division, institution & public division (innovating programs). Besides two additional divisions: selling business to customers and business to consumer market (BtB division) were created for business goals. Staff division supports the programs with digital learning, ICT, career development office, international student office, administration, ranking and international development offices that promote the program on international level.

3.2 Position on the market: main competitors, competitive advantages

According to the official data of the University the results of the learning process are substantially successful. The average mark of students tends to be high, many students prepare

for the sessions (read cases) in advance, live sessions always last longer than is scheduled and many students are interested to receive additional materials through the platform to study the topics more deeply. Due to the combination of these factors the overall level of the program effectiveness according to the University is very high. As a result the applications and enrolment increase every year.

The program competes mostly in Italy, the main competitors the respondent considers Bocconi University and some new fast growing programs such as Luiss Business School. But in general they strive to market leaders in Italy.

The directors of four divisions have responsibilities to innovate their programs as often as possible, whenever there are changes on the market; in average it takes place around every month. The organization follows an ideology of a continuous improvement, according to the managers: 'without continuous improvement any company can risk to go out of the market'. Every three years there is a strategic rethinking of the company goals.

3.3 NSD process description

In 2015 the University introduced new services: Leadership and Career Development courses. To support this introduction the University had to restructure its organization to arrange Talent development center, hiring people from outside to offer a more professional service in leadership development.

This incremental change is common inside the organization. According to the Professor this kind of change happens simultaneously with the introduction of any new service, for example if the University decides to introduce the Master in Luxury Business, it may require new divisions. According to his opinion, 'if innovation is incremental it happens within the boundaries of an organization'.

According to the Professor the ideas for new services can come from external and internal sources. In most cases new ideas are the results of research activities, following the interview, 'we have a lot of knowledge produced by our professors'. As an example the respondent proposed a lunch of a new specialized Master in Renewable Energy. When the professors have enough quantity of research materials in a certain field they can introduce a new Master program. Due to particular features of the service more ideas have internal origin, even if the managers understand the needs of the market, they need internal staff that had already developed a research on this topic to introduce a new program. At the same time the service should be a response of a trend, the service is introduced if both the professors and managers realize the need on the market.

The respondent believes that the company is proposing innovative services; they are trying to change the market. He affirms that the first mover advantages are very important, as pioneers after they can proceed as leaders.

As external sources of new ideas the University follows more companies of other KIBS sectors such as LinkedIn, Lynda books, than their competitors, other Universities. The respondent at the same time believes that a more structured process of following competitors is necessary, they should follow the competitors but they do not.

Valuating the final service, the respondent estimated that 70-80% of new ideas and services arrive inside the company and 20-30 % from the University clients.

Interactions, exchange of ideas between the managers and professors often do not happen before the release of new services. The arrangements where the professors exchange knowledge are usually more informal. Interactions happen not very often, and according to the opinion of the interviewee should happen more often on a regular and official level. Ideas are discussed on the executive committee, a meeting where their more material value is discussed.

The process of NSD in the company is 'Unstructured and Bottomed up'. The head of every division is responsible to innovate and continuously improve the process. Time for it is up to heads, there are no deadlines, except official terms for beginning of the year, when the new courses should be introduced and some other important deadlines (Figure 3).

After the emergence of idea, there is a trial period, the service is experimented with companies on short-programs. But usually the programs are quickly introduced to the market. The program can be launched within 6 months - 1 year.

To release new services the company is using internal trainings, since the professors should learn the new tools. But usually the learning period is as well not repetitive and not codified.

Figure 3: The main stages of the NSD process

3.4 New services assessment, innovation strategy

Areas for performance assessment of digital technologies in learning and education, according to the professor are: student satisfaction, faculty satisfaction, learning and cost effectiveness. To estimate new programs costs the University is using business cases for calculation of expected minimum revenues and margins. If the estimated numbers are solid the program is released. But also if the program is too radical it is released in any case even if its result is more "a bet", the University chooses to risk. Even if sometimes the program does not reach the breakeven - a sufficient number of students.

The Professor underlined the distinguishing characteristics of Disruptive and Sustaining innovation theories (called as well incremental and radical) , to support the proposal that digital learning "can or should be used to better meet the emerging needs of particular segments of management education and can or should be conceived and managed as a (radical) sustaining innovation".

MIP made a partnership with World of Business Ideas to promote ideas of digital approach in education at international level.

In 2016 the University introduced a big change; an additional 30% investment was done to improve the tools for the use of the platform. In 2017 the changes should be accomplished in the backhand: to run and collect information as a response to the necessity of improvement the terms of interaction with the students.

The long-term plans include:

- Introduce a tag system for video material in the Digital Platform
- Apply cognitive technology (IBM Watson) to allow students to automatically create learning paths using online resources
- Develop an App that brings what the students have learned close to their everyday professional life

There is an overall check if the University is consistent with the strategy every 3 years. The interviewed Professor proposed an example of following this strategy, if they want to grow in terms of international rankings they check in this period if the programs help to grow in international rankings. If the proposal of any employee does not correspond to their knowledge strategy they remove it.

The goal of the University is to extend to international level and to launch International Flex MBA with the target of 30 people which already overcame with 35 people for the moment of the interview.

3.5 Case discussion: definition of the knowledge base

Classifying the company according to its knowledge base it is necessary to consider the specific features of the service the company is performing.

The main service of the company is the educational service provided through a digital educational platform. The company is not involved in coding the program, but the managers of the company are developing educational programs for the platform and are aimed at satisfying the maximum clients' needs by means of improving the platform exploitation and the supporting services. The process of service development in the company is very fast and not codified. The goal of every service development is to satisfy maximum clients' needs. This kind of activity based on constant learning through monitoring of clients' needs and situations on the market resulting in tacit experience and knowledge is more close to the type of knowledge based on experience, which, according to the Oxford dictionary corresponds to the term 'synthetic' 'having truth or falsity determinable by recourse to experience'. Knowledge based on experience is the core definition of the knowledge base.

Following the research of Pina and Tether (2016), who identified the purpose of knowledge creation in the synthetic knowledge type as "designing and/or providing practical solutions to client specific problems" which corresponds to the words of the respondent that the goal of the online education is to satisfy the students' needs in the flexibility of the learning process for their maximum comfort in time management and learning process accessibility. The output requires as well "strong clients interactions" and "identification of specific problems needing a practical solution" (Pina and Tether, 2016). This helps to refer the company to the synthetic type of the knowledge base.

The specific feature of the service is that the ideas for new services, the new educational programs the University is developing through research. The research process requires strict

codified process based on codified data, as observed in previous cases. The knowledge used on this stage of the process is more close to Analytical one.

According to Strambach (2008) and Pina and Tether (2016), the research activity in the companies is usually an expression of analytical knowledge base, since the type of knowledge created is “deterministic, based on scientific methods and codified data sources” (Pina and Tether, 2016).

Basing on these definitions it’s possible to conclude that the company is in general employing synthetic knowledge with an influence of analytical knowledge expressed in the type of knowledge created and a source of initiation.

Case 4: Alfresco

4.1 Company introduction: brief history, main services and clients, organisational structure

Alfresco is a discernible example of an IT international company. The interview for the research was held with the VP Product Development Manager of the company in London.

The company develops a free software and enterprise content management (ECM) system for Microsoft and Unix-like operating systems. The purpose of the system is to create efficient connection process for the content of the organizations, enterprise content management for documents, web, records, images and collaborative content development. More than 1,800 companies in 195 countries are currently using the system, including leaders in different sectors like financial sectors, healthcare and public sector.

The company has headquarters in the US, UK, Australia and Germany, offices in Belgium, France, Italy, Spain and India. It was founded by John Newton (co-founder of Documentum) and John Powell (a former COO of Business Objects) in 2005. The main engineers arrived from Documentum and Oracle. Over the time, Alfresco has expanded through further hiring of engineers from leading companies like Interwoven, Vignette and developing new offerings like document capture and Content Management Interoperability Services for PDF capture and search and workflow development.

At the moment of the interview, 400 people were employed in the company with 90 million of revenue. The organizational structure of the company consists of CEO, large Engineering organization, large sales organization, marketing organization, finance (under CFO), HR (under CHRO) and Product management.

The main instruments of production include: people, desks, network, and laptops, more and more cloud-based software services, without capital equipment. Applied business model incudes standard software products, sold on an annual license, rather than a perpetual software license. There is a supporting service organization to support the primary business of delivering software. The company owns the IP of their core products, and they give the IP of customizations to their customers.

The company’s offering consists of a set of services for its clients: support, consulting, training and documentation. New versions of the software with easier to use interfaces are developed on constant basis - ‘Alfresco Explorer’ and ‘Alfresco Share’.

Alfresco Enterprise Network portal provides continuous support for the clients:

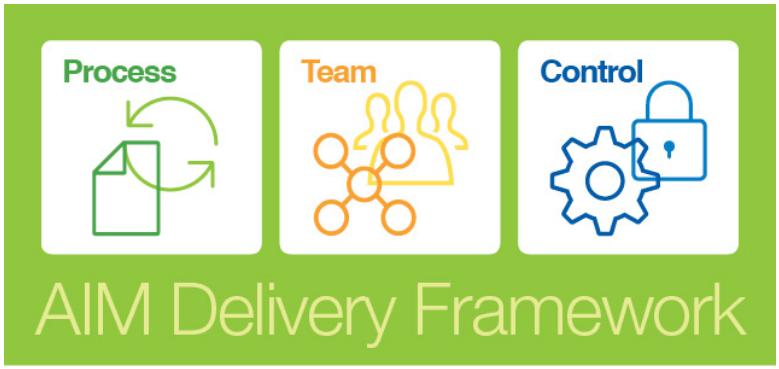
- 24x7/365 access to the Alfresco Call Tracking (ACT) system, with guaranteed responses;
- 24x7/365 access to the Alfresco Support Knowledgebase (ASK), where it's possible to find answers to commonly asked questions;
- Alfresco Product Documentation;
- Alfresco Product Downloads;
- Support Alerts & Notifications;
- Support Handbook.

The company is offering as well a direct access to experienced support engineers through web, email or phone that are providing any kind of performance advice in the process when the clients need. Alfresco Support packages include: Starter/Business Support, Enterprise Support, Premier Support Services and Alfresco Partner Support. The services depend on the type of the packages which are ranged according to price.

Alfresco consulting services are devoted to help the client's company to coordinate the company strategy, ECM, technology and business processes. They include: Advisory Services, Solution Delivery Services, Upgrade & Migration Services and Optimization Services.

As indicated in the company's website, with their methodology it is possible to define a common Process (lifecycle), Team, and Control Models that are enhancing Alfresco software (Picture 3).

Picture 3: The methodology of the company



The consulting services of the company are offering the clients to estimate strategic goals with their possibilities, coordinate implementation of the best practice, develop fast Alfresco solutions, provide effective operation of the solutions and estimate the objective result.

The consultants of the company are subdivided into:

- Solution Architect
- Principal Consultant / Managing Consultant / Technical Lead
- Senior Consultant / Business Analyst
- Consultant / Developer

The company is organizing Alfresco University courses that provide training program in online or face-to-face formats. The choice of a program depends on the levels of individual

preparation which are ranked on the company's website as: Developer, Administrator, End User, Alfresco One Business Specialist or Activity BPM. The graduation of the course allows receiving the certificates such as: Certified Alfresco Engineer or Certified Alfresco Administrator.

The provided on the website documentation helps the users to find explanation on every function of the software and the company's services.

4.2 Competitive advantages: position on the market and main competitors

The company is developing a number of services to strive to the leading positions in the field. According to the corporate website, Alfresco "simplifies and strengthens compliance by automating the entire information lifecycle for documents - from initial capture through archive or final destruction". Additionally Alfresco incorporates electronic record for which the virtual file system is used. The so called 'smart innovation' should help companies to accelerate adoption of changes and safety, since the developed system secures the companies' information.

The company allows client organizations to manage a wide range of critical business processes by means of several products: Alfresco One (platform for enterprises), Alfresco in the Cloud (for teams with multiple offices and branches) and Alfresco Community Edition (for technical developers). The company is as well proposing an enterprise Business Process Management (BPM) platform targeted at business people and developers.

The main competitors of the company at the present stage of development are big companies e.g. IBM, OpenText that have acquired the company's competitors, and some innovative startups. The company competes in Enterprise Content Management (ECM) and Business Process Management (BPM) enterprise software markets.

One of the main competitive advantages of the company is simplicity; the products of the company should be easily reached and installed:

- The metadata procedures are automatic without users' interaction required
- The automated management provides easy control over review, hold, transfer, archive or destroy data
- Records are easily accessed, at the same time controlled and do not disappear

The advantages of the company's products according to the company's information are as follows:

Quick search:

- 'Amazon-style search features', simple search filtering with search suggestions, and quick retrieval of relevant content
- 'Smart folders' that facilitate content discovery by grouping files based on their content
- Mobile access integrated with applications that allows to work from any place using the preferred device

Integration of content into processes:

- Metadata models that allow to automatically move documents through a business process
- Simplified document review and content activity
- The repetitive tasks are automated in folder rules that releases the users for less actions and make them more free

Security:

- 'Multiple layers of access permissions'(for sites, folders and files) allow to control who can view, modify and delete documents
- 'Document versioning', allows to facilitate document monitoring and file unity
- Automated management complies with information governance policies for the entire document lifecycle

4.3 NSD process description

The development and introduction of new products and services are carried out on a regular basis in the company. As underlined by the respondent: "We revise existing products at least twice per year and introduce a new product line or add on typically one per year, though it is hard to get new products to take off".

The sources of new ideas that the respondent identified include:

- Opportunities identified by staff from new technology or market observation
- Analyst information
- Feedback, ideas and needs from existing customers
- Competitive action that requires a response

Among the above mentioned sources, opportunities identified by staff from new technology and market observation are regarded as the most important. This process is so important for the company that all employees are responsible for the search and introduction of new ideas. At the same time, the process of new search and introduction is neither repetitive nor codified: in fact it changes case by case, according to the opinion of the respondent. However, as underlined in the interview "sooner or later new ideas need executive support". The sharing of ideas is as well happening in a not structured way as well as ideas screening and evaluating; the crucial aspect for the company is that the ideas are "discussed and supported".

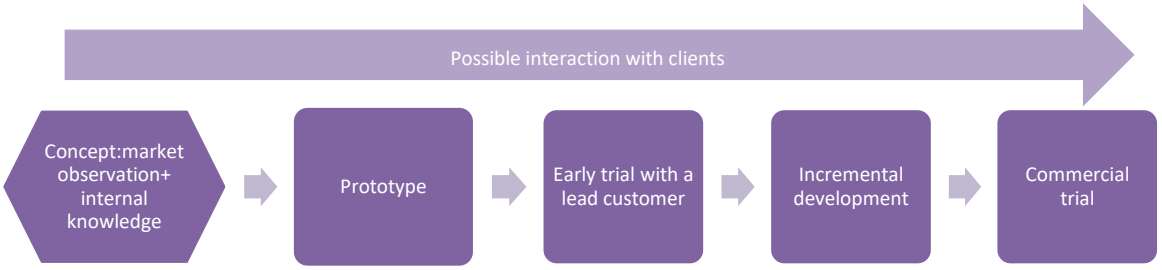
The process of new service development is similar to the process of new ideas search since it is not codified but occurs in an incremental and iterative way. Anyway, the respondent could identify the main stages of the process, which are:

- Concept
- Prototype
- Early trial with a lead customer
- Incremental development
- Commercial trial

Time is important for the company: the idea search and prototype development process usually last six month, but this period can vary.

The main responsible for the process are Engineering and Product Management professionals. They make up teams, where some members participate in part time, others in full time. The main technical equipment for the process is Laptop PC and specialist software development tools. There are constant contacts with the clients during the process where they can also participate (Figure 4).

Figure 4: The main stages of the NSD process



The company has presented numerous developed services in the cases' description on the company's website. In what follows some examples of developed new services are given.

The first case is a service developed for the NASA Langley Research Center. The Center performs hundreds of tests every year where different teams of engineers, researchers, technicians, managers and customers are involved. These teams should be constantly collaborating. The Center had a collaborative portal "Aero Compass" which could not coordinate any more the amount of information and its security. Alfresco provided the Center with the new 'collaborative portal' with familiar interfaces and strong security adjustments. A personal dashboard helped the users to quickly approach the new added information about their project and easily share new files, images or videos about the project. The users could also use Alfresco portal to approach the so called sensitive information marked with special yellow label banner. As a result the portal had more than 400 users with access to the platform and 2,5 TB of information. The system helped the researchers to easily access in any time the information they needed and facilitated the administrators to control the website usage.

Another important example is the service developed for Cisco Company, the largest networking company in the world, with over 100,000 products and one million Stock Keeping Units (SKUs). The company experienced problems with organizing their information spread in different resources for their 6000 Sales Engineers. This problem slowed the process of customers' support. To resolve the problem the company contacted Alfresco. In six months Alfresco developed a new program SalesConnect that combined 87,000 users in over 26 languages and 151 countries. The program was developed in a short time thanks to Alfresco's open source platform and their easily followed source code. Cisco managers were satisfied with the platform, since it appeared 'transformative, scalable, open and easy to use'. When a sales person determined content based on his needs, it was tagged with appropriate search words, and assigned an expiration date to ensure the documents in the Alfresco platform are organized and up to date.

Cisco and Alfresco continue collaboration in innovating their services and expanding the use of the platform for other departments and documents of the company.

4.4 New services assessment, innovation strategy

Regarding new services estimation, the respondent noted that the company spends 23% of total revenue on product development and maintenance, but they do little business case development, which is, according to his opinion, not enough due to their 'start-up' heritage. 'Start-up heritage' means that the company is still following not very structured and articulated processes, characteristic for start-up companies.

The company is constantly improving their services proposals, making them more comfortable and simple for the users. As a global strategy the company has informal strategy process, according to the respondent "probably too informal". This is according to the words of the respondent as well due to the company's 'start-up' heritage.

4.5 Case discussion: definition of the knowledge base

The main services provided by the company are oriented towards developing and improving the company's software to satisfy the clients' maximum needs and desires. For this reason the company is developing a lot of supporting services for its clients, such as consulting, training and documentation. The development of every IT program requires certain repetitive stages. That is why the SD process is iterative and incremental due to the technological base of the company and the need to test every service inside the company, but not codified. The process is developed inside the company and can be changed if the goal for service development or technical equipment for service development is changed. The process is based not on codified rules but rather on internal tacit knowledge of employees and their experience. The process of new ideas search is as well not codified; the sources of new ideas are not codified sources and depend on the analysis and observations of employees of the market. It is possible to conclude that the NSD process is based basically on the experience and internal knowledge of employees, corresponding it to the type of knowledge termed 'synthetic', which according to the Oxford definition means "having truth or falsity determinable by recourse to experience".

Following the detailed description of the knowledge base by Pina and Tether (2016), the purpose of knowledge creation in the synthetic knowledge type is "designing and/or providing practical solutions to client specific problems" and the source of initiation as "identification of specific problems needing a practical solution", the definition satisfies the goal of the company to match their products and services with the maximum feasibility and simplicity for the users. Following Pina and Tether (2016) research results "strong client's interactions throughout the project" with outputs as "practical solutions, often including implementation, written documentation is secondary" is vital for this type of knowledge application. This definition as well corresponds with the dominant practical vector in the work results of the company with the constant referring to the company's clients.

According to Strambach, 2008 classification, the t-KIBS (technology-based KIBS cf. Miles *et al*., 1996; den Hertog, 2000) specifically software firms, focus on synthetic knowledge (Asheim and Gertler, 2005; Asheim and Coenen, 2006). Tacit knowledge in these companies is more important than in R&D services with a dominant analytical knowledge base, due to the "inductive way of knowledge creation through the new combination of existing knowledge parts based on experiences in learning by doing, using and interacting processes aimed at solving the user's specific problems" (Strambach, 2008). The definition corresponds with the company's application of knowledge based on market observation and opportunities identified by staff from new technologies.

Case 5: VIP telecom service

5.1 Company introduction: brief history, main services and clients, organisational structure

VIP telecom service is a Moscow based IT company providing internet connection, telecommunications services and international connection services.

It started its activity in 1999 and in 2009 was bought by new owners. At the moment of the interview the company was employing 60-70 people including all technicians. The interview was held with the Sales Director of the company.

The company was founded during emergence of the sector in the country together with a number of same companies due to high profits with comparatively low investment, especially for the internet connection.

Among company's clients there are more than 6000 private representatives and 500 organizations.

The main services of the company include:

- Internet – based on the technology 'Fast Ethernet' which provides till 100 Mb/sec (file downloading till 600-700 Mb for 4-5 min), free of charge connection
- Television – more than 130 of Russian and international channels
- Telephony – Moscow telephone numbers, multichannel numbers (a possibility to have several telephone calls through several lines which allows to speak with different numbers at the same time without keeping the telephone busy), a possibility to choose a telephone number
- IT help – large number of experienced professional IT specialists

Every proposed service is performed according to particular needs of every client and can be changed according to his desires.

Initially, the company was providing internet connection with cooper, radio relay (which did not provide the best quality signal) or air connection. The latest and best quality signals are performed with optical cables that at the moment of the interview were widespread. The cost of such equipment is substantially high, that is why the companies made an agreement of the mutual rent of the equipment. It has reduced the income of the companies since 2003.

The main equipment of the company is supplied by Cisco, Nortel, Acton, D-Link, Intel.

Internet connection is the core and most vital service for the company since it provides the main income to the company due to lower investment compared to other services.

5.2 Position on the market: main competitors, competitive advantages

The company is one of the small-medium sized companies on the market operating in the highly competitive sector. The present tendency of the telecommunication sector in Russia is the monopolization of the market by big companies, e.g. Rostelecom, MTS. This tendency is endorsed with the legal acts introduced in the last years. According to the recent laws, companies proposing supporting services for the sector can collaborate solely with big leading companies. Exclusively leading companies can participate in competitions for the state orders and procurement. These new rules weakened considerably the position of small medium companies on the market.

In the search of new possibilities, SMEs in the sector are trying to exploit possibilities in the regions around Moscow. The interviewed company as well has exploited the market in these regions, but the tendency of the market monopolization is emerging there as well.

The product strategy of the company is high customization. The main orientation is to satisfy their clients' maximum needs.

The website of the company is confirming this strategy. It proposes different offers and discounts at a constant base, additional services that can help the client to improve his work conditions, different service offers: center of client's service (hot-line), automatic service, and individual online services.

The company as well is offering many advantages compared to other companies of the sector, as follows:

- Time for connection – from one day;
- Convenient methods of payment;
- Different and various tariffs;
- Various telecommunications and other services;
- Immediate reaction on any problem of the clients.

According to the words of the Sales Director, the main competitive sides of the company are "speed, quality and low price".

5.3 NSD process description

The search of ideas for new services is usually oriented towards the competing companies of the same sector, usually the biggest ones - leaders of the sector. According to the words of the Sales Director, the new services are copied and fulfilled with higher speed and quality. The company at a constant level is monitoring the main trends and new proposals on the market, especially from the leaders on the market.

The NSD process starts with a new service approval, and then it is developed inside the company and tested on the company's equipment. The role of the technical director in the company is crucial, since he should face all new technical challenges that appear rapidly in the sector. After the internal test the service is proposed to the most faithful clients of the company to receive their feedback and proposals. If the clients are satisfied with the service and do not make suggestions the service is proposed to a larger audience. The cycle of the constant clients with whom the company supports long and constant relations is essential since it helps the company to receive feedback and proposals on the quality of the services.

With the periodicity of one - two times a year the company organizes the modernization of all the technical equipment.

The ideas of new services are mostly connected with the improvement of the existing services. One of the examples of the company's offers is a substantial increase in speed of the services. The Sales Director proposed to organize the presence of all the managers and technicians to connect the client company in one day, the speed that is not proposed by the company's competitors.

The time of every NSD process varies and depends on the complexity of the service and its technical equipment. But in general the speed of new service introduction and its following performance is substantial for the company (Figure 5).

Figure 5: The main stages of the NSD process

5.4 New services assessment, innovation strategy

The company is following strict assessment approach: the new service should bring the profit after one year. If it does not achieve profit, the company either increases the prices to the clients or the managers change the service and in the worst case remove it.

The overall future strategy of the company includes:

- To expand its activity to other regions and small towns;
- To expand the range of services inside the existing activity, without its diversification;
- To increase the number of services for the existing clients, to make them as customized as possible to satisfy every particular need of the client;
- To increase the speed the proposed services.

Despite the defined goals the management of the company is choosing more tactic rather than strategic solutions in their activity, their plans can change depending on the situation. At the same time the management does not follow the trends developed in management theory and

prefers to make decisions based on the concrete practical situations. The company is not interested in developing innovative services that could change the market but to continue improving existing services and proposing them with a better quality.

5.5 Case discussion: definition of the knowledge base

The main services provided by the company are oriented towards satisfying the clients' maximum needs and desires. For this reason the company's main goal is to perform the services with maximum speed and low price. The SD process is developed inside the company, it depends on the technology that the company is using at the present moment, but can change if the technology is changing (evolution from cooper to optical cables used in the services and described in the case). The SD process is iterative and incremental due to the technological base of the company and the need to test every service inside the company, but not codified. The process is based not on codified rules but rather on internal tacit knowledge of employees and their experience.

The process of new ideas search is as well not codified; there are no codified sources for new services. The company is not oriented towards looking for original innovative ideas for its services but rather to copy the new services proposed by leading companies - a tactical response to a high competitive situation on the market. It is possible to conclude that the NSD process is based basically on the experience and internal knowledge of employees corresponding it to the type of knowledge termed 'synthetic' which according to the Oxford definition means "having truth or falsity determinable by recourse to experience".

Following the detailed description of the knowledge base by Pina and Tether (2016), the purpose of knowledge creation in the synthetic knowledge type is "designing and/or providing practical solutions to client specific problems" and the source of initiation as "identification of specific problems needing a practical solution", the definition satisfies the goal of the company to improve the proposed services for the maximum satisfaction of clients' needs, and to offer the maximum personalized services for every single need of a client. Following Pina and Tether (2016) research results the outputs of this type of knowledge in the companies are usually "practical solutions, often including implementation, written documentation is secondary". This definition as well corresponds with the dominant practical vector in work results of the company with the constant referring to the company's clients especially at the initial stage and testing stages.

As highlighted in the previous case according to Strambach (2008) classification, the t-KIBS (technology-based KIBS cf. Miles *et al.,* 1996; den Hertog, 2000) specifically software firms, focus on synthetic knowledge (Asheim and Gertler, 2005; Asheim and Coenen, 2006). Tacit knowledge in these companies is more important than in R&D services with a dominant analytical knowledge base, due to the "inductive way of knowledge creation through the new combination of existing knowledge parts based on experiences in learning by doing, using and interacting processes aimed at solving the user's specific problems" (Strambach, 2008). The definition corresponds with the company's application of knowledge based on practical estimation of the situation in the market, relying on the experience of managers, technical knowledge and focused on clients' needs.

Case 6: FTI Consulting

6.1 Company introduction: brief history, main services and clients, organisational structure

FTI Consulting is one of the leading consulting companies worldwide with more than 4,600 employees located in 29 countries in North and South America, Asia Pacific, Europe, Middle East and Africa. The company has employed 17 Nobel Laurates in Economy since the beginning of its activity. The company is public and traded in NYSE (The New York Stock Exchange).

According to its website: "FTI Consulting is an independent global business advisory firm dedicated to help organizations manage change, mitigate risk and resolve disputes: financial, legal, operational, political & regulatory, reputational and transactional".

Founded initially as 'Forensic Technologies International' in 1982 in Annapolis by Dan Luczak and Joseph Reynolds, two visionaries, who developed computer models for the courtroom to help the court members to understand technical aspects of cases, it was developing as a provider of complex technical investigations and litigation services. With the time it expanded its services to forensic accounting practice. In 2002 the company acquired business recovery service practice of Pricewaterhouse Coopers and Dispute Advisory Services of KPMG. In the next years it continued with the acquisition of strategic industries and mergers with other leading consulting companies (London-based Forensic Accounting LLP, Rubino & McGeehin Consulting Group, Leexon, CXO etc.) to expand their service portfolio and enter the markets of other countries. In 2009 the company took part in restructuring Lehman Brothers, General Motors and other multinationals.

According to the data of 2015 the company held $1,4 billion equity market capitalization. It works for the world's top 10 bank holding companies, clients of 92 of the world's top 100 law firms and 48 of the Global 100 corporations are the company's clients.

FTI Consulting was included on Forbes magazine's inaugural list of America's Best Management Consulting Firms in 17 categories for both industries and functional areas: Automotive, Consumer Goods & Retail, Digital Transformation, Energy & Environment, Finance & Risk Management, Financial Institutions, Internet, Media & Entertainment, IT (Technology & Telecommunications), IT (Strategy), Metals & Mining, Mergers & Acquisitions, Oil & Gas, Operations, Organization, Other Industrial Goods & Services, Strategy and Travel, Transport, & Logistics.

The key areas of the company are: Corporate Finance & Restructuring, Economic Consulting, Forensic & Litigation Consulting, Strategic Communications and Technology.

A vast range of services provided by the company is divided in the company's corporate structure into:

- Transactional
- Operational
- Financial
- Legal
- Political and Regulatory
- Reputational

Among the core strengths of the provided services the company stresses that they “provide expertise in guiding companies through the value creation lifecycle”. The targeted offerings include ‘restructuring, insolvency, and litigation support, interim management, capital market advisory, post-acquisition integration, valuation, tax advisory as well as financial management and performance improvement solutions’.

The description of a number of services provided by the company occupies the major part of the company website information, among which are:

- Economic Solutions:

Economic Consulting practice is involved in a wide range of employment related to economics, finance and accounting. It provides expert solutions in legal and regulatory proceedings, strategic decision making and public policy debates. The service as well provides professional expertise in antitrust issues, mergers and acquisitions, securities litigation and risk management, valuation and international arbitration.

- Forensic and Litigation Consulting:

The Forensic and Litigation Consulting practice at FTI Consulting provides ‘multidisciplinary, independent dispute advisory, investigative, data acquisition, analysis and forensic accounting services to the global business and legal community’.

- Strategic Communications:

The Strategic Communications segment of FTI Consulting “designs and executes communications strategies for clients managing financial, regulatory and reputational challenges”. With approximately 650 expert strategic communications consultants located in key markets around the world, combining international with local knowledge it helps the companies to lead their brands in a competitive environment. The company is ranked as the #1 communications advisor in the global league tables.

- Technology:

The FTI Consulting Technology practice offers clients risk management services and consulting support in e-discovery events. The company developed their own platform ‘e-discovery software’ that helps legal managers to review documents and supports visual coding. The service includes: Ringtail E-Discovery Software, E-Discovery Management, Managed Document Review, Collections & Computer Forensics Information, Governance & Compliance Services, and Radiance Visual Analytics Software.

The interview for the research was held with the senior consultant of Tax department of UK office in London which is the biggest office in Europe, with around 850 workers employed.

According to the words of the interviewed the organizational structure of the company has a strict hierarchy, every department has a CEO. But at the same time the company supports freedom in proposals and a team spirit. The teams are organized for every project, the roles in teams are substantially equal and there is no strong subordination. The work in team is highly

appreciated in the company since it helps to support the creative spirit of employees for keeping the leading position on the market.

6.2 Position on the market: main competitors, competitive advantages

In 2014 FTI Consulting had "the most professionals by firm" on Who's Who Legal List of Commercial Arbitration Expert Witnesses (fifth consecutive year); was named one of the best Economic Firms in the World by Global Competition Review (ninth consecutive year) while the firm's Ringtail E-discovery Software was named in the "Leaders" "Magic Quadrant for E-discovery Software" report (second consecutive year).

According to the opinion of the interviewed consultant the company in general does not have direct competitors; instead every department has their own competitors among other multinationals. The highest level of expertise and knowledge of the company's employees, their profound selection is the core competitive advantage of the company. Specifically for the Tax department the respondent recognized as competitors the "Big 4" (PwC, EY, KPMG, and Deloitte consulting companies) and "Big 10".

6.3 NSD process description

The tax department operates exclusively in the UK office of the company and is a part of the Corporate Finance department. The work of the department started from acquisition the LECG Company and developed with the arrival of an expert partner from Deloitte consulting in 2013. Starting from 2013 the department has grown from 10 up to 80 people.

The company's management supports all the offerings of new services or improvements of existing ones arriving from the managers, and as a result the new services are developing on a regular basis. Besides new services, the new spheres of expertise were added: International, Corporate TAX and Human Capital.

There are no corporate computer programs developed inside the company, the employees work in Microsoft programs, Outlook etc.

The choice of the strategy for every service, personalization or codification depends on every individual case and the client for whom the service is conducted. Every case is different and should be coordinated with the clients' needs. The interviewed consultant for example is holding around 10 constant clients in his personal database and the services developed for them he can perform in a quite repetitive way.

According to the words of the respondent, a huge number of departments in the company and a variety of services impede the introduction of common codified procedures across the company since every department has its own policy and goals, which create difficulties for the general management.

Every department is supporting entrepreneurial spirit among its employees. The employees are supported to propose new ideas either for the introduction of new services or for the improvement of the existing ones. The ideas for new services arrive from the personal expert knowledge of employees or from the offerings of the clients. But the process of new ideas search as well as new service development is not systemized and not codified. Nevertheless there are weekly meetings in every department where the ongoing projects are discussed. Once a month the company is holding regular meetings where all the projects are summarized.

The employees inside the company are communicating constantly either via email or personally.

The management of the company tends not to pursue the new service offerings developed by their competitors. They prefer to adhere to the approaches which their competitors use in their work. The company as well does not follow the new services proposed by the companies of other KIBS sectors.

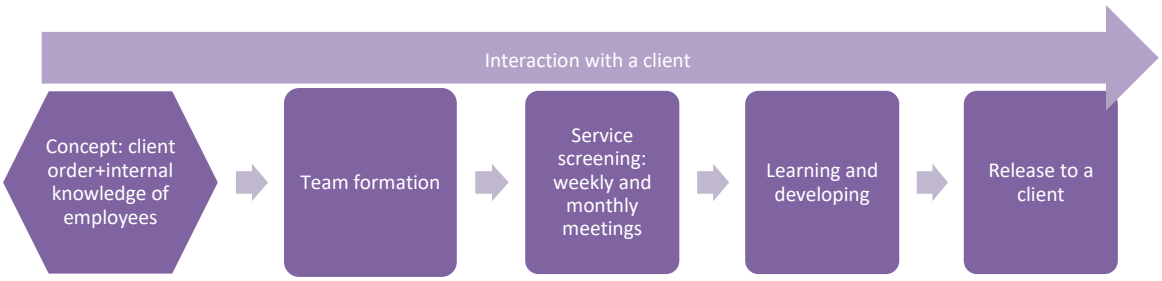
The process of service development, according to the respondent is in general not systemized. If the project is long lasting, the Gantt chart is developed to organize and follow the timetable. If the project is less time consuming there are constant discussions held in an organized team of around three people. The timeframe differs depending on the project (Figure 6).

The company has developed a corporate data base where common examples of presentations are kept based on the data of previously performed services. These samples can be used for performing repetitive services.

The interviewed manager is specialized in the analysis of pricing. The permanent professional materials he is using in his work are reports in economic analysis, economic research data, Bloomberg data and industries analysis. Besides these materials the company is providing database with the expert materials and the necessary journals' subscriptions. Despite the fact that the processes are not systemized the consultant knows in every case where he can retrieve the necessary information for the service development process.

According to the policy of the company the consultants are recommended to avoid addressing repeatedly to the clients that is why the majority of questions for every project are clarified at the initial stage. If there is a need to contact a client during the following stages the consultant can do it via email or telephone.

Figure 6: The main stages of the NSD process



On the company's website a number of cases performed for their clients involving different services are constantly introducing. In what follows some examples of developed new services are given.

Some of the cornerstone cases are: "Growing Google's Business, Reputation in Latin America", the project performed in a complicated regulatory environment in collaboration with key opinion leaders; "Merger of US Airways and American Airlines"; "Communicating a rights issue in Dubai" for Takaful Emarat the only exclusive health and life insurer in the United Arab Emirates (UAE). FTI Consulting supported Merck with the integration in the new culture of an acquired business via effective change of communications and employee engagement; helped the Beijing-based Autohome Company to build a strategic communications IPO plan on the New York Stock Exchange by creating an attractive media campaign, to attract and build solid relations with top-tier investors.

The company supported New York's Delivery Service Reform Incentive Payment Project (DSRIP) the primary goal of which was to reduce unnecessary utilization by promoting the community-wide integration of healthcare provision in the development of metrics, organization of local healthcare providers, assessment of community health, identification and selection of specific health initiatives, and determination of required resources. While Retail and Consumer Products case showed how the company's practice helped the companies to compete on every stage of their lifecycle changes.

Another case among many others described on the company website was dedicated to the product and price optimization for the manufacturing company in the corporate financing and restructuring department. The manufacturing company failed in launching new products in time. The consulting company's main role was to assess the rate of sales threshold for success within the new product development. After examining the NPD the consultants assessed that the process was conducted in a not effective way. They developed a number of recommendations for the product profitability (such as Model profit maximizing simulations and sensitivity analysis), pricing strategy (to align pricing strategy with company strategy) and product lifecycle management to reduce time to market through technology and tools and to develop robust Stage Gate process model.

The company as well deals with a number of Public Sector problems for cities and countries (e.g. Detroit, Philadelphia, NY, Los Angeles, San Diego etc.), schools, higher education, public health, state agencies, municipal community districts, public-private partnerships.
The City of Philadelphia case presented on the company's website helps to understand on a concrete example the process of solution search and development of the service in the company (Figure 7,8):

Figure 7: The scope of the problem

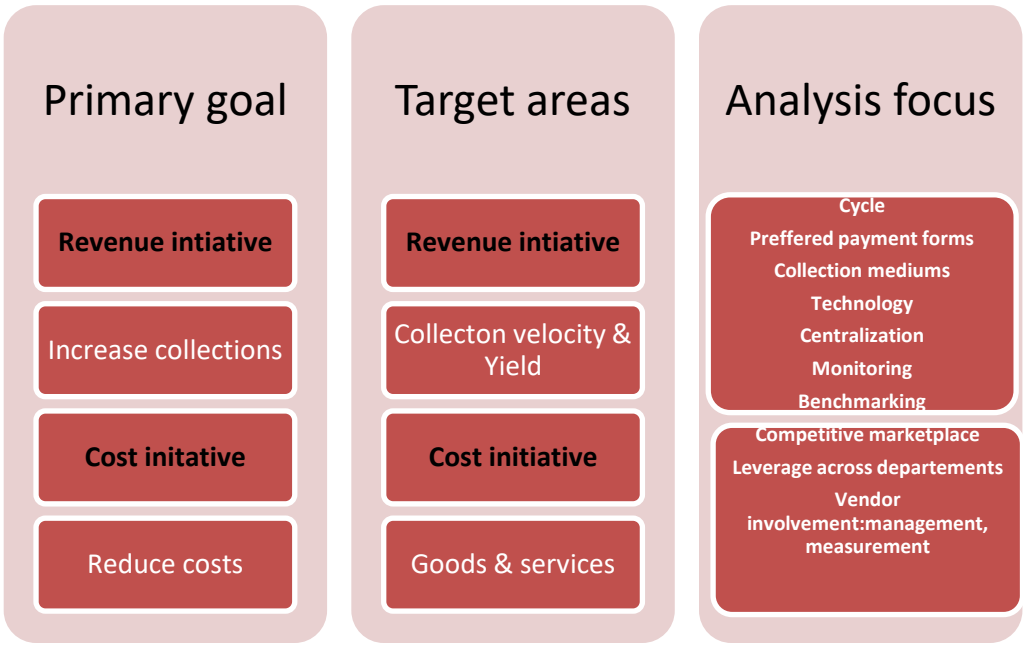
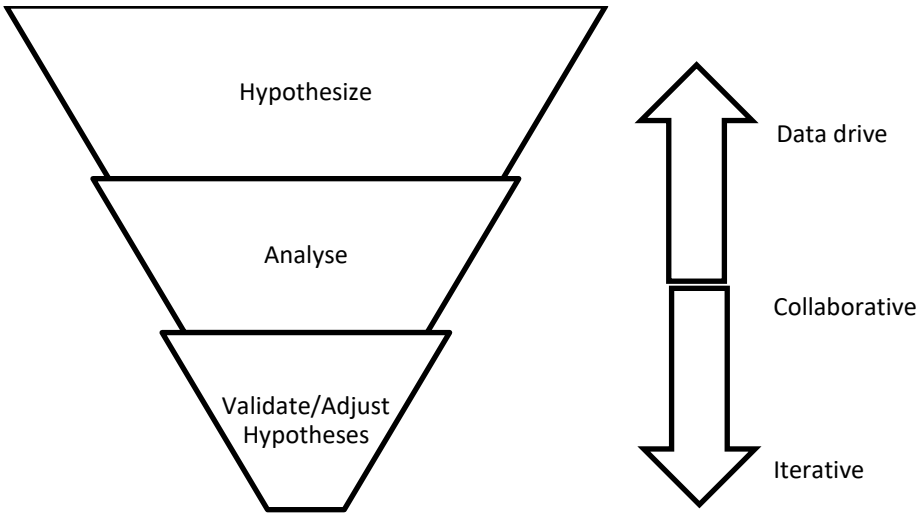


Figure 8: Approach to problem solving



Categorize recommendations

Prioritize recommendations

The subsequent development of the case contains detailed framework for categorization of recommendations, the estimated impact and revenue from recommendations. The consultants proposed organization chart and the estimated detailed budget of every aspect of the case (police, streets, prisons, energy efficiency etc.).

6.4 New services assessment, innovation strategy

The budget for every project is usually coordinated with the senior manager in a team of one-two people and can be reviewed throughout the process.

The company is constantly increasing and improving the provided services - the diversity and high expert quality of services is the company's main goal. The leading position of all the company's services in international rankings is the substantial acknowledgement of the pursued strategy.

At the same time the company is developing practices to keep its leading position and fulfill its responsibilities. A great attention is payed to the responsibilities towards its shareholders. Constant reports are published to help the shareholders to oversee the work of management and the company's business results. The guidelines developed in the practices are 'intended to align the interests of Directors and management with those of the company's shareholders'.

The employment of the Nobel laurates helps the company to be updated with recent scientific achievements in innovation.

6.5 Case discussion: definition of the knowledge base

The main services provided by the company are highly personalized oriented towards satisfying the clients' maximum needs and desires based on the highest level of qualification and profound knowledge of its experts. The knowledge of the company's employees is grounded on substantial experience and latest theoretical trends in the expertise fields.

The SD process is not codified in the company and depends on every project. The project-based activity and an extensive structure of the company affects its SD process - making it not systemized. The process is based not on codified rules but rather on internal tacit knowledge of the employees and their experience. The employee's knowledge and expertise is the main competitive advantage of the company. The employees are recruited according to their level of expertise in Economy, Law, IT and Management. Despite that the SD process is not codified, it is always planned and organized in advance with strict time limits to satisfy the clients' needs. Every employee is provided with the materials necessary for every project. The process organization can be changed inside the company if it will satisfy in a better way the company's or the clients' needs.

The process of new ideas search or new knowledge extract is as well not codified. New ideas proposals highly depend on personal knowledge of employees, their entrepreneurial spirit. The company does not follow the services proposed by their competitors.

It is possible to conclude the NSD process is based basically on the knowledge and experience of the managers of the company, this type of knowledge is more close to the term 'synthetic', which according to the Oxford definition means "having truth or falsity determinable by recourse to experience".

At the same time the managers substantially use in their activity the codified materials based on the latest theoretical achievements in their fields of expertise. This distinguishes the process from the previously studied cases describing companies with synthetic knowledge base.

The use of codified sources, especially in Economic and Law consulting services affects the NSD process in the company. The process becomes similar to the NSD process in legal companies that substantially use codified materials in the work process - laws and regulations. Their activity is described later in the research. Consequently it is possible to conclude that the activity of the consulting company is based basically on the synthetic type of knowledge but is influenced as well by the type of knowledge used in the legal companies. The present research proposes a new type of knowledge for legal companies. This new type of knowledge is termed in the present research Interpretative; the term according to Oxford dictionary means 'Relating to or providing interpretation'.

The influence of different knowledge bases is affirmed by many previous researchers (Strambach, 2008; Scarso, 2015; Pina and Tether, 2016). Especially the influence of different types of knowledge bases is notable in big companies with a wide range of provided services.

Following the classification of services developed by Strambach (2008) economic services, including consulting services are ascribed as possessing synthetic knowledge base. In fact following in the detailed classification of the base developed by Pina and Tether (2016) the purpose of knowledge creation in the synthetic knowledge type is "designing and/or providing practical solutions to client specific problems" corresponds to the company's goals, the source of initiation as "identification of specific problems needing a practical solution" as well corresponds to the company's goals and initial communication with the clients with the aim to understand their situation and their goals. As knowledge approach the researchers (Pina and

Tether, 2016) point “application of experience and heuristics developed through learning by doing, using and interacting, especially on similar prior projects” which corresponds to the respondent answers that the NSD process is based on a team work always referring to the results of previous projects. At the same time this type of knowledge requires “strong client’s interactions throughout the project” with outputs as “practical solutions, often including implementation” (Pina and Tether, 2016). These definitions as well correspond to the necessity of clients’ interactions during the NSD process in consulting, with the results of the process as practical solutions for the clients. The results can be expressed in written documents but they are aimed at practical application and resolution of the clients’ goals.

The definitions of researchers help to refer the company to a synthetic type of knowledge base, but a deep study of the NSD process helped to reveal an influence of another type of knowledge on the company’s activity.

Case 7: Conte

7.1 Company introduction: brief history, main services and clients, organisational structure

Car insurance company “Conte” is a subsidiary of the Irish Admiral group in Italy. In Italy the company started its activity in 2008.

Admiral insurance group is a UK based insurance company, founded in 1993. At the beginning it specialized exclusively on car Insurance. In 2005 the company launched a new product designed to help people with two or more cars to receive the best offer, the service was called Multi Car Insurance. The cover allowed the customers to use one policy for their cars and to get a discount on the overall price. In 2013 the company introduced another service for car insurance, the so-called ‘Black Box’ Insurance, its products allowed the drivers to receive discounts based on their safe driving style.

With the time the group decided to propose services that could cover all insurance needs of their clients in one place with the their existing customer discounts. They diversified the services and started to offer a wealth of other insurance products like Home Insurance, Travel Insurance, Pet Insurance and Van Insurance. The advantage of the service resulted in saving the time and money of the clients.

The company was voted as Best Car Insurance Provider by consumers for four consistent years. According to the company’s website every 12 seconds a new customer joins the Admiral Group.

At the moment of an interview the Italian office of the company employed around 500 employees. All the offices of the group have around 7000 employees and more than 4 million clients around Europe. The company holds offices in Italy, France, Spain and USA. From 2004 the company is listed on the London stock exchange.

The interview was held with the Marketing Director of the Italian office of the group.

According to the official objectives of the group, the company:

- Always in search of new innovative products that can create the maximum of comfort;

- Analyses new orientations on the market of online insurance.

The Italian office opened in 2008 in Rome and was named 'Conte', with the objective to propose the lower insurance tariffs compared to the other competitors on the market and a more convenient and innovative website. The UK group provided significant freedom to the Italian team to launch the new business. The team consisted of Italian nationals, and the central office did not interfere in the managing of the new office. It was important for the new office to work according to the Italian rules and regulations, and to take into account national characteristic features of the clients. The name of the brand Conte was proposed by the Marketing Director of the company who joined the company from the beginning of its work in Italy. The aim of the name which corresponded with the aim of the promotional campaign was to elicit the sense of affinity to the potential customers from the company. The investments in the first advertising campaign were not high. The preference was given to online advertisement instead of TV.

7.2 Position on the market: main competitors, competitive advantages

Since the beginning the company had to compete on the market with a substantial number of existing online insurance companies, both national and European, the main of which are Zurich connect, Genialloyd, Allianz, Direct Line etc. The competitive sides of the company are highly customized services for the clients and 24 hours support for the drivers. At the same time the everlasting support affects higher prices compared to some other companies on the market which reveals weak sides of the company in the market competition. The Director pointed as well a number of difficulties in directing the business in Italy arriving from the immaturity of the online insurance market in the country where many drivers still prefer not to use directly online services but to buy insurance through brokers.

From 2005 the company has proposed in Italy two innovative services developed in the UK market:

- Multi Car Insurance, a service that proposes for one client to cover several means of transport with the same insurance policy. The advantages include one discount for all means, the management of all the means at the same time and identical time of expiry.
- Little Black Box Insurance that takes into account personal styles of driving and allows on this basis to receive discounts.

The company is growing with success and was admitted in Italy several times as the company with the best website of the year, and the awards in excellence in the clients' assistance. In 2017 the company was included on the 2nd position in the list of the best companies to work in Italy.

7.3 NSD process description

The policy of the company is to "push" all employees to do as often as possible proposals for new services initiation or improvement of the process and to send continuous emails to the managers. The Marketing director is supporting exchange of ideas and proposals. For this reason the company holds monthly meetings where these proposals are discussed. The proposals can be either for technical improvements that can be personal opinion of the employees or based on clients questions, which are answered by operators of the company and

are discussed later by the employees. The employees as well as managers are encouraged to devote some time to the internet research and communication with employees of other sectors in search of new ideas. Following this policy the management team supports creativity and analytical spirit, as well as initiatives in the company. The goal is to promote innovations in the company and constant improvement of services. Collaboration and team work are substantially important for the company, as well as personal initiative.

According to the words of the Marketing Director, the changes in the insurance sector are in general very slow, as the sector depends on many factors and quite conservative in adapting to changes. There are many departments that must collaborate to develop a new service; specifically Pricing department affects the IT department, which affects the Operations department and the opposite, so there is a constant need in collaboration of all the departments.

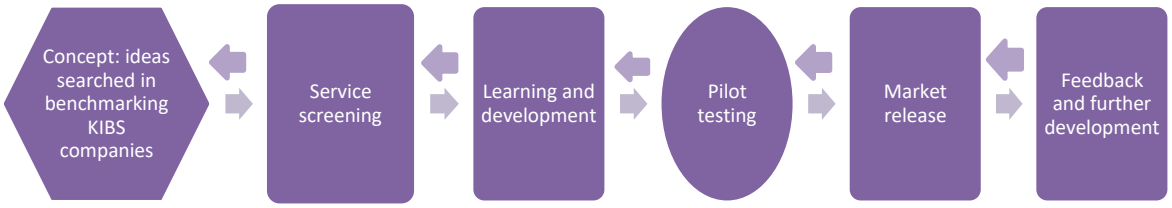
The sector of insurance is affected by the so called 'cycles of development'. When the prices of oil were extremely high the company had to decrease the activity. According the Marketing Director customers tried to limit frequent driving and tried to avoid acquisition of new or additional cars.

The respondent proposed an example of a new service introduced in the recent time; a new promotional campaign, the idea of which was borrowed from the company of another KIBS sector. One of the examples of the promotional campaigns of the company is the sponsorship of important sports events, such as the football championship of "Serie B", the sport of extreme importance for the culture of the country and the choice of which is directly connected with national characteristic features.

In general, the director underlined that the benchmarking companies where the team takes inspiration are Amazon (the electronic trade platform) and Fineco (financial online sector). The company takes examples from the world leading companies, despite they are not of the same sector. For the company it is more important to take examples from the leaders in their own sectors even if different from the company's sector and to follow them in achieving the leading position.

The NSD process, according to the respondent starts with an idea, but it doesn't happen always, after moves to "learn and test phases". The testing phase is called "AB testing". The director noticed that apart testing the new service on the internal equipment of the company, the employees should also learn new approaches to the new service if there are. After testing and learning stages, the service is proposed to a small target of clients. Every new service demands collaboration of all the departments of the company. That is why the idea can change during the development stages of the process. A specific department can introduce changes that can change the idea of the service completely or change its way of development, either in the technical or financial or other aspects (Figure 9).

Figure 9: The main stages of the NSD process



7.4 New services assessment, innovation strategy

Regarding the product strategy the company tends to be as “customized” as possible. The company is oriented to propose very specialized services for every single request of a client, even if the client has particular requests for the insurance of his singular needs. In this way the company seeks to differentiate itself from the other players on the market and at the same time, according to the words of the Marketing Director, the customization and personalization of services are the general tendency on the overall market.

Another strategic goal of the company is to develop maximum digital services; to become completely telematic. The company is undertaking a massive process of improving of all the company’s web programs and their website of online price estimation. The goal of the company is to provide the least possible telephone services and more online services, to make the procedure from the initial price estimation till the final service acquisition fully interactive online.

One of the main targets in this regard is to concentrate on developing mobile applications for performing all operations. This is another important trend that the Director sees on the market and considers the most important route to follow.

In the new services estimation the company is always following a “business case” approach. Before developing a new service the company is performing a business case and calculates possible investments and incomes.

The management of the company defines itself as Analytical oriented company in the strategy. The management is in general selected on the basis of its high quality education and experience. They follow not only the practical situation on the market but also theoretical trends in management and are developing long-term strategies.

The success of the company in the country rankings shows the success of the chosen strategy.

At the moment of an interview the management of the company did not plan to diversify its activity but to improve the existing services while in the future they did not exclude also diversification and in general the management is always in search of new ideas, both radical or improving the existing services.

7.5 Case discussion: definition of the knowledge base

The main services provided by the company are highly personalized and oriented towards satisfying the clients’ maximum needs and desires.

The SD process is not codified in the company and depends a lot on the complicated structure of the company and the necessity to coordinate the cooperation of several departments in developing every service. For this reason the SD process is not incremental and depends on every new service. The process is based not on codified rules but rather on internal tacit knowledge of employees and their experience, it can be changed inside the company depending on the project. The employees should learn (acquire new knowledge necessary for

the new service) during SD processes since the services of the company require a combination of Marketing, Pricing and IT knowledge.

The process of new ideas search is as well not codified. Every employee is responsible for new ideas search and new proposals for the company. The new ideas are searched in all companies of KIBS sector not just company's competitors.

It is possible to conclude that the NSD process is based basically on the experience and internal knowledge of employees corresponding it to the type of knowledge termed 'synthetic', which according to the Oxford definition means "having truth or falsity determinable by recourse to experience".

According to the classification of services developed by Strambach (2008) economic services, including consulting services are ascribed as possessing synthetic knowledge base. At the same time the company's activity is based on continuous development of specialized IT programs, relating it to software firms which according to Strambach (2008) focus as well on synthetic knowledge.

Following the detailed classification of the base developed by Pina and Tether (2016) the purpose of knowledge creation in the synthetic knowledge type is "designing and/or providing practical solutions to client specific problems" corresponds to the company's goals, while the source of initiation as "identification of specific problems needing a practical solution" as well corresponds to the company's activity and strategy in providing highly personalized services for every case of drivers' specific needs and problems. According to the respondent also if the client needs special conditions in the insurance (for example insurance for periodical trips in certain periods of time) the company can create a special package just for him.

As a knowledge approach the researchers (Pina and Tether, 2016) point "application of experience and heuristics developed through learning by doing, using and interacting, especially on similar prior projects" which corresponds to the words of the interviewed Director that after introducing a new service, an important stage in the process is 'learning' and acquiring new knowledge necessary for the new service by the employees of the company. At the same time this type of knowledge requires "strong client's interactions throughout the project" with outputs as "practical solutions, often including implementation. Written documentation is secondary". The definitions as well correspond to the necessity of clients' interactions during the initiation of the process and during the testing period. The practical results of the NSD process dominate; the results are usually not codified.

These definitions help to refer the company to a synthetic knowledge base.

Case 8: LETO

8.1 Company introduction: brief history, main services and clients, organisational structure

The case dedicated to the company LETO is particularly important for the present research since the company developed its own NSD process aimed at introducing new services in a more effective and efficient way. That is why a special attention is dedicated to the description of the case.

Company “LETO” is included in the ranking of the best 50 digital companies in London.

The company was organized in 2011 by several students graduated from Southampton University with a background in program developing. At the beginning the company was helping mainly other start-up companies to develop their products and release them to the market.

The interview was held with one of the founders and CEO of the company. The CEO defines the activity of the company as the “digital innovation partner”. Their goal is “to help ambitious enterprise teams to insource innovation”.

At the moment of an interview the main clients of the company, besides several start-ups, were also big multinationals in manufacturing and service sectors, and state structures: Unilever, Admiral insurance group, British museum, AIWIP, MR. Glue, Pitchmaker, etc.

According to the information of the website of the company the company’s clients usually have “a solid existing business plan and they are either looking for innovative ways to increase market share, or are interested in developing a new supportive product to the existing business model”.

Originally the company did not have a developed structure; later several departments were created. But still, according to the owner, ”the company is looking for its root”, the company would like to support unstructured kind of organization, since it helps to support a more flexible way of collaboration on work, more informal atmosphere and as a result a more creative and innovative approach to work. Due to it the organizational structure of the company is ‘flat’; there are monthly sessions with all the employees where they are encouraged to give as many proposals as possible. The CEO as well spends substantial time to speak in an unformal way (e.g. during coffee breaks) with every employee to understand his ideas and suggestions.

There are 16 employees in the London office, 10 in Amsterdam and 5 in the opening office in Wales.

When the company started to develop its experience with helping other start-ups to bring new products to life they understood that there are some core points in the process to deal with:

1) The company needed to introduce a “reusable” process for developing and launching new products or services for their clients.
2) The company had to develop a strategy for dealing with their clients, since according to the owner: “The process of NSD becomes complex when different stakeholders are involved”. The founder insists that the company advices to its clients not to be bound by traditional products and their brand’s names, since the brands are not sold anymore.

Basing on these points and their experience the company decided to introduce its own New Product/Service development process taking inspiration from the lean management developed initially in Toyota. One of the influencers on the company’s founders was Eric Ries, who organized a school of lean start-ups and with whom the interviewed CEO communicated about the topic.

8.2 Position on the market: main competitors, competitive advantages

According to the owner there are many competitive companies of the similar sector in the UK market, as some few examples he gave 4-KAM Digital, Digital OMNI, RIGA.

Coming from this competitive situation the company has developed its distinctive competitive sides: the company started to study the customers' needs differently from traditional marketing approaches. According to the respondent, the companies usually spend substantial budgets to perform the marketing research, choosing target groups etc. Instead LETO is trying to be as close to the customers as possible, "we try to speak face to face to customers, to understand customers' main points", this, according to the owner, distinguishes them from other competitive firms.

Another competitive point is the developed internal NSD process inspired by the lean development model of Toyota company, as well as from a model developed specifically for KIBS companies by Google Ventures, the venture capital firm that invests in the fields of life science, healthcare, artificial intelligence, robotics, transportation, cyber security, and agriculture start-ups and helps these companies interface with Google.

The company follows the latest released technical products, for example they were among the first to buy the amazon dot control voice. According to the opinion of the owner following the latest technical trends is necessary for the company to be effective in supporting the NSD process in the most efficient way.

This approach helps the company to hold high positions in the rankings in a very competitive sector.

8.3 NSD process description

The process of NSD usually starts with the order the client. It can be any kind of order starting from just a desire to sell the product, or to develop a delivery process or even to develop the whole NSD process including design, marketing, launch and delivery.

After receiving the order the managers of the studied company try to persuade their clients to refuse from "branding" their products. According to the opinion of the respondent it is not important if the product is the product of Unilever or another brand, the more important is the product itself, how comfortable and affordable it is for the user. The comfort and the preferences of the users should be the main priority in developing new products. That's why the respondent always asks his client companies to forget about their previous products and to start completely new product or service development process based not on the company previous experience but on the study of their potential buyers' desires.

The search of ideas for new products and services is the responsibility of all the employees of the company, which is part of the structured NSD process. The search of ideas is not limited. The employees can look for all information they want in all possible sources. In most cases new ideas are based on their knowledge and experience.

At the same time the CEO believes that purely original ideas do not exist, since looking at his ideas after they were realized he understands that they had already existed before, and every product is the improvement of the one already existing in the past. According to his persuasion: "The best product is the one still not done".

The developed NSD process in the company is based on the lean management process developed by Toyota and Design Sprint process developed by Google (Figure 10,11).

Figure 10: Creative Sprint model developed by Google Ventures

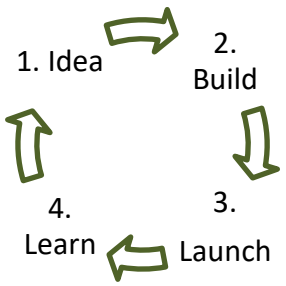
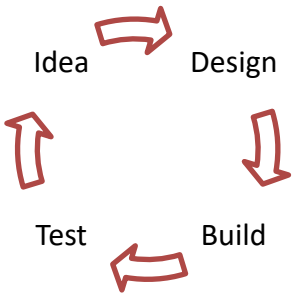


Figure 11: Lean development process developed in Toyota



The website of the company describes in a detailed way how the company is employing the process.

A Creative Sprint innovated by Google is a five-day process that allows companies independently from their size to face business goals through design, prototyping, and testing ideas with customers. The developed by Google Venture process is easily applied and covers business strategy, innovation, behavior science, design thinking etc. The aim of the process to increase the productivity of the company: reduce waste of time from months to one week, resources, to lower the idea screening time through creating a realistic prototype instead of investing into launching a trial product. “The sprint gives teams a shortcut to learning without building and launching” (SprintStories.com).

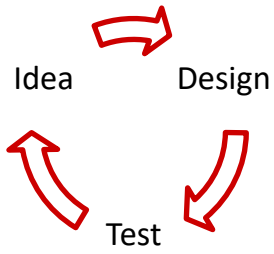
According to the design sprint the model is connected strictly to the days and should follow the scheme:

- Monday - map out the problem and pick an important place to focus
- Tuesday - sketch competing solutions on paper
- Wednesday - make difficult decisions and turn your ideas into a testable hypothesis
- Thursday - hammer out a high-fidelity prototype
- Friday - test it with real live humans

The creative sprint was used by many companies and supported them in entering new markets, designing new products, developing new features and defining marketing strategies. The stories of these companies were collected at SprintStories.com.

Combining the two models LETO designed its own NSD model. To apply the model for the needs of a KIBS company the "build" stage necessary for manufacturing company was removed (Figure 12).

Figure 12: NSD model developed by LETO Company:



According the company's website they adapted the process described in the Google Design Sprint for their clients to receive the best outcome for the investment.

The NSD process should strictly follow the precise schedule. The whole process from the idea to the launch should take one month; the process of new product/service development lasts exactly five days:

1st day: On the company's website this phase is titled Understand. The employees of company ask as many as possible questions to the client to understand the kind of product he needs and his problems. The company and the client are figuring out the main objectives, problems, resources, KPI, the base of the collaboration. They are contemplating on risks and obstacles to deal with during the process. The most important for the company on this stage is to clear the reasons the company is applying the Sprint, the business objectives, the weak points and to identify the target market for the Sprint. Due to plural opinions of interested parts involved in every case, it's crucial for the company to "create a common language" through the length of the project.

2 day: On the company's website this phase is titled Diverge. On this stage the employees propose all the ideas that come to their mind for resolving the case tasks, the so called 'fast brainstorming' or 'out of the box' thinking without identifying their weak points or estimating their execution potential. Employees expand and inspire each other's ideas and are encouraged to "go as wild as possible". The number of ideas always differs and can arrive to fifty.

3 day: On the company's website this phase is titled Converge. On this stage the employees are "killing" most of the ideas, eliminating the most irrelevant and hard to execute, leaving for generation around 3-4 that the employees feel more confident about.

4 day: On the company's website this phase is titled Prototype. The stage is dedicated to elaborating one idea making it more visible, giving it form, design (it can be a website or a delivery system) in the form of a draft on the paper. The most important for the company on this stage is to find a visual explaining and presentation of the idea. The goal is to create the more clear and precise image to cut the time of coding. A finished prototype of a product can look like a working application or a prepared design.

5 day: On the company's website this phase is titled Test & Plan or Learn. The idea of the phase to test the prototype on around 10 or more people, interviewing people on the streets, friends etc., to receive the feedback as quickly as possible to choose the right direction. If there is a need in testing the initial product it is sent to several customers. The users are asked several bespoke questions to understand if the product is easily understood, 'intuitive', in accordance with their desires and problems.

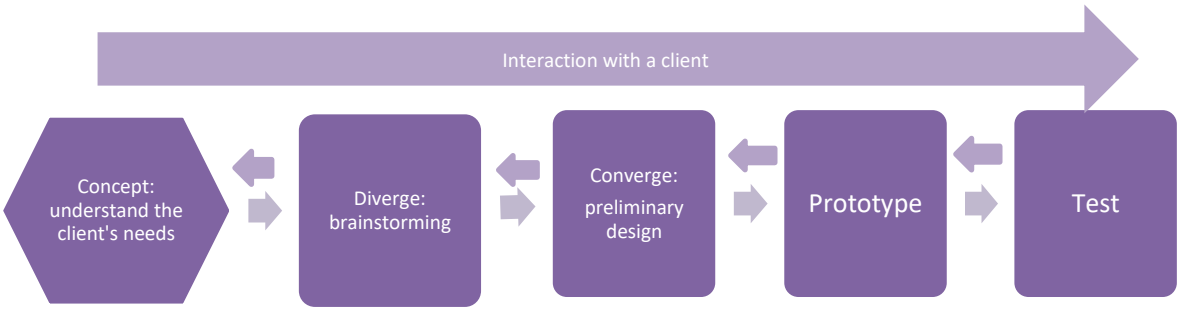
The CEO of LETO gave an example of the interview of the founder of one of the most successful start-ups in UK, where he noted that all the new services he introduced he was testing on his friends.

The results are presented to the client so that he could decide whether to go on with the project or to change the approach.

The most important in developing new products and services according to the CEO is to be clear to the user. If the tests are successful the rest of the month is dedicated to finish, to deliver and launch the product and to receive a feedback from the customers which are according to the CEO usually positive. But if the product does not have success the NSD process starts again.

The main competitive advantage of this model is the speed. According to the CEO big companies spend too much time and money for marketing research programs. When the research is finished, a long process of new product development starts, and when the product is launched the situation on the market had already been changed. That's ultimate learning in the field, according to the respondent (Figure 13).

Figure 13: The main stages of the NSD process



The website of the company proposes a number of cases of the companies with which they worked and a detailed description of how they could resolve their orders. The description of the developed services was as well described during the interview. In what follows some examples of developed new services are given.

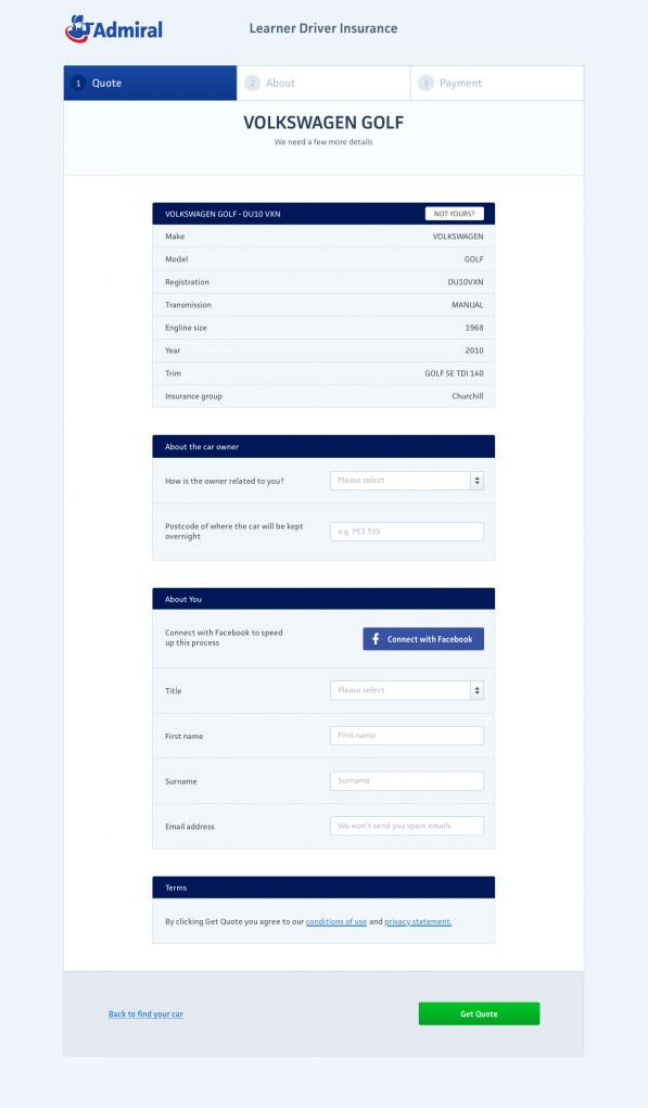
One of the successful projects was performed for the leading UK car insurance company Admiral (the company studied in the previous case). Admiral aimed at supporting its leading position on the market competing with constantly appearing new 'tech driven' startups. To achieve this goal the company is always introducing new services for their clients. One of these new services was introduced for the new market of insurance, for 'learning drivers'.

The challenge of LETO was "to launch the product fast, but also create a concept that would stand out from the competition". The team of the company helped Admiral group to elaborate their general idea with which they came initially and to develop the target market.

Starting according to their model from the brainstorming the team proposed several ideas and designed a prototype which was tested on young people between 17-25 years old. According to the CEO he went personally to driving schools to speak with young people. The results were positive. For the project the company developed UX/UI Design and Web development (Picture 4). The project was launched just in 2 months after the idea proposal.

The Admiral team wrote many praising recommendations for the company which were published on their website and recommended them for the future work. The results helped the insurance group to better understand the needs of the targeted audience and move with the further product development.

Picture 4: Application developed for Admiral Insurance group



Another successful project was developed for the Aiwip company. LETO organized the services of Branding, mobile development, UX/UI Design, Web development. The founders of Aiwip developed a concept proposal in order to allow students to print their documents for free (lecture notes, etc.) by enabling advertisers to pay for it.

The company has worked with Aiwip project for two years. The process was divided into two big stages. On the 1st stage the company built the initial product and tested it on the market, it

lasted for six months, after which was tested the first web dashboard (print/manage documents) and the advertiser dashboard (create/manage campaigns). A special code was generated so that just students could use the Aiwip printers. On the 2 stage: the service was tested and the company understood that the users were not satisfied with using the code, so the company went back to the prototype building process to find a new solution. Aiwip also wanted to introduce new possibilities of advertising on the printed page. They introduced digital banners which students could download in the apps while they waited for their printout.

The main challenge for the company was to introduce the new service for the new academic year, the time requested by the client company. To achieve this LETO had four months. To manage the time deadlines the company decided to develop as “many wireframes as possible for different platforms” to approve the design.

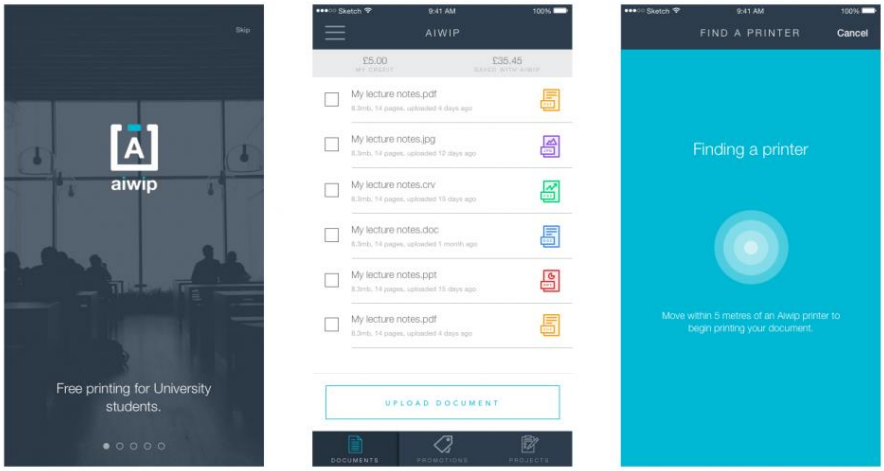
The platforms that needed to be designed and built were:

– Student homepage
– Advertiser homepage
– Student dashboard
– Advertiser dashboard
– Student iOS app
– Student Android app

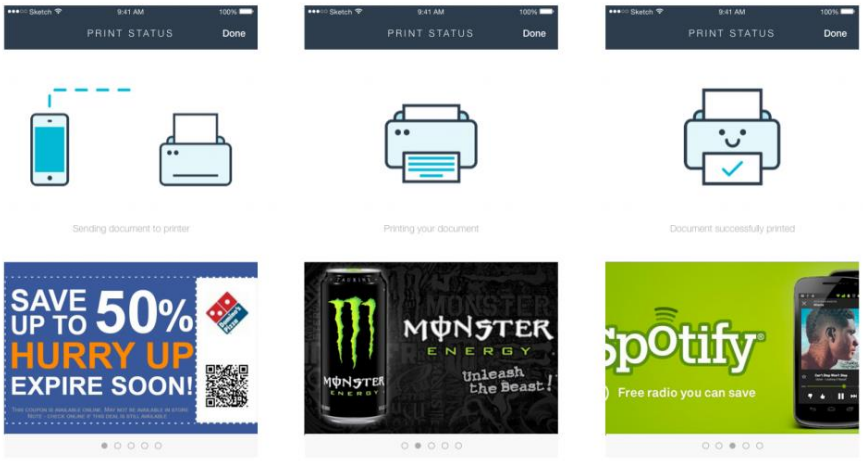
The company held regular meetings to meet the deadlines and coordinate the work. During this time there were constant meetings with the client as well. The company had to organize quick tests of the product to arrive to the final product; the tests were undertaken in some Universities.

The idea could not be borrowed from the storage programs like Dropbox or Google Drive since the concept was different. The idea was that a student could upload a document, tap on it, go through printing settings and print the document (Picture 5,6,7,8).

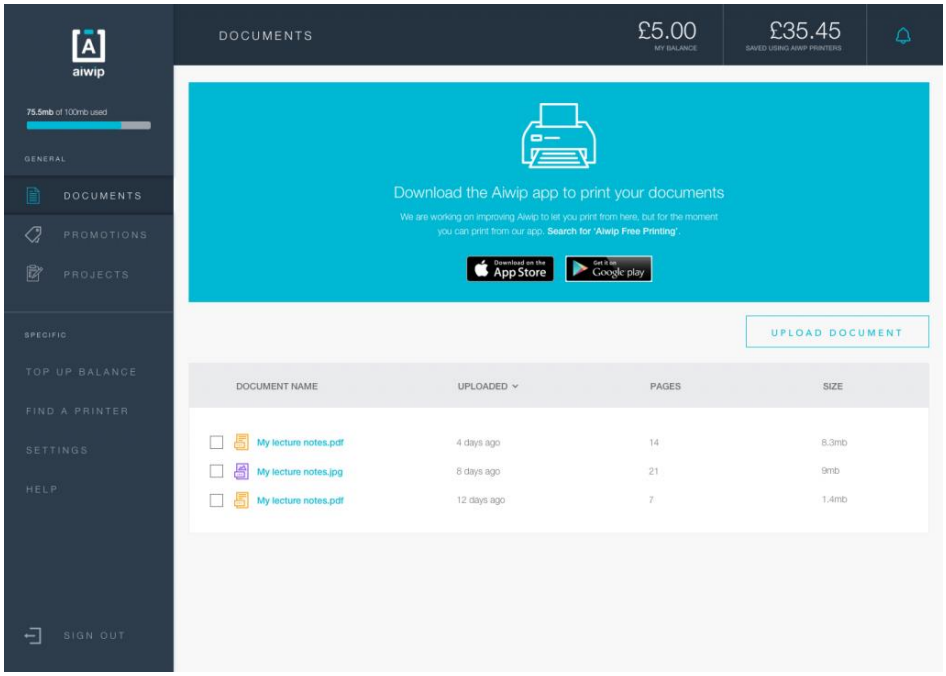
Picture 5: Application developed for Aiwip - initial page



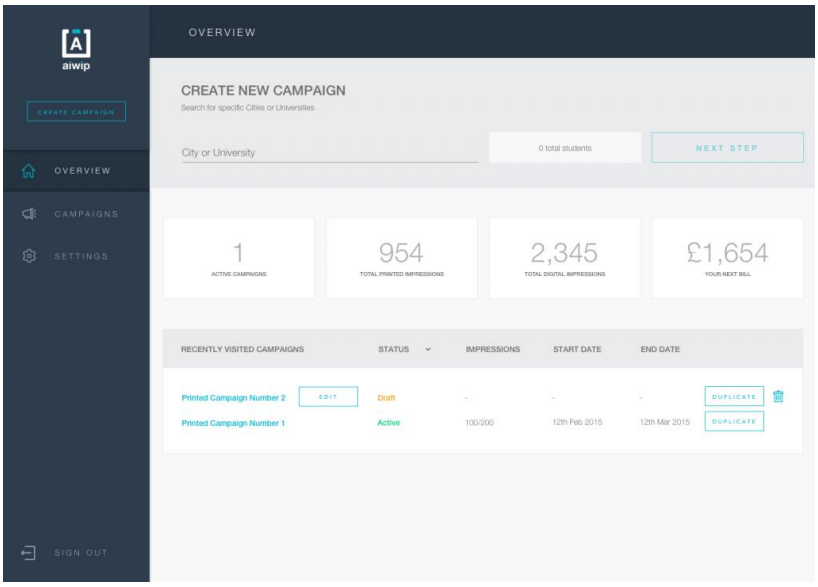
Picture 6: Application developed for Aiwip with advertisement



Picture 7: Application developed for Aiwip main page



Picture 8: Application developed for Aiwip overview page



The success of the service was high among students who wanted to use the free of charge service. In post-launch results there were 13 Universities using the Aiwip system, up to 100,000 students had access to the service and Aiwip had advertisements for both local businesses and multinational brands.

Another case the company gives as example of their projects is the website: standtall.org, which the company developed for Unilever to provide support to women who suffered from domestic violence. The company performed Branding, UX/UI design and Web development. The idea of the project came from a trainee at Unilever who suffered a bad experience in life. It had to be an anonymous platform for the victims of abuse “to share their experience” and to connect them with charities and NGOs. The CEO of Unilever Paul Polman approved the idea and advised LETO to develop the platform.

According to description of the case, the company faced three challenges:

- The time was around one month to develop and release the project;
- Since the platform initially existed in India, it was used for 70% by mobile, web CSS or JavaScript could not work on these devices, the platform had to be simple, with minimum pictures and as static as possible;
- The site as well had to be “welcoming, non-judgmental, fully understanding” and anonymous.

The priority was to build a website for the mobile, but it had to be as well displayed on a desktop.

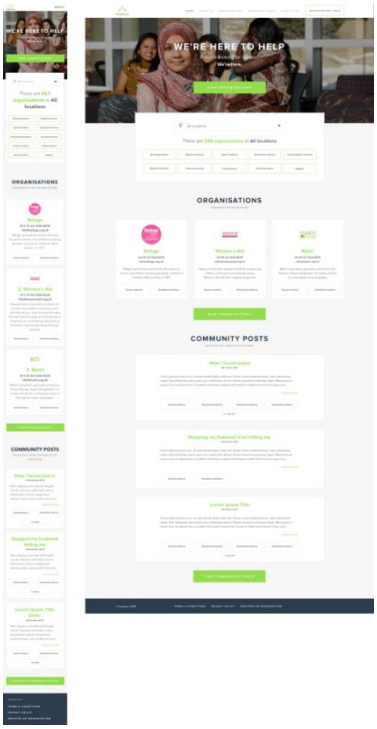
The company showed on their website how they were developing the logo of the site, the process of creating sketches and its final development on the computer (Picture 9,10). The client was always following the process which is typical experience for the KIBS companies.

Picture 9: Development of Standtall application

Picture 10: Development of Standtall application

Respecting the deadlines the company created the branding and the design, developed and launched the platform which answered “dual goals of a forum to document abuse, share victim stories and tips, and a platform to discover and contact relevant NGOs/charities” (Picture 11).

Picture 11: Standtall application



The program was linked to other Unilever's programs to improve women's safety and standards of living.

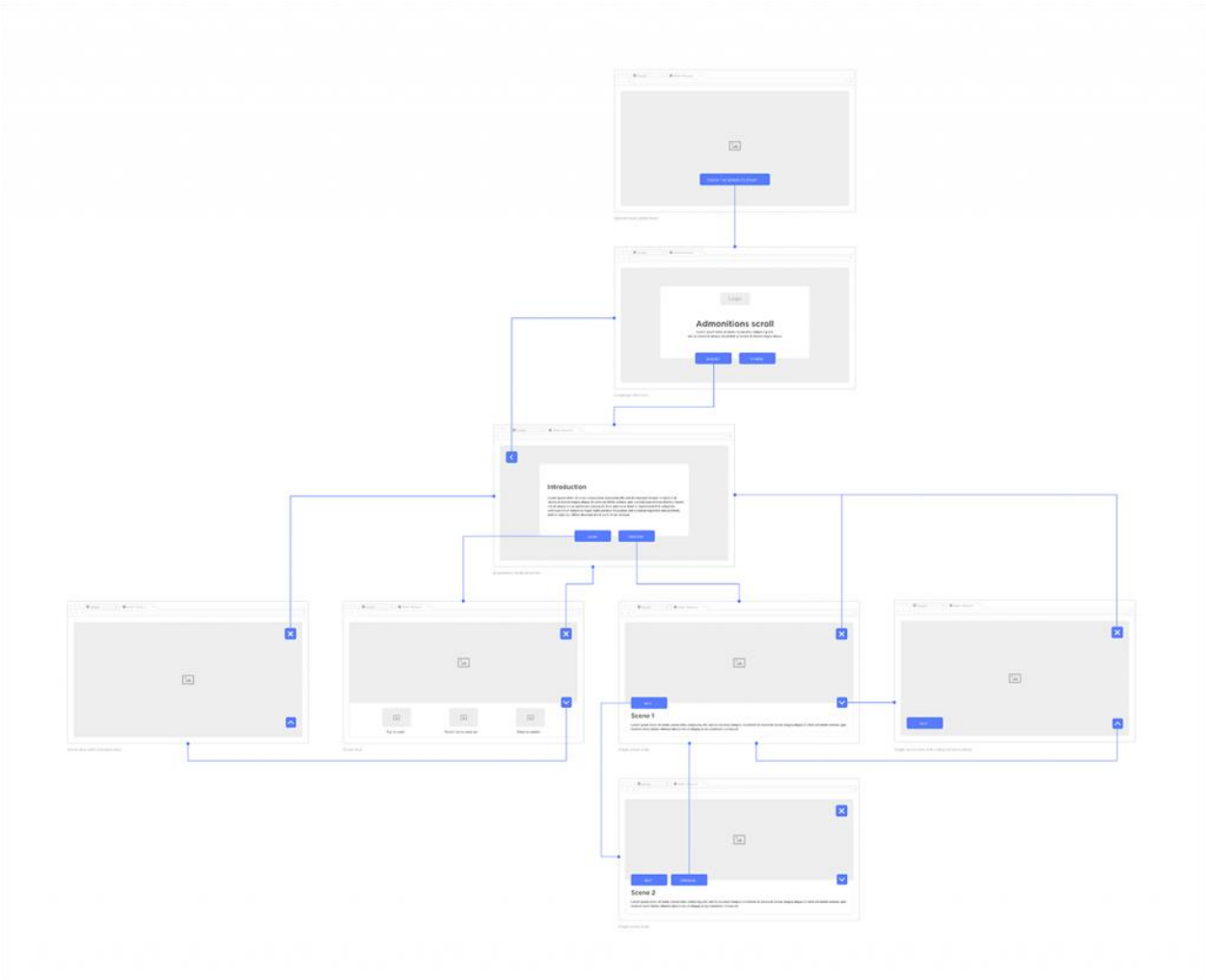
Another case introduced as well on the company's website was about their work for the British Museum. The museum needed to develop a digital solution to show to wider public rare Chinese narrative paintings on silk from 5th-7th centuries that due to fragility could be demonstrated just eight weeks a year. The Museum wanted that the users could interact fully with the scroll, they partnered with LETO and Google Cultural Institute to develop a solution.

The company decided to add the missing parts: the twelve scenes of the 12th century paintings by coping them in black-and-white to overcome the dissatisfaction of the users who could not see the artefacts alive.

Google digitized the scroll and gave the images to the company. Resolving the problem of large weight of the images with the help of the JavaScript library the company pre-loaded all of them, when the user opened the browser. As well it developed a hyper-sensitive experience, which allowed the viewer to go from 1x focal length to 20x focal length.

The final product according to the company's opinion answered both to laypersons and experts. The site was developed in English and Chinese. Big advantage arrived from both Discover option to explore the drawings and the Zoom option (Picture 12).

Picture 12: Development of new service for the British museum



8.4 New services assessment, innovation strategy

The investment in developing new products is basically the client's responsibility, but surprisingly LETO as well is investing in developing their new products and services. According to the CEO on average 70% of the developed ideas fail. But the goal of the company is "to fail as quickly as possible", in one week, and to start the NSD process again.

The benchmarking company for the CEO is Google. The strategy of the company is to keep being innovative, less structured and formalized. The CEO is planning to expand departments in some other countries, but the main goal remains to develop innovative approach.

8.5 Case discussion: definition of the knowledge base

The specific feature of the company is that the initiators of every service are the clients of the company, usually other companies. That's why the NSD process is oriented towards realizing their requests in the most effective way, taking into account their needs and the needs of the market.

To perform the services in a more effective and fast way the company developed its codified NSD process, iterative and incremental.

Every employee is responsible for new ideas search and development in the process. The ideas appear as a result of brainstorming based on personal knowledge and creativity of employees.

Despite the fact the company is using a codified NSD process; it is not possible to classify the company as basing on analytical knowledge, because the NSD process is developed inside the company according to personal experience and knowledge of its founders. The difference with the codified process in companies relying on analytical knowledge is that their NSD or research process is determined by general rules that cannot be deviated inside the company. Instead the NSD process developed in the studied company can be changed if it is reconsidered as effective.

It is possible to conclude that the knowledge used in the NSD process is more close to the type of knowledge based on experience which is defined by the term 'synthetic', according to the Oxford definition "having truth or falsity determinable by recourse to experience".

The more detailed description of the knowledge base introduced by Pina and Tether (2016) can examine more deeply different stages of the process. The purpose of knowledge creation in the synthetic knowledge type they determined as "designing and/or providing practical solutions to client specific problems" and the source of initiation as "identification of specific problems needing a practical solution", the definitions correspond to the words of the respondent that the main goal of the NSD process is to find the best solution for the clients' needs. At the same time this type of knowledge requires "strong client's interactions throughout the project" with outputs as "practical solutions, often including implementation, written documentation is secondary" (Pina and Tether, 2016) the definition as well corresponds with the dominant practical vector in work results of the company with the constant referring to the company's clients. The knowledge base they defined as "application of experience and heuristics developed through learning by doing, using and interacting, especially on similar prior projects", the definition confirms the methods of works applied by the company in the idea generation stage - brainstorming and team work.

The specific feature of the company activity is that besides coding the company is developing as well the design of the products. This activity differs from the development of technical and marketing solutions for the products. Applying as well the definition proposed by Pina and Tether (2016) who identified that 'the outputs of the companies' work – "creative symbols or forms, including graphics models and prototypes" are the outputs of the companies applying symbolic type of knowledge, it is possible to conclude that the results of the company's activity are influenced as well by the symbolic type of knowledge. This type of knowledge is studied more deeply in the following cases.

Case 9: Omniauto

9.1 Company introduction: brief history, main services and clients, organisational structure

Omniauto or "Il magazine dell'automobile" is the internet website dedicated to cars, car industry, cars' advertisement, cars' technical characteristics and a blog.

The company was founded in 2004 in Rome. At the moment of an interview the company was employing 50 constant workers and 10 collaborators.

The interview was held with the founder and the Managing Director of the company and one of the collaborating photographers.

The main product of the company is its website in the format of an online magazine with a rich context. The website contains links dedicated to news in the car industry, photos of latest cars' models, videos devoted to latest models' trials, a blog, information about latest trends in cars' equipment, such as insurance, auto electricity etc. Besides there is an online trade platform for car market of new and used cars.

The website is connected with the social networks. There are links to the company's pages in Instagram, Facebook, twitter, YouTube, pin interest, Google+. The company dedicates a lot of attention to social networks. It is following the latest trends in online marketing and advertising, paying a lot of attention to its followers in all social networks.

The company started its activity as a website dedicated to car industry. The other project of the company was auto blog dedicated to the discussion of all the topics connected with cars and supporting services. With the time the company decided to introduce a new form of presentation on their website - the videos, each of around 7 minutes dedicated to a certain model of a car, described by different journalists. The project received the name "My garage". Each video described a certain aspect of a car, for example in one video different journalists spoke about the consumption capability of the car, its advantages and disadvantages, another video touched another technical aspect, another video presented the opinions of journalists or photographers on esthetical aspects of a certain model design. The videos were presented on the YouTube platform and the results turned successful, the videos collected substantial number of visitors.

The young team of the company is in constant search of new services to propose on the market. It is vital for the company and its employees to 'feel' and understand the trends on the market, the mood and desires of the audience.

Since the website of the company is its main product it should satisfy the psychological needs of the audience, be involving, contain the maximum useful information and at the same time be convenient and simple to use. The website should be clear for specialists in the area and ordinary consumers that are interested in car market.

The videos help to present the information in a visual way making it more spectacular. Social networks help the company to be in touch with the customers following their feedback and interests. Since the main income of the company is received from the advertisement from cars' producers, the popularity of the website among customers is vital.

The organizational structure of the company is quite flexible in order to support the creative atmosphere and spirit of the employees who are involved in the creative process.

9.2 Position on the market: main competitors, competitive advantages

The video format created by the company became revolutionary in a certain way – internet advertisement in the form of short videos with journalist's reports similar to short documentary films. Due to high competition on the internet market, companies search new ways of advertisement avoiding traditional approach. The buyer should be persuaded in an indirect way to buy the product. Following this trend the studied company succeeded to combine

informational and entertaining elements in the advertisement to involve the customers' emotions.

The success of the new service resulted in the success of the company on the market: 51% of the company share was sold to an American group. Besides that the successful idea inspired the other companies to imitate the service.

At the present moment the company's activity is dedicated to the improvement of this successful service, which is in constant evolution and development. The format of videos can change three-four times a year; new topics are continuously introduced in the videos.

9.3 NSD process description

The NSD process starts with the search of idea for services. The company does not have a separate creative department. There is one creative responsible in the company being as well in charge of marketing. He gives 'hints' for new services that should be shared during meetings with the edition. The meetings are usually not scheduled.

The responsible is constantly searching and developing new ideas or improving the existing ones. He tends to look for new ideas in all other sectors of KIBS companies. For example the idea of videos presented on YouTube platform was inspired by the videos produced in other sectors in particular in fashion companies. The investigated company prefers not to copy the ideas from the competing companies, because the activity and the income of the company (from sponsors, car industries) are based on the originality of the advertisement they develop.

According to the words of the owner the 'hints' they usually look for abroad, mostly in the countries that are leaders in KIBS, for example the United Kingdom, since they consider themselves "leaders in video production in Italy" without other competitors in this location.

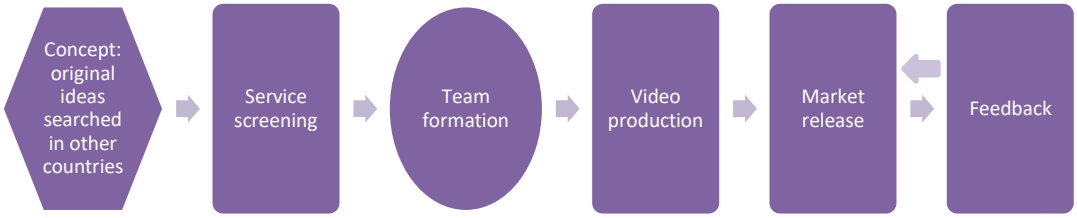
The search of new ideas is spread around all kinds of video production: music video production, documentary films, commercial video production etc. Sometimes the ideas can emerge from the company's employees past experience and knowledge.

The process of New Service Development is not structured and not codified, according to the words of the owner, "what arrives arrives". After the responsible proposes the new idea, the edition discusses it and if they decide to approve it, it is immediately released to the market. If the service does not have success, it is removed from the market and a new service is proposed.

The results of new services according to the owner are usually the mix of clients' needs and independent vision of the company. When the video is released it is 50% consisting of clients' needs and 50% of the company's independent creation. But when the owner tried to look at the overall result of the company's services, he noted that 70% of all services – are the result of clients' needs and 30% - independent creation.

"I cannot do this thing because I like, but I also cannot do all what a client wants", noted the owner. According to him they cannot avoid not to think of a person who will consume the service, but also when they create something new, it 'should be really new'. "We base on the needs of clients but we also can create the needs" stressed the respondent (Figure 14).

Figure 14: The main stages of the NSD process



9.4 New services assessment, innovation strategy

The main part of investment comes from the producers of cars and the industries of car equipment and services. All new ideas must always have 'concrete funding' according to the respondent. The company always does financial and investment plans. Either the sponsor should be found or someone who gives 'the push' to start a new service. If the company does not find the investor, even if the idea is found, it is not realized.

The strategy of the company is oriented towards improving its position in social media, and in social networks, according to the words of one of the creators of the service; substantial efforts are oriented to receive followers in social media.

The main goal of the management is to remain as creative and innovative as possible, not to follow managerial theories and too structured working process which in a certain way can damage the creative spirit of the company.

9.5 Case discussion: definition of the knowledge base

The SD process of the company is highly unstructured and not codified. The process substantially depends on the concrete idea for the process. The new ideas search is the most important part of the process. It is a not codified process based on creative internal knowledge of employees, their ability to search for new ideas in all possible sources, sectors and countries and develop them in a creative way. This knowledge application contradicts to the description of an analytical type of knowledge and is more close to a synthetic type, based on internal knowledge and experience of the employees.

But the company's goal is develop services that can address not just rational sense but to the audience emotions to cause desires aimed by the company. The company is addressing to the customers' emotions with the help of visual images or in other words 'symbols'.

It is possible to conclude that the NSD process is based basically on the type of knowledge that can be termed 'symbolic', which is defined in the Oxford dictionary as "the use of symbols to represent ideas or qualities".

According to Pina and Tether (2016) the purpose of symbolic knowledge creation and the source of initiation are "creating or manipulating expressive forms to elicit desire" and "identification of a need through expressive language or forms" which corresponds to the goal

of the company activity to affect people emotions and interest with the help of the video format that can arise intellectual and esthetic interest.

The type of knowledge created the researchers (Pina and Tether, 2016) defined as “expressive, based on insight, subjective interpretation and conditioned by attitude to sociocultural acceptance” which as well corresponds to the described in the case the website of the company developed according to the present moment preferences and interests in the society, one of which is the denial of traditional advertisement forms. The outputs of the symbolic based activity Pina and Tether (2016) defined as “creative symbols or forms, including graphics, models and prototype”; the definition as well corresponds to the products of the company - website, photos, videos, blogs and short articles and interviews.

Since the company is proposing communication and advertising services taking as a base the research of Strambach (2008) who defined cultural industries and creative service industries such as film making, music, fashion, theatre, publishing or advertising and design as possessing symbolic type of knowledge, it is possible to refer the company to the same classification. According to Strambach (2008), KIBS subsectors such as marketing, advertising and creative services are “heavily dependent on symbolic knowledge dealing with ideas, symbols and socially constructed commodities”. The description of the knowledge base corresponds to the activity of the company looking for ideas that can satisfy customers’ social needs.

Following the observations of Strambach (2008), who underlined that the introduction of new ICT has ‘brought huge structural changes in services’, it is important to underline that in the observed company the development of services require as well IT programs implementation for video introduction, which involves to an extent the application of technical or synthetic type of knowledge, ‘application of experience and heuristics developed through learning by doing’ (Pina and Tether, 2016). In general it is possible to conclude that the company is basing its activity on the symbolic type of knowledge with an influence of the synthetic type in the service development stage.

The influence of different knowledge bases on different stages of the NSD process is observed as well in other cases and confirms the present tendency of convergence of different knowledge types in KIBS companies (Toivonen, 2004; Strambach, 2008; Scarso, 2015; Pina & Tether, 2016).

Case 10: MKV design

10.1 Company introduction: brief history, main services and clients, organisational structure

MKV design is an example of a design company operating at international level for several years.

MKV design is an interior and architectural design company based in London with offices in Switzerland and Greece. The company was founded in 1999. From that time MKV has completed a number of unique interiors projects around the world, from leading hotel groups to residential properties. According to the official website of the company “MKV Design has become a go-to design studio for hotel projects and resorts around the world, particularly historical renovations”. The firm at the moment of an interview has comprised around 20

architects and interior designers, who have worked all over the world on projects as remote as India, Austria and Azerbaijan.

According to the official website of the company its mission is in creating environments that 'can be delivered on every level'. By "applying intelligence to design" the company produces products that combine aesthetic, practical, commercial and experiential aspects. The main principles of the company are to approach with a personal vision for every project, to set the highest level standards and to work in the closest possible contact with the clients. According to the company information these principles helped them to be the leader on the market as 'world-class designers'.

The main services of the company include design brief advisory, concept creation, space planning, schematic design, design development, FF&E specification, contract documentation production, purchasing, artwork packages, installation supervision, and site inspection.

Among numerous clients of the company are: Alpine Spa (Switzerland), Blue Palace Resort and Spa (Greece), Boulevard Hotel (Azerbaijan), Burgenstock Hotel (Switzerland), Certo restaurant, Radisson Blue Hotel (Dubai), Grand Hyatt Hotel and Residences (Abu-Dhabi), Grand Residences (Switzerland), Hotel Kempinski Cornivus (Budapest), Hotel Schwelzerhof (Bern, Switzerland), Metropol Palace (Belgrade, Serbia), Mykonos Grand Hotel and Resort, Palace Hotel (Switzerland), Pokerstars LIVE (London), Radisson Blue Style Hotel (Vienna), Royal Savoy Spa, Hotel Royal Savoy (Lausanne, Switzerland), Sheraton Grand Hotel and Spa (Edinburgh), Sheraton Grande Park Lane (London), Victory House (London), Big chains as Starwood, Intercontinental, Cheval and Marriot, Individuals in hospitality and residential and many others.

The organizational structure of the company consists of the founder and managing director, directors, associate, architectural and FF&E departments.

The company was founded by Greece native Maria Katsarou Vafiadis. The team she created won different awards and worked with international clients from developers and operators to demanding private holders. Maria Vafiadis graduated as an architect before moving towards interior design. She is known in the design world for her 'universal approach', as she does not bounder her ideas with 'house style' but is trying to expand the vision of every project. According to her opinion, the company has a trademark that demonstrates how to create spaces that can 'move people emotionally', to create emotional contact with people, location and culture as a whole and appearing in small details.

The company is lead and influenced a lot by the founder who has a remarkable reputation in the design world. "Maria's range of vision comes from an instinct for luxury design and the creative insight to draw ideas from diverse sources, whether an object that tells a story or the energy of an entire city" points out the website of the company.

The vision of the founder defines the policy and strategy of the company. According to this approach, the design should be intelligent; it should be related not with just aesthetics and creation of 'pretty space', but based on complexity - architectural principles and cultural receptivity. The works should affect emotions. The founder stresses the importance of involvement in the project from the first day of work, the importance to be part of a team that has the same goal and values, and aims at creating the best product.

10.2 Position on the market: main competitors, competitive advantages

The main competitors of the company operating in the market of luxury hotels design are GA International, Richmond International, KCA International, RPW Design, HBA.

The designers of the company see their strong points distinguishing them from the competitors in two services - concept creation and space planning.

Close collaboration with the clients is one the cornerstone principles of the company. The approach to every client is highly personalized; “unique and tailored solution” should be the result of this collaboration as stressed on the company’s website.

At the same time the vision of the company’s employees is constantly innovating. The designers are trying to overcome the limits of the traditions and trends and go beyond the bounds of a brief (the design project). They are searching to create transformative spaces that can combine originality and sense, and remain lasting. To achieve this, the designers should understand the “ultimate essence” of a project. The company is always aspiring to generate the final result that should be unique and organic to the place.

The depth of perception combined with intelligent and complex approach creates the unique style of the company’s products. The company sets highest standards in materials, finish texture and craftsmanship. It is fighting for balance between commercial demands and creative ambitions. The perfect result the company is seeing in experience, commercial sense and creative expanse. All this allows the company to have a strong competitive position on the market.

The technical equipment is vital for the company and upgraded yearly. The main equipment necessary for the services are computers, printers, scanners and plotters. The main programs used are AutoCAD, 3d Max, Spec Designer, Photoshop and InDesign.

10.3 NSD process description

The interview on the NSD process was conducted with the junior designer of the company.

The process of new services’ development starts with the orders of the clients. Major innovations in products development depend mostly on the clients’ orders and changes in the market.

Describing the process of new ideas search and creation for new products the interviewed designer mentioned that every new project is unique and for every project ideas can arrive from different sources. The sources she pointed out included:

- Internal sources: employee knowledge and previous experience, the company’s own collection of art materials, portfolios;
- External sources: clients, suppliers, competitors, exhibitions, among companies of other KIBS sectors the respondent pointed fashion companies.

For the designer it was difficult to evaluate the importance of every source of ideas for different projects.

For the designers' activity such concept as inspiration is important, an impulse that can push the designer to create a unique project. According to the designer inspiration for different projects depending on the place, time and project can arrive from unexpected sources. The designer should be active, constantly 'feed' oneself 'keeping the eyes open to all the details around in everyday live'. It is important for the sake of the profession to travel and open new countries, cultures, people, to visit new places and architectural pieces. If there is no possibility to travel it is important to follow the specialized journals. According to the opinion of the designer, the journals which are trendy and timing pieces help to be updated on modern trends, tendencies, color decisions and styles directions. It is important to follow the spirit of time and mood in society in general and particularly the newly opened hotels, restaurants, shops etc.

According to the words of the respondent, "since our company is basically performing the projects in Europe, Middle East and UK, we follow the editorials of these regions, and all the leading publishers". The designers as well should visit the main events in the world of design and architecture, such as EXPO Maison & Objet, Salone del Mobile, Clerkenwell, May Design Week and September Design Week. The company has subscriptions for around fifteen different journals and books in the reference library. The designers also follow Pin interest and other web sources.

The inseparable parts of the work are meetings with the suppliers, who come to the office with the demonstrations of new collections, products and projects with which they work with other companies. The inspiration to designers can come as well from visiting suppliers' showrooms. In general the designer thinks that inspiration can spark from little different things, conversations, also from communication with the colleagues or friends. The vital feature for the designer is to be open to everything, to be able 'to listen and hear', 'to be able to look around and notice interesting and unusual details and solutions'.

Just few employees involved in the project are responsible for new ideas search. The process of interaction of ideas is built in the company through brainstorming, sourcing individually and then sharing ideas and visions with each other and testing them out. The process of ideas screening and evaluation is organized through presentation of space planning – 2D, general concept scheme - imagery, FF&E mood boards and 3D visuals.

The process of NSD according to the designer is half systematic depending on the single project. The timing is always important and defined for every project.

The main stages of NSD process the designer defined as:

- Initial ideas to realization through the concept,
- Design and detail developments,
- Specifications and installation.

The stages of the process can overlap to some extent. The interactions with the clients are held during the entire length of the process in the form of meetings, site visits, conference calls and day to day e-mails and correspondence.

The concrete steps and the sequence of stages depend as well on the dimensions of the project, the specific features of the client and his vision, besides that the specific stylistic characteristics of the project play an important role. According to the respondent every project is unique and different from the others that is why every project demands an individual

approach. Sometimes the process starts just with pictures, the so called 'mood images', followed by the sketch by hand, sometimes the space is modeled on 'sketch up', then the space is planned by hand in 2D and after transmitted on computer in 'AutoCAD', at the same time the visualization in 3D and 3D Max is modelled and developed in FF&E (furniture, fixtures and equipment). All these processes are interconnected and exchangeable.

Sometimes the process can start from 2D, space planning, followed by mood images; sometimes it starts with the concept, without sketches, with FF&E selection to give the direction. It can also finish at this point till the presentation and receiving of feedback from the client.

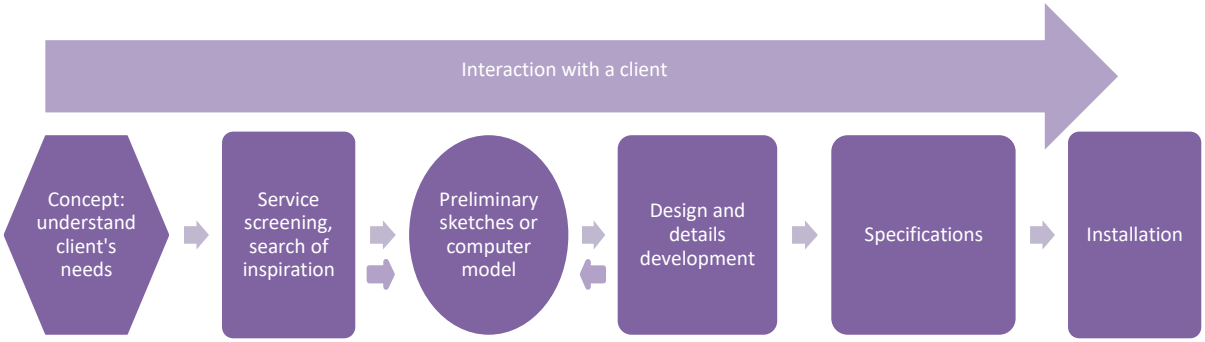
Summarizing the opinion of the designer it is possible to conclude that there are no rules in the creative field, every process is individual. The systematization of the process depends on how much time is scheduled for the project. If the client has strict time limits, if the client has enough finance, investment or not, if the project presents a new building or a renovation. Sometimes the project begins and continues till the end without interruption; in this case it can be accomplished quite quickly. Sometimes the project starts quickly but can be interrupted or postponed according to different circumstances to an undefined period. After some time the project can start again or not. Sometimes the project is long lasting and in this case the work is accomplished gradually, from time to time. The active work can be done during a certain period and after the results are sent to the client and the project can be interrupted till the next stage, after it can start again, till the next time. From this point of view as well every project is individual.

Answering the question about the final product the designer noted that it's difficult to evaluate the level of influence of the designer's ideas and clients' desire on the final product. Some clients come to the company and give the entire freedom of fantasy and ideas to the designers. The process is built in this case on trust. The clients could have seen previous projects and they could appreciate the style of the company's works or they could visit the hotels, restaurants or resorts where the company had worked, and could receive a certain impression. Some projects, especially if it is a big chain (such as hotel chains) have a predetermined package of conditions, which the company is obliged to follow. In this case there are many limitations since the beginning. Sometimes the client knows what he wants exactly and can formulate his ideas in a clear way. In this case the company is following this direction. Sometimes the style or the colors are determined by the place, country or the city, the location, or by the building itself, its architecture. Sometimes the client is not experienced and does not know what he wants and the designers should guess about his tastes, sometimes it is easy to do, sometimes it takes a lot of time and effort. If the client had already worked with the company, the process of working is built more easily; because the designers know the preferences and tastes of the client and the objections the client may do (Figure 15).

At the end the extent of the creativity and of original ideas in the projects and the influence of the client's desire differ on every project.

According to the respondent for the process of new product development knowledge in different fields is necessary, some of the most important are knowledge of the market, technological knowledge, procedural knowledge, and knowledge of human psychology.

Figure 15: The main stages of the NSD process



Several examples of the company's products can be found in the article "Complexity of design" published on several specialized websites which describes several corner stone renovations performed by the company including the renovation of the Hôtel Royal Savoy Lausanne and the Burgenstock Resort.

The Hotel Royal Savoy Lausanne was for centuries defined as a European 'Grand Dame', hotel described as a 'fairytale'. The hotel is located between French Alps and Geneva Lake and accepted during its history legendary visitors from rock stars to members of royal families.

According to the founder of MKV Design when they received the project, the building was extraordinary, but after a number of reconstructions it lost most of its original appearance. Besides that the new owners wanted not only to renovate but also enlarge it. It came as a challenge to the company. The hotel was bought by the Qatar operator 'Katara Hospitality' the goal of which was to return to the building its historic appearance. The renovations lasted for five years with total investment of 100 million francs ($98.6 million) and the result achieved could meet the original idea - the original façade was reconstructed with modern interiors, spa and Sky Lounge. According to the interview of the MKV design founder the designers took inspiration from the exterior surroundings and the spirit of the historical design but transforming it with the new forms and elements.

Another key project of the company planned to the opening in 2017 was the Burgenstock Hotel, Palace Hotel, and Alpine Spa at the Burgenstock Resort, Switzerland. The Palace Hotel, which was originally opened in 1904, was recreated as a boutique hotel, whereas the Burgenstock Hotel was built from the scratch. The key elements of the hotel according to the designer included oversized windows, simple materials, unusual textiles, and 'earth-toned' color range. The idea of the hotel design was to create an organic and close to the exterior environment design. Stone and timber with metal applied as the technics characteristics for the mountains buildings were used as materials.

Among rich curriculum of the company there are as well Sheraton Park Lane in London, Victory House in London, and the Grand Hyatt Abu Dhabi Hotel & Residences, which Vafiadis describes as 'a modern interpretation of the Arabic lifestyle'. For the owner "her all-time favorite project" is the Costa Navarino Resort in Greece, opened in 2008 and "involved the creation of an entire destination". The challenging request of this project was that the created design had to 'tell a story'. The result succeeded to combine the contrasts of classical architecture with contemporary elements, resort aspects with hotel functions.

10.4 New services assessment, innovation strategy

According to the respondent, the company invests in 'good quality printers and plotters, presentation materials, etc.' i.e. in the sources for new products development, while the clients who order the service invest in the new services realization.

Contemplating on the company's future strategy, the founder stresses that typically the company has worked in a five star luxury segment, but it should not limit the company's activity. Since the market in the hotel business as well developing and expanding from pure hotel models the company keeps its eye on residential, apartments, also hostels that are continuously conquering the market and the company should be broadminded enough to "explore more aspects of hospitality design".

The main success factors of the company according the owner and experts are highly business-minded practice, deep expertise knowledge on hospitality industry, right balance between commercial demands and creative spirit and sensitive advertence towards the clients and their needs.

10.5 Case discussion: definition of the knowledge base

The NSD processes performed in the company are initiated by the client. Every service should satisfy the client's needs and desires. At the same time the process is highly creative, it is partly codified and highly unstructured, every stage can be skipped and overlapped depending on the project. The process depends a lot on the concrete idea for the service. For the designers an important spark for the creative process is inspiration, which arrives from their internal emotions. The goal of the designer is to transfer these emotions to the final result to affect to the clients' aesthetic senses. The final result of the designers' work represents a visual picture involving symbols that address to the customers' emotions. It is possible to conclude that the NSD process is based basically on the type of knowledge termed 'symbolic', which according to the Oxford definition means "the use of symbols to represent ideas or qualities".

According to Pina and Tether (2016) the purpose of symbolic knowledge creation and the source of initiation are "creating or manipulating expressive forms" and "identification of a need through expressive language or forms" which corresponds to the goal of the company activity to affect people emotions by the means of the created design.

The type of knowledge created the researchers (Pina and Tether, 2016) defined as "expressive, based on insight, subjective interpretation and conditioned by attitude to sociocultural acceptance" which as well corresponds to the process of inspiration search described by the designer in the surrounding details, space, culture, place and transforming it through internal knowledge and imagination. The outputs of the symbolic based activity Pina and Tether (2016) defined as "creative symbols or forms, including graphics, models and prototype"; the definition as well corresponds to the products of the company - sketches, space planning or final interior design and architecture objects.

Basing on the research of Strambach (2008) who defined cultural industries and creative service industries such as film making, music, fashion, theatre, publishing or advertising and design as possessing symbolic type of knowledge, it is possible to refer the company to the same classification. According to Strambach (2008), KIBS subsectors such as marketing, advertising and creative services are 'heavily dependent on symbolic knowledge dealing with

ideas, symbols and socially constructed commodities'. The description of the knowledge base corresponds to the interviews of both designers of the company about importance of following the latest trends, time spirit of the society, its cultural aspects and the necessity to look for ideas in all surrounding details.

At the same time the type of knowledge applied in architectural services is discussed by researchers (Strambach, 2008; Pina and Tether, 2016). According to Strambach (2008) "architectural services exemplify how closely technical engineering knowledge and symbolic knowledge are intertwined". In fact apart a symbolic type of knowledge relying on "generative and creative processes" (Pina and Tether, 2016), the architectural services require technical synthetic knowledge, "application of experience and heuristics developed through learning by doing" (Pina and Tether, 2016). The application of different knowledge types on different stages of the NSD process helped to determine more precisely the knowledge bases of the company. The company is basing its activity mainly on a symbolic type of knowledge with the influence of a synthetic type, since the NSD process in the company involves creative approach aimed at developing symbols to represent ideas and the technical approach based on the knowledge and experience of the employees to develop architectural and engineering aspects of their services. The influence of the synthetic type of knowledge is produced mostly on the stages of the design (computer modelling) and installations.

Case 11: Studio P+P

11.1 Company introduction: brief history, main services and clients, organisational structure

Studio P+P is a London based design studio, specialized in developing the Visual Identities, Branding of businesses connected with the luxury market - Real Estate properties, Fashion, Design and Art companies. According to the website of the company their aim is "to create the design solutions which are able to reflect the client's personality in an intelligent and comprehensive way". They achieve this through an "analytical approach to every aspect of the project and through effective communication with the clients".

The interview was conducted with the founder and director of the studio. The company was founded in 2012 by a Russian native designer, initially called Design Division - renamed in 2015 to Studio P+P.

During its activity the company received several awards: Gold in International Visual Identity Award in 2016, runner up in Best Brand Awards in 2014, International Design Award in 2014, Coloring Your Brand Dopress Books in 2013.

The company is performing in several media fields which are:

- Branding and Strategy
- Visual Identity
- Art direction
- Exhibition Design
- Web Design

- Editorial Design

The Studio is a small size company with the main designers, Marketing Manager and several freelancers. The founder is the main designer of the company, performing design for the majority of the projects though in some cases she can attract freelance designers. Marketing director is responsible for the marketing strategy of the company, for 'clients' hunting', administration, and freelancers/interns management. The main technical devices of the company are computers which are upgraded in average once a year.

Some of the company clients are lux producers like Melissa Tofton Leather, Sovetnik House, Paulsen Collection, Villa Vesper, Adele Brydges Design and others.

11.2 Position on the market: main competitors, competitive advantages

The company is working in a highly competitive filed. The founder considers studios of similar size and freelancers the amount of which is substantial both in London area, United Kingdom and around Europe as the main competitors of the company.

As the main competitive sides of the company the founder points at:

- Competitive prices for services since the company is small and has less expenses and staff compared to a large company;
- High end outcome - "Quality is the most important aspect of our company";
- High attention to the clients, spending more time with the clients and accomplishing their requests;
- Producing more volume of work for lower budget.

11.3 NSD process description

The respondent considers that the main source where she is looking for ideas for the services are: experience, observation and education of people who are involved in the project. Inspiration is an important aspect for the designer's work when developing new services. According to her opinion, everything can spark inspiration when the designer works for the project. If there is a clear idea and a message she can find inspiration 'around, in books, streets, exhibitions, other projects, and online sources like Pinterest that can be used to create boards and share ideas'.

Regarding the communication with the client who orders the service, normally the client does not share many ideas; the client shares the 'brief', the design project. The company asks what the client likes or dislikes and keeps that in mind. The preferences of the client are the landmarks for the work process. If the client has 'poor vision' the designers "do not stick to it". The respondent considers that their work includes as well educational aspect for their clients: creating the new product for the client they can demonstrate basic design laws and show new trends in design.

According to the interview at the end all ideas for new products and services are the ideas based in the brief, particularly in the message that the company should deliver to the client's

potential audience. When producing the final product the company is focusing primarily on the kind of message the client aims to deliver to the customers.

The main responsible for the new ideas creation is the main designer of the company.

The process of new ideas creation and product development is systematic and repetitive. The main stages the founder identified as:

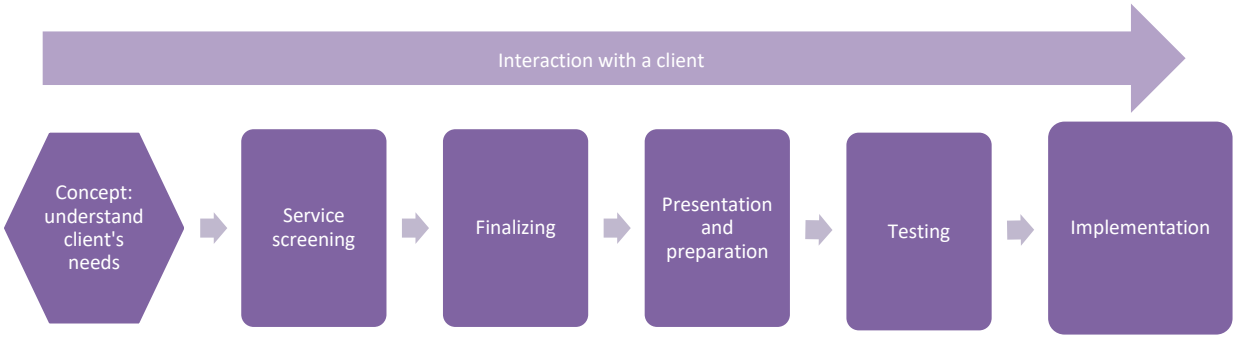
- Meeting and discussion to establish two or three major ideas;
- Meeting for developing ideas;
- Finalizing;
- Presentation and preparation;
- Testing;
- Implementation.

The stages are always sequential, but they can overlap if the time is scant. The designer prefers not to change the sequence of the stages since according to her opinion 'they have a system that works'.

The deadlines are set in advance by the Director or Marketing Manager and are never missed. The work is following precise time frames. The speed of the process is important but if the project needs more time for finalization, the designer prefers to spend extra time to get the best outcome possible. There are constant contacts with the clients during the process, mostly during testing and implementation stages (Figure 16).

The designer agreed with the proposed during the interview fields of knowledge necessary for the working process which are: knowledge of the market, technological knowledge, procedural knowledge, knowledge of human psychology. But the activity is not limited by these fields; every project depending on its complexity can require the study of new materials and aspects.

Figure 16: The main stages of the NSD process



11.4 New services assessment, innovation strategy

Every project is initiated by the clients' order and fully depends on the client's budget. The client and the company are discussing the budget of every project in advance.

The product strategy that the company follows the founder called “Concept Design Implementation”. The company is not focused on introducing new products; it is focused rather on design aspects. The aim of the company is to improve the service to be the best in the niche. “We always improve current service and the way we manage our work process but it always depends on the client and the project” noted the founder and owner of the company.

11.5 Case discussion: definition of the knowledge base

The NSD processes described by the respondent and performed in the company are always initiated by the client. Every service should satisfy the client’s maximum needs and desires.

The company has developed a structured and repetitive system for the NSD process, but at the same time this process should be highly creative it can be can changed in the company depending on the project. The designers should develop services that affect the buyers’ emotions and create desires that the client wants to transmit to buyers. The designers achieve this goal with the help of visual products that present symbols.

It is possible to conclude that the NSD process is based basically on the type of knowledge termed symbolic, which according to the Oxford definition means “the use of symbols to represent ideas or qualities”.

According to Pina and Tether (2016) the purpose of knowledge creation and purpose of initiation in companies with symbolic knowledge base are “creating or manipulating expressive forms” and “identification of a need through expressive language or forms” which corresponds to the answers of the respondent, that the company’s aim is to create the design solutions which are able to reflect the client’s personality. The type of knowledge created is “expressive, based on insight, subjective interpretation and conditioned by attitude to sociocultural acceptance” (Pina and Tether, 2016) as well corresponds to the contemplations of the designer on search of inspiration for the works and drawing through them educational aspects for the clients. Outputs, defined by Pina and Tether (2016) as “creative symbols or forms, including graphics, models and prototype” correspond as well to the company’s products.

Considering that the activity of the company in creating brand design requires the knowledge of marketing and advertising, Strambach (2008) defines KIBS subsectors such as marketing and advertising heavily “dependent on symbolic knowledge dealing with ideas, symbols and socially constructed commodities”. At the same time the substantial use of IT in the company’s activity involves to an extent the application of technical or synthetic type of knowledge as observed in Case 9. The NSD process is based on specialized web design programs which require ‘application of experience and heuristics developed through learning by doing’ (Pina and Tether, 2016).

As in previous cases the deep study of the NSD process helped to determine more precisely the knowledge base of the company. The company is basing it is activity mainly on a symbolic type of knowledge with the influence of a synthetic type, since the NSD process in the company involves creative approach aimed at developing symbols to represent ideas and the technical approach based on the knowledge and experience of the employees to apply IT programs for developing their services. The influence of the synthetic type of knowledge is produced mostly on the stage of design.

Case 12: Legal firm

12.1 Company introduction: brief history, main services and clients, organisational structure

The legal firm based in Rome is specialized in civil law. The firm was founded in 1996. The company was found by two lawyers, later two other lawyers joined the office. The interview was held with one of the lawyers and the founder of the firm.

The organizational structure of the firm is very flexible - there is no direct hierarchy, since every lawyer is responsible for the work with his clients and his income.

The activity of the company started with the collaboration with the bank of Rome, Unicredit, specifically with the department “Leasing Roma”. The company helped the official lawyers of the bank to work for insurance cases in the sector of leasing. The cases were mostly connected the clients of the bank who used the bank’s services in car renting and leasing and missed the expiring date of payment. The service was performed by external lawyers since the legal office of the bank was not sufficient to manage all the clients and trials. The lawyers received the percentage of the fee after the trial, another part of which was received by the bank. If the trial was too long it was possible to receive the anticipation of remuneration, since the average time of trials could arrive to four or five years. The company received the profit from the quantity of trials, despite that some trials could be lost. The bank at the end of a trial was receiving money either from the insurance or from the client, while the main service of the lawyers was to negotiate with the insurance company and the clients to arrive to an agreement. In the case if the agreement was not achieved the lawyers were starting the trial procedure in the court.

When the board of directors of the bank changed the company had to finish the service and start to look for new possibilities on the market.

12.2 Position on the market: main competitors, competitive advantages

The competition on the market in the sector especially in Rome is substantial. At the moment of an interview there were around 20 000 lawyers in Rome the number exceeding the same indicator in France and resulting in extreme difficulty for the companies especially for small to survive in the market. Consequently the majority of lawyers prefer to work as employees in big companies. For these reasons the main aim of legal companies both big and small is to compete for the clients proposing their services. Different lawyers use different strategies to find clients. Leading companies try to compete with brand and reputation, while small with the quality of services and low price.

According to the opinion of the interviewed lawyer the most convenient situation for the lawyers is to have as a client a big company or any other big institution, as a supplier of services. The lawyers who do not have the possibility to have as clients big companies usually find clients through personal connections and contacts.

One of the rules of the Italian Order of lawyers (“Ordine degli Avvocati”) is the prohibition the services advertisement which makes the process of clients search substantially hard.

12.3 NSD process description

According to the interview of one of the lawyers they are always in search of new ideas for services the main goal of which is to attract new clients. The company policy is very flexible, the lawyers are ready to improve or introduce new services to satisfy clients' maximum needs. The personalization of services in this case is very high, but there are limits connected with the specific features of the sector. It is impossible to perform the legal procedure faster even if the client needs because the legal terms are defined by the law, or to arrive to a successful result for the client in the trial if the initial situation of the client is complicated. The lawyers prefer not to reassure the clients on the results of the processes despite that many legal firms prefer to give optimistic forecasts to the clients to attract them. Communication with the clients is an important aspect in the company activity and depends on persuasive capabilities of different lawyers.

While searching for new ideas for the company started to diversify the services.

The search of new ideas can be divided into several main streams which are always in interconnection:

1) The lawyers through past knowledge and experience are constantly in search of new specializations inside the activity. The list of lawyers' services is summarized in the "Card of Services" ("Carta di Servizii"). In many legal firms, lawyers who specialized basically in civil law started to engage as well in administrative trials. One of the lawyers of the firm decided to start to perform as well administrative procedures, which he did not practice in the past. The reason was that the administrative procedures are usually more complicated and take more time to prepare. The procedure is more codified and formal. To learn to carry the activity the lawyer had to accomplish the service for his personal needs. He had to have a period of learning, and after he could introduce the service also for other clients.

2) Search of service suppliers. Legal companies in general try to find the clients through suppliers – other companies that deal with clients that can need legal support. One of the main sources for most lawyers till the recent time was insurance agencies. The lawyers always collaborated with them in providing legal services, the most important of which were services for car accidents. But with the change in the legislation it became impossible to provide this kind of service.

In the case of the interviewed firm the lawyers found service suppliers at the beginning in the car insurance agencies as well and later in the real estate agencies, which could provide clients to the firm. If the clients of the agency had problems in the commercial dials or contracts the lawyers proposed to resolve them, starting from legal advice finishing with the trials initiation.

3) Following the activity of other legal companies. In general all the observed sources to find new clients and ideas for new services are borrowed and used as well by the other legal offices. The services and the ways of search of clients are copied very quickly by different lawyers and firms. If the company has a solid range of clients and is known it tries to keep its position on the market. If the firm does not have this position it is always in search of new possibilities.

4) Looking at the needs on the market and the needs of clients. The needs of clients are always a priority. All the services are highly customized with the limits of the sector. To fight with the competition on the market the lawyers compete on the prices of their services, they put the prices much less than is determined by their "Card of Services" and can ask money not in advance of the procedure but at the end of it even if it can damage the activity of the company.

5) Search of ideas of new services in the other KIBS sectors.

One of the examples of the idea for the new service proposed by one of the lawyers became rendering of inheritance services that is usually provided by the state accounting service organizations (CAF). The idea for the service arrived from the personal experience of one of the lawyers who had to perform the service for his needs. He understood that this service could be in demand by other clients. Since this kind of service is listed in the "Card of services" of lawyers, he knew about the possibility to perform it but usually legal companies do not provide this kind of service as it requires accounting knowledge.

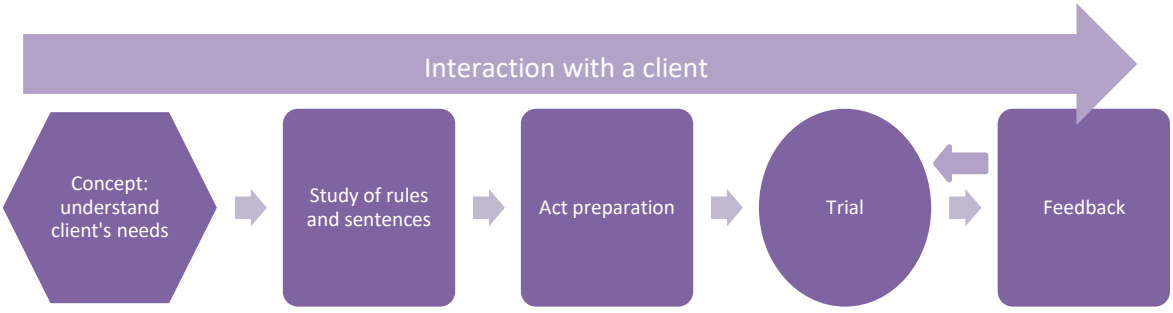
After the idea screening, the lawyers had to learn how to perform the new service, which included the combination of legal and accounting knowledge. When the new knowledge was acquired the service was introduced to the clients.

Every case or trial is different, so every new service can require new knowledge and the necessity to learn either inside the lawyers' specialization or in the new field of knowledge.

Every NSD process starts with the understanding of the client's needs. But when the order from the client is accepted the process is usually codified. On the next stage the lawyers usually study the rules and sentences connected with the client's case; on this stage they are doing a legal research. On the next stage the lawyer is writing the act for the client, basing his argumentation on the undertaken research of previous cases and court sentences and on the last stage he initiates the tribunal trial if necessary. The work can finish just with the consultancy of a client if the client does not want to continue the tribunal trial or if according to the lawyer it is useless. All the stages are sequential and cannot be skipped or overlapped unless there is a need of additional learning for the trial in case the client reveals additional demands or circumstances of his situation. If the client is not satisfied with the results of the trial process he can ask to do an appeal. In this case the process repeats from the beginning. The stages of the process are similar for all legal companies; they cannot be changed inside the company since they are determined by the requirements of the activity (Figure 17).

The knowledge applied in the process is in the major part codified since every trial is conducted basing on the codified sources and general laws. But there is always a space for different interpretation of the codified sources depending on personal experience of lawyers, concrete cases and needs of clients, opinion of different judges, and evolutionary changes in the society. The results of the trials are usually not affected by the market, and can be lightly affected by the client after the initiation of the trial.

Figure 17: The main stages of the NSD process



12.4 New services assessment, innovation strategy

The initiation of services usually requires standard state taxes which are charged from the clients. Apart taxes, the investment for new services can require expenses for learning materials, books, internet services, and consultancy from other lawyers. If there are special expenses connected with particular clients' case, such as a trip to another city or additional payments connected with the case, they are as well charged from the clients. The time of every new service performance is always different; it depends on the complexity of the client's case. In general the speed is not so important for the sector; the more important is the quality of the services, the bigger number of successful trials or cases creates the better reputation for the company. The time for the service development is as well different and depends on the tribunal predefined timeframes for every process. Some processes can last for years.

The remuneration of lawyers does not depend on the result of the trial or consultancy. If it is successful the client receives the trial expenses paid by the lost part and the sum he requested in the trial (if it was necessary), while the lawyers remuneration is identified by the Card of services and based on the time required for the service preparation and its complexity. If the trial is lost the expenses prescribed to the winning part are charged from the client. The lawyers receive the remuneration in any case.

The strategy of the company is to continue with constant search of new ideas that could attract new clients. Every lawyer is free to propose and introduce new services for the company. More individual approach and personal freedom is more important than the team work in the company, since every lawyer is responsible for his income. The situation on the market makes the activity very unstable, resulting in constant necessity to search for new services and new clients.

12.5 Case discussion: definition of the knowledge base

Legal companies similar to consulting companies were considered as relying on synthetic knowledge base in their activity (Strambach, 2008). But recent researchers overlooked the activity of legal companies and in the last research Pina and Tether (2016) proposed to classify legal companies as possessing a different type of knowledge, which they called Compliance.

The study of the NSD process of the legal company confirmed the decisive distinguishing features compared to the other companies studied in the present research.

The initiation of the service, as in other companies with the synthetic knowledge bases, is oriented towards finding the practical solution for their clients' problems, but the service development process is different. Every new service, which is in the case of legal companies is usually a trial process or a consultancy is based on strict codified procedures and codified sources of knowledge relating it more with an analytical type of knowledge. The stages of the process and their order are determined by the specific features of the legal activity and cannot be changed inside a single company. Every new service should initiate with the study of the client's problem: the lawyer should study the correspondent laws and regulations connected with the problem and after to write an act dedicated to the client's case to give a consulting conclusion. If the client decides to continue with the trial, the lawyer initiates the trial procedure determined by the tribunal regulations. The time as well is determined by the trial procedures and cannot be changed by the legal company. As a result the NSD process of legal firms combines the characteristics of companies basing on synthetic and analytical types of

knowledge, but at the same time is different from them. That is why following the research of Pina and Tether (2016) the present research proposes a new type of knowledge base for legal companies. The proposed type is termed 'Interpretative' the definition of which according to Oxford dictionary is 'relating to or providing interpretation'.

Pina and Tether (2016) proposed the term 'Compliance' for the type of knowledge used by legal companies. They defined this term as 'providing, assessing or reforming solutions so that they comply with laws and regulations'.

Basing on the present research and the deep interview with the lawyer it was possible to reveal that the process of knowledge application in legal companies results not just in finding compliance with the codified laws and regulations but rather in interpreting them depending on a particular need or a problem of a client in finding solutions for his problems. The proposed term corresponds as well to the type of knowledge created, which Pina and Tether (2016) identified as "interpretive, based on extensively documented knowledge and the certified expertise" which corresponds with the described service development procedure based on the study of codified sources, laws.

Since the interview with the lawyer revealed that the activity of the lawyers is grounded not only on the compliance of the services with the codified laws and regulations but also interpretation them according to a specific case, the proposed term for the knowledge base 'Interpretative' according to the opinion of the lawyers more corresponds to his understanding of the activity.

The study on the knowledge base of legal companies needs further research. It is possible to propose another definition for the knowledge base used by the law companies, but the studied NSD process clearly confirmed the differences compared to the companies using other types of knowledge. These differences should be taken into account in the further studies of the knowledge base of this kind of KIBS sector, and this distinctive feature should result either in definition of the different knowledge base, or a special subsector of the existing knowledge bases.

The chapter presented the in depth investigation of the twelve companies based on the interviews with the key informants of the companies. The companies were described from different aspects starting from the brief history of their activity finishing with future strategic plans. The detailed description of the companies' NSD processes helped to determine the knowledge bases of the companies, while the study of every stage of the process helped to identify in a more precise way the influence of additional knowledge types on the process.

Chapter 5. Discussion, Main Findings

This chapter summarizes and discusses the main findings of the research. Of particular note, some aspects of the research results contradict the findings of previous researchers, while others confirm them.

The research results are discussed in three main sections, each corresponding to a research question. The first section examines the service development (SD) process as it is organized and implemented in the investigated companies. The second section explores if and how the knowledge bases of the companies influence their NSD processes. The third section investigates the forces that drive innovation efforts and outcomes in KIBS companies with different knowledge bases.

Research question #1: How do KIBS companies organize their service development processes?

- *Are there common stages in different companies?*
- *Which factors influence the process?*

It is important to begin by noting that the findings of the empirical study show that the investigated companies generally tend to systemize their service development processes. These results contradict the commonly held view of scholars that KIBS companies do not systemize their development processes because of their unstructured nature (Toivonen and Tuominen, 2009; Kelly and Storey, 2000). Each company adopts its own NSD process, whose stages seem to depend on the specific features of the company's activity.

As represented by the case of LETO, some of the investigated companies are looking for procedures that allow them to make their NSD processes repetitive and less time consuming. For instance, in order to achieve this goal LETO draws inspiration from the approaches developed by manufacturing companies, specifically the lean development model of Toyota. LETO also looked to a model developed specifically for KIBS companies by Google Ventures, the venture capital firm that invests in the fields of life science, healthcare, artificial intelligence, robotics, transportation, cyber security and agriculture, and which helps start-ups in these fields interface with Google.

The study reveals that the stages of the NSD process followed by the investigated companies have strong analogies to the stages identified by previous studies concerning the service sector. Taking as a reference the stages identified by Alam and Perry (2002), one of the few models developed on the basis of empirical results, it is possible to summarize how the NSD processes take place in each of the investigated companies. The scheme developed by Alam and Perry consists of the following stages:

1. Strategic planning
2. Idea generation
3. Idea screening
4. Business analysis
5. Formation of cross-functional team
6. Service design and process/system design
7. Personnel training
8. Service testing and pilot run
9. Test marketing
10. Commercialization

Such stages are also found in the investigated companies, although there are some differences and exceptions. One is that none of the respondents indicated strategic planning as the initial stage of the NSD process, neither in the sense of future plans for the company, nor in the sense of financial strategy for new services. The other stage of the Alam and Perry model that is not found in the sampled companies is the business analysis stage, which follows the idea screening stage. In fact, the respondents identified the process of business or financial analysis for NSD as a separate stage not included in the sequence of the NSD process. All the respondents spoke about business analysis as a separate stage. Some of the companies analysed the financial strategy throughout the NSD process, but the majority did so before the NSD process.

It is for this reason that the stages of strategy planning and business analysis are combined into one stage and placed at the beginning of Table 1 below, and in Table 2 later in this chapter. Other stages that differ from those suggested by Alam and Perry are the test marketing and commercialization stages. For the investigated companies, those stages are termed market release and feedback. In fact, none of the analysed companies used test marketing in the NSD process; instead, they delivered services directly to the market. The commercialization stage was termed the feedback stage because it better reflects the companies' activity during this stage, when the company is waiting for feedback from customers about a service and how successful it is on the market.

The companies in Tables 1 and 2 have been subdivided according to the nature of their relations with clients. Table 1 includes companies that look for ideas for a new service internally, while Table 2 includes companies that deliver their services on a made-to-order basis. In the companies included in Table 2, the ideas for new services usually arrive from their clients, who can control every stage of the NSD process because the results are expected to meet their requirements.

The stage termed by Alam and Perry as service design and process/system design was renamed in Table 1 to the learning, testing and design stage. The difficulties with this stage appeared due to different sectors of the investigated companies. In this stage companies of different sectors perform different activities. Research companies employ tests during this stage, while T-KIBS usually perform testing or incremental development of a new service, and P-KIBS performs both testing and learning when employees are required to learn new materials in order to perform a new service. In Table 2, the final development stage was added, since most companies working with client orders are dealing with design stages, which are in most companies divided into preliminary design and final development.

In summary, even if different companies employ different terms to indicate the various stages of the NSD process, their essence corresponds to, or is very close to that of, the stages defined by Alam and Perry (2002). If the stage is present in the company, the stage column in Table 1 is marked with 'yes'. If the stage is not present, the column is marked 'no'. In some companies there are stages that are executed in a different order than, or that overlap with, that suggested by Alam and Perry. Such stages are marked with arrows.

Table 1: NSD stages in companies with primarily internal generation of new ideas

CASE	*Stage 1 Strategy planning, business analysis*	*Stage 2 Idea generation*	*Stage 3: Idea screening*	*Stage 4: Team formation*	*Stage 5: Learning, testing and design*	*Stage 6: Pilot testing*	*Stage 7 Market release*	*Stage 8: Feedback (further development)*
1	Not calculated in advance	Gaps in previous research	Literature review	Occasionally	Cases test	No	Occasionally results are generalized	In some cases articles are published
2	Not calculated in advance	Gaps in previous research	Literature review, search of tests	Occasionally	Tests, scoring	No	Occasionally results are generalized	In some cases articles are published
3	Revised every three years, business case	Internal knowledge based on research	Discussion among responsible people	Coordination of work	No	No	Yes	Yes, if the results are bad the program is closed
4	Informal, little business case	Internal knowledge and market observation	Prototype	Occasionally	Incremental development	Early trial with a lead customer	Commercial trial	Yes
5	Improve services, Profit expected in one year	Ideas copied from competitors	Discussion among employees	No	Internal testing on company's equipment	Service proposed to most confident clients	Yes	Yes
7	Service expansion, business case	Ideas mostly searched from all KIBS sectors	Discussion among employees, emails	Coordination among departments	Learning and testing	Service proposed to certain clients	Yes	Yes
9	Sponsors search, clients' investment	Ideas mostly searched in companies in another country	Discussion during unscheduled meetings	Choice of journalists	Video production	No	Yes	If the product is bad it is removed

If a new service development process starts following a client's order, the company maintains contact with the client during each stage of the process, to show the results and to keep the client informed about the progress of the process. As shown in Table 2 below, in some cases the client is allowed to request changes in the project at every stage of the process. The exception in Table 1 is Case 4, in which the correspondent noted constant interaction with clients during the SD process, but the initiation of the NSD process came not from the client but from within the company.

Table 2: NSD stages in companies with process started by client order

CASE	*Stage 1 Strategy planning, business analysis*	*Stage 2 Client order/idea*	*Stage 3 Idea screening, Initial development*	*Stage 4 Team formation*	*Stage 5 Preliminary design and learning*	*Stage 6 Final development*	*Stage 7 Pilot testing*	*Stage 8 Release to client*	*Stage 9 Client feed back*
Constant interaction with the clients during all the process									
6	Improve SD process, budget is set by managers	Internal knowledge	Monthly meetings	Yes	Materials learning	No	No	Yes	Yes
8	Improve SD process, clients' investment	Understand the client's needs	Diverge: brain storming	No	Converge: leaving one idea, design	Create prototype	Test on 10 people	Yes	Yes
10	Expand to new objects, clients' investment	Design concept: understand the client's needs	Search for inspiration and ideas	Occasionally	Preliminary sketches or computer models	Design and details development	Specification	Installations	Yes
11	Improve quality and SD, clients' investment	Internal knowledge, inspiration	Discussion of 2-3 major ideas	Meeting for ideas development	Finalizing	Presentation and preparation	Yes	Implemen-tation	Yes
12	Expand services, clients' investment	Understand the client's needs	Study of rules and sentences	No	No	Writing the act	No	Court trial (when required)	appeal (when required)

As noted earlier, the investigated companies follow similar steps in their SD processes that can be identified according to the similarity of activities performed during the different stages. Irrespective of what and how many stages are performed, and in which order, the results differ from one case to another. Some companies follow the different stages in a strict sequential order (Cases 1, 2, 4, 5, 8, 11, 12). Others do not follow the stages in a strict order, and the process is led by indicative guidelines (Cases 6, 9, 10). In addition, some companies have developed a codified procedure and strictly follow it (Cases 1, 2, 8). In these cases, the processes are iterative and incremental. Some other companies did not develop a codified procedure and the NSD process is based on experience and competence – the tacit knowledge – of their employees (Cases 6, 9, 10). Lastly, there are cases in which the NSD process tends to be nonlinear; some stages are skipped or overlap, depending on the project (Cases 7, 10, 11).

The specific solution adopted by an individual company seems to be related to the particular nature of the services provided, to the size of the company and its organizational structure, and to its type of relations with clients.

Concerning the type of service delivered, the findings suggest that T-KIBS act differently from P-KIBS. T-KIBS tend to perform the testing and prototype stages, because they must try new services on their internal equipment before delivering them to the market (Cases 4, 5). P-KIBS companies, by contrast, instead of a testing stage usually have a stage that can be termed the learning stage, in which employees learn how to deliver a new service if its delivery process is different from previous ones. Such was the case of an online insurance company that, in order to deliver new services, had to introduce new software programs that employees had to study before implementation. Employees of consulting and legal firms likewise must learn new procedures and laws when delivering certain new services (Cases 6, 7, 12).

Despite the fact that the process in most cases is sequential, in practice the managers often return to the previous stage of the process if the results on a certain point are dissatisfying or require further elaboration (the arrows indicated in Tables 1 and 2). A more sequential process is observed in companies performing scientific research, T-KIBS and legal firms (Cases 1, 2, 3, 4, 5, 12), while P-KIBS showed more flexible processes with overlapping stages (Cases 6, 7, 8). Companies performing creative services had the least structured process, with stages that were often skipped or that overlapped (Cases 9, 10, 11).

Regarding the size of the company, small-medium companies usually have faster NSD processes, especially if they have been recently established. This finding corresponds to results found by previous research (Alam and Perry, 2002). Due to their start-up heritage, the structure of such companies is not yet fully developed into multiple departments, making the NSD more rapid (Cases 3, 4, 5, 8, 9, 11, 12). Conversely, companies of a bigger size, especially if their activity depends on interaction among several departments (as in the case of the aforementioned insurance company), have more complicated and articulated NSD processes, the stages of which always overlap as a result of inter-departmental cooperation (Cases 6, 7, 10).

A substantial difference in the NSD process can be observed in the sources of ideas for new services. As noted earlier in the chapter, the investigated companies can be divided into two groups: those that create their own ideas for new services, and those that derive new ideas from clients' orders. The latter normally attempt to improve the NSD process to meet the clients' needs in the best way possible, instead of developing new ideas for services. Usually, when the idea for a new service comes from the client, the client tends to control the results of every stage of the process. In all cases in which the companies are delivering clients' orders, timing becomes a crucial aspect.

In summary, the results of the empirical investigation show that the investigated companies prefer to follow certain systematization of the NSD process. Furthermore, companies follow similar stages in their service development processes, but the specific characteristics and order of execution of the processes differ according to the activity of an individual company, its size, its structure, and the type of its relations with clients. Some companies have adopted a codified SD process and strictly follow it. In these cases, the processes are iterative and incremental. Some others have not developed a codified approach and follow a process that is based on past experience and tacit procedures.

Research question #2: Is the NSD process affected by the knowledge base of a company, and if yes, how?

- *Is there a connection between the knowledge base of a company and the NSD process?*

- *How is the NSD process systemized in companies with different knowledge bases?*

As noted in Chapter 2 the characteristics of the NSD process are assumed to be influenced by the knowledge base of a company.

To classify companies according to their knowledge bases, the type of knowledge the company is employing in developing new services needs to be identified. This study considered specific characteristics of the NSD process of each company, and then employed them to identify its knowledge base. Such characteristics include the type (more tacit or more codified) of knowledge used during the NSD process in a prevalent way; the nature (more or less codified) of the process; the origin and the goal of the process.

The results of such classifications are illustrated in Table 3 below. Along with the analytical, synthetic and symbolic knowledge bases, a fourth has been introduced, the interpretative knowledge base, to take into account the specific cognitive nature of legal services. In Table 3, the term iterative refers to processes that continuously repeat, while the term incremental refers to an order of stages that is gradual and unchanging.

Table 3: Knowledge bases of investigated companies

COMPANY	Service development process characteristics identifying knowledge base				Knowledge Base Definition (terms defined according to Oxford dictionary)
	Prevailingly used knowledge	***Nature of the process***	***Process origin***	***Process description and main goals***	
1.	Codified	Codified: iterative and incremental	Based on general rules determined outside the company (general scientific research methods) from which the company cannot deviate	Use of scientific knowledge based on tests and statistical methods to arrive at the maximum objective results	*Analytical*: 'Relating to or using analysis or logical reasoning'
2.	Codified	Codified: iterative and incremental			
3.	Tacit	Not codified: not iterative, not incremental	Developed inside the company and based on knowledge and experience of employees	Use of employees' knowledge and experience to satisfy client's maximum needs	*Synthetic*: 'Having truth or falsity determinable by recourse to experience'
4.	Tacit	Not codified: iterative and incremental			
5.	Tacit	Not codified: iterative and incremental			
6.	Tacit and codified	Not codified: iterative, not incremental			
7.	Tacit	Not codified: iterative, not incremental			
8.	Tacit	Codified: iterative and incremental			
9.	Tacit	Not codified: not iterative, not incremental	Developed inside the company and based on knowledge and experience of employees	Use of employees' knowledge and experience to transform it to symbols in that can address to the audience emotions and cause desires	*Symbolic*: 'The use of symbols to represent ideas or qualities'
10.	Tacit and codified	Codified: iterative, not incremental			
11.	Tacit and codified	Codified: iterative, not incremental			
12.	Codified	Codified: iterative and incremental	Based on general rules determined outside the company (trial process defined by law) from which the company cannot deviate	Use of knowledge and experience to satisfy client's needs	*Interpretative*: 'Relating to or providing an interpretation'

It is worth noting that in the majority of the investigated cases, it was possible to identify a prevailing type of knowledge. However, there were three companies (Cases 6, 10, 11) that make use of tacit and codified knowledge in a balanced way.

Companies delivering research services (Cases 1, 2) in their NSD processes rely on scientific knowledge belonging to different domains. Their NSD processes are based on strict codified rules and procedures determined by scientific methods, including literature review, collection of data, and the use of case studies, statistics and other research methods. These rules cannot be changed by the companies, since their aim is to arrive at "objective" outcomes based on systematic analysis. The knowledge base that emerges from this process reflects Oxford's definition of analytical as 'relating to using analysis or logical reasoning'.

Companies that implement their internal NSD processes primarily based on the knowledge and experience of their employees and that pursue the goal of satisfying the client's maximum needs (Cases 3, 4, 5, 6, 7, 8) possess a knowledge base that can be categorized as synthetic, given that the distinctive characteristic of the term synthetic is 'experience'. These companies continuously monitor their clients' needs and situation in the market. In most of the companies (especially in Cases 4, 6, 7), the employees' knowledge and expertise are their main competitive resources. The NSD process of these companies is usually not codified, the only exception being a digital company (Case 8) that follows a codified, repetitive NSD process that was inspired by the lean development process and model developed by Google Ventures specifically for KIBS companies. Despite the fact that the company adopted a codified process, the process was transformed inside the company. Its knowledge base, therefore, must be classified as synthetic, since its NSD process is carried out according to personal experience and the knowledge of its founders.

The companies that deliver services that address an audience's emotions and desires, and which develop NSD processes inside the companies based on their employees' knowledge and experience (Cases 9, 10, 11) can be categorized as symbolic. To address to an audience emotions they use symbols. The NSD processes in these companies are usually unstructured, and any of the steps can overlap. The way the process is performed depends substantially on the idea upon which it is based. Accordingly, the most important part of the process is identifying new ideas or new knowledge. This is especially crucial for companies providing design services (Cases 10, 11). The stages of their design processes are in general codified, since they require predefined stages such as preliminary sketches and details development. But as noted by the correspondents, the presence and order of these stages vary according to each individual project and the idea upon which it is based, making the process quite chaotic. For example, a project can start from details development, such as choosing materials, or computer development of the design, without ever developing design concept or preliminary sketches.

The creative media company in Case 9 employs a completely uncodified process, and is substantially based on the creative capacity of employees and their ability to search for new ideas from all possible sources, sectors and countries and to develop them in an original way. The companies in Cases 10 and 11 use both tacit and codified sources, since the companies are providing design services and the sources that they use to develop their services are largely visual materials (such as colour magazines and specialized websites). These codified materials are necessary to spark inspiration and to elaborate them into the tacit knowledge of a designer.

The legal firm in Case 12 presents a completely different situation from the others. As noted in the literature review chapter, previous researchers found legal firms to possess a synthetic

knowledge base (Miles *et al.,* 1984; Strambach, 2008; Asheim, 2008), since they are oriented toward finding practical solutions to their clients' problems. More recently, Pina and Tether (2016) proposed introducing a new type of knowledge base for these legal firms, which they termed 'compliance'. Compliance takes into account the fact that the activity of lawyers has to conform to existing rules and laws. A comparison of what emerged from the legal firm with the cases of companies with synthetic knowledge bases confirmed that their NSD processes have specific distinguishing features. Each new service, which in the case of legal firms is usually a trial or a consulting process, is based on codified knowledge and strict codified procedures determined outside the company by a legal code from which the legal firm cannot deviate. In this sense, the NSD process relates more to a process based on analytical type of knowledge.

Nevertheless, the examined case shows that the activity of lawyers is grounded not only in the compliance of the legal services with codified laws and regulations, but also in interpreting them with respect to specific cases. It is for this reason that a new term for their knowledge base, 'interpretative', may be suggested.

In summary, it is possible to conclude that the NSD process is affected by the type of knowledge base possessed by a company. The research findings show that companies with an analytical knowledge base tend to rely on codified sources, and to follow a strict codified iterative and incremental process that usually produces equally codifiable outcomes. For such companies, the codification of the NSD process is important for its results and for future activity. Companies with a synthetic knowledge base tend to develop the process based mostly on tacit knowledge with uncodified NSD and usually iterative processes. Companies with a symbolic knowledge base elaborate codified knowledge into the tacit knowledge of their employees, with the NSD process occasionally codified but followed in practice differently depending on each particular project and the idea upon which it is built. The stages are generally not incremental. Companies with a purely symbolic knowledge base have a less structured process. The more creative the process performed by a company, the less the process is systemized. Lastly, a new type of knowledge base has been proposed for legal firms: interpretative. At such firms, the NSD activity relies on codified knowledge, and takes place through a formalized, iterative and incremental process.

The influence of the knowledge base on the NSD process is expressed in all stages of the NSD process. The empirical research highlighted that the knowledge base affects the search process for new ideas. It also showed the type of knowledge the employees predominantly used throughout the process, as shown in Table 4 below. The research results revealed that the type of knowledge the employees use in the process of new ideas search can differ from the type of knowledge used in the process of service development (Table 3). In some companies (Cases 3, 9, 10, 11), the process of new ideas search is of particular importance, and the companies pay special attention to this stage of the process.

Table 4: Process of new ideas search in companies with different knowledge bases

Case	*Type of knowledge*	*Process of new knowledge search*	*Knowledge base*
1.	Codified	Codified	Analytical
2.	Codified	Codified	
3.	Codified	Codified	Synthetic
4.	Tacit	Not codified	
5.	Tacit	Not codified	
6.	Tacit and Codified	Not codified	
7.	Tacit	Not codified	
8.	Tacit	Not codified	
9.	Tacit	Not codified	Symbolic
10.	Tacit and codified	Not codified	
11.	Tacit and codified	Not codified	
12.	Codified and tacit	Codified and tacit	Interpretative

As noted in the literature review chapter, Pina and Tether (2016) suggest that the different stages of the NSD process can involve different types of knowledge, even within a single company. This implies that a KIBS company can possess a type of hybrid knowledge base. The research findings support such an assumption, as they show that in some companies the type of knowledge used in a certain stage of the NSD process can differ from the type of knowledge used in another stage – the type of knowledge used during the new ideas search stage, for example, can differ from the knowledge used in the knowledge processing or knowledge outcomes stages.

Such was the case with the company in Case 3, where the new service initiation or the search for new knowledge for new services is the result of a scientific process. Since the activity of idea search is based on codified sources, it is possible to conclude that the company is using an analytical type of knowledge in this part of the process. The rest of the NSD process, by contrast, is based on the tacit experience of the employees, and hence relies on a synthetic type of knowledge. The company developing separate digital services for its clients (Case 8) is influenced by a symbolic type of knowledge in the phase of knowledge creation (phases developed by Pina and Tether, 2016), because it develops brand design for client companies, which requires creative knowledge. Companies that were identified as being basing on a type of symbolic knowledge use in their activity IT digital platforms (Cases 9, 11) thus employing technical knowledge based on experience. As well as a design company (Case 10) employing architectural knowledge for developing its services based on technical knowledge. As a result, the activities of these companies during the knowledge input phase (Pina and Tether, 2016) are affected by a synthetic type of knowledge. These results confirm the finding of Pina and Tether (2016) that many KIBS companies presently base their activity on two or more knowledge bases.

In summary, the current business activities of many KIBS companies may require that they mix different types of knowledge. This fusion of different types of knowledge also derives from the fact that KIBS companies are broadening their range of services, and some convergence among the different sectors occurs, hampering a univocal classification (Scarso, 2015).

In order to classify the knowledge bases of the investigated companies in a more articulated and precise way, Table 5 below presents a reformulation of the data from Table 3:

Table 5: Further classification of knowledge bases

Knowledge base	***Company***	***Features of the NSD used to identify the knowledge bases***
Analytical	1) Medical research	Correspondence of the stages of the NSD process to knowledge base characteristics: scientific process with codified results
	2) Research in psychology	
Synthetic influenced by analytical	3) Online education	Influence of analytical type of knowledge in the source of initiation: scientific
Synthetic	4), 5) 7) IT, IT consulting, telecom, online insurance	Correspondence of the stages of the NSD process to knowledge base characteristics: practical based on experience, the main goal being to satisfy client's needs
Synthetic influenced by interpretative	6)Consulting	Influence of the interpretative knowledge in the type of knowledge creation
Synthetic influenced by symbolic	8) Digital innovation and marketing	Influence of symbolic knowledge in the type of knowledge creation
Symbolic influenced by synthetic	9) Digital media and advertising	Correspondence of the stages of the NSD process to the knowledge base characteristics: use of expressive forms based on insights to attract clients Influence of synthetic knowledge on the stage of the knowledge inputs due to IT implementation
	11) Visual branding	
Symbolic influenced by synthetic	10) Interior design and architecture	Influence of synthetic knowledge in the type of knowledge input due to technical requirements for architectural activity
Interpretative	12) Law	The NSD process based on codified sources confirms the proposed new type of knowledge, interpretative, aimed at the interpretation of codified knowledge

Analysis of each stage of the NSD process not only shows that it is influenced by the knowledge base used during its implementation, but also that different stages can involve different types of knowledge bases. This analysis confirms the suggestion by recent studies that KIBS companies may have hybrid knowledge bases. Furthermore, it is possible to affirm that the influence of the knowledge base on the NSD process is dynamic, because if a company decides to modify its NSD process – such as by changing the type of knowledge used in a certain stage of the NSD process – the knowledge base of the company may change as well.

Research question #3: What are the forces driving innovation in KIBS companies with different knowledge bases?

- *Can the level of formalization of the service development and ideas search process affect the level of innovativeness of the final service?*
- *How is the final service affected by the knowledge base of the company?*

Before discussing what emerged from the study, it must be noted that the level of innovativeness of the services offered by the investigated companies was estimated based on the subjective opinions of the managers interviewed. One of the respondents affirmed that is difficult, if not nearly impossible, to create a radically innovative product or service because, according to his experience, every delivered new service is just an improvement on an existing

one. It is for that reason that the new services were not classified according to the innovation types suggested by previous literature, such as radical, improvement, incremental, ad hoc, recombinative, and formalization innovations (Gallouj and Weinstein, 1997; Johnson *et al*, 2000). Furthermore, the goal of the study was to compare the level of innovativeness of the services developed by companies with different knowledge bases, rather than to make classifications of the type of service innovations introduced by the companies.

Having said this, the research revealed that the level of innovativeness first of all depends on where and how the companies search ideas for new services. As summarized in Table 6 below, some companies look for innovative ideas in all possible sectors and sources (Cases 3, 7, 9), while other companies just imitate new services introduced by their competitors (Case 5) or substantially aim at improving existing offerings (Case 6).

The second factor that influences the level of services' innovativeness is whether the NSD process is activated by the clients through the ordering of a new service, or initiated by the company on its own. In the former, the level of innovativeness depends on the client, who can order either a new type of service or product, or just an improvement of an already existing service or product (Table 6).

Another factor that has to be taken into account in the innovation process is the product strategy of the company. Most of the observed companies, in fact, offer a highly customized range of services. Some of the respondents noted that they see the future of KIBS companies in delivering highly personalized offerings (Cases 3, 5, 7). This goal affects the NSD process, especially during the stages of idea generation, idea screening and feedback from customers, since the company should develop and deliver a service that is able to fully meet the needs and desires of the client.

Table 6: Driving forces of new services' innovativeness

Case	***Source of Ideas Search***	***Influence of clients and market***	***Level of innovativeness***
1.	Problems not studied in the past	Not affected by clients, low personalization	Highly innovative, can change market
2.	Problems not studied in the past		
3.	Internal knowledge of employees based on scientific research	Highly affected by clients, high personalization	Innovative
4.	Internal knowledge of employees based on new technology and market observation		Moderately innovative
5.	Ideas copied from competitors		Not innovative
6.	Internal knowledge of employees		Not innovative
7.	Internal knowledge of employees and ideas searched in the competing companies and other KIBS sectors		Moderately innovative
8.	Internal knowledge of employees		Moderately innovative
9.	Ideas searched in companies of all KIBS sectors in all countries	Highly affected by clients, medium-high personalization	Innovative
10.	Ideas given by clients affected by creative influence inside the company		Moderately innovative
11.	Ideas given by clients affected by creative influence inside the company		Moderately innovative
12.	Ideas given by clients, and ideas searched in the competing companies and other KIBS sectors	Moderately affected by clients, medium-high personalization	Innovative in rare cases

The last factor that comes into play is the assessment of new services and the strategic innovation plans of the company, which appear in Stage 1 in Tables 1 and 2.

The assessment and investment methods pursued by the investigated companies revealed that companies with similar knowledge bases resorted to not entirely similar approaches. In particular, companies with analytical knowledge bases generally use existing funds earmarked for research activity and provided by private and public institutions. Most companies with synthetic knowledge bases make use of the business case method for evaluating and estimating new services. The common goal of these companies is to assess in advance the expected expenses and revenue. Companies relying on a symbolic type of knowledge depend mostly on the investment of the clients ordering their services. They make little investment in new services themselves, instead investing in materials. The same type of investment method is used in legal firms, as shown in Table 7 below.

Table 7 shows that few companies develop a formal strategy (Cases 3, 6, 7, 10). These companies strive to market leaders. In Case 3, a university proposing online educational programs aims to rise to the top of international rankings by offering highly innovative personalized educational programs that change the market. In Case 7, an insurance company is modifying its organization to become completely telematic and expand it range of services to services to be on the level of benchmark leaders Amazon and Fineco. Other companies that develop a formal strategy aim at keeping their already acquired leading market position by expanding existing services to new countries or to new fields of application. In Case 6, a multinational consulting group continuously expands activity to new countries and broadens the range of its proposed services. In Case 10, a leading design company aims at expanding its services to new categories – not only luxury hotels, but also houses, private apartments and hostels – and countries.

Companies relying on synthetic and symbolic types of knowledge mostly plan the improvement of their services or their approaches to the performance of their services, such as speed and quality (Table 7). Companies with symbolic knowledge bases depend substantially on clients' investment and develop services according to their orders. Few companies plan not only to expand but also to develop their service offering, as with companies in Cases 7 and 9. Surprisingly, the expansion of a company's offerings is important also for legal firms, due to the highly competitive nature of the market, and the need to constantly search for new clients.

This empirical investigation shows that companies with synthetic and symbolic knowledge bases invest in improving their NSD processes, while companies with an analytical knowledge base invest directly in new research activities that produce new products and services.

Table 7: New services estimation, investment methods and strategic innovation plans

Company	*New services assessment and investment methods*	*Company's strategic innovation plans*
1 .Analytical	Research university and clinic funds	Formal strategy aimed at conducting new research: new research can be undertaken without approval of funds
2. Analytical		Formal strategy aimed at conducting new research: New research must be approved by university responsible for funds
3. Synthetic and analytical	Business case method to reach breakeven, can accept 'bet' (risky) decisions	Formal strategy is revised every three years, main investment in digital tools to improve international ranking
4. Synthetic	Little use of business case, 23% of total revenue is spent on NSD	Informal strategy process due to company's start-up heritage
5. Synthetic	Strict investment strategy: profit should be received within one year	Informal strategy: improve service, increase speed, extend geographically
6. Synthetic	Budget is coordinated by top management and reviewed throughout process	Formal strategy: expand service and geographically, improve approaches for service performance
7. Synthetic	Business case method to estimate new services in advance	Formal strategy: invest in telematics services to become more digital, with possible services expansion
8. Synthetic and symbolic	Clients' investment and company's own investment	Informal strategy: improve speed and quality of the developed NSD process
9. Symbolic	Exclusively clients' or sponsors' investment	Informal strategy: continuous search for new services and sponsors for their realization
10. Symbolic and synthetic	Clients' Investment and company's investment in materials	Formal strategy: expand services to new objects
11. Symbolic	Clients' investment	Informal strategy: improve quality of services and speed
12. Interpretative	Clients' investment	Informal strategy: expand a range of services

Table 8 below shows that companies with analytical knowledge bases produce more innovative services, while companies with synthetic knowledge bases tend to improve previous services, confirming the propositions of previous researchers (Pina and Tether, 2016):

Table 8: Influence of knowledge base and NSD process codification on services' innovativeness

Company knowledge base	*Knowledge codification*	*NSD process and knowledge codification*	*Influence of clients and market*	*Level of innovativeness*
Analytical	Codified	Codified process, iterative and incremental	Not affected by clients, lightly affected by market	Innovative or highly innovative results that can change market
Synthetic, partly analytical	Tacit	Not codified process	Highly affected by clients, high personalization of services	Innovative results that can change market
Synthetic	Tacit	Not codified process, iterative and mostly incremental	Highly affected by clients, high personalization of services	Moderately innovative or not innovative results
Synthetic, partly symbolic	Tacit	Codified process, iterative and incremental	Highly affected by clients, high personalization of services	Moderately innovative results
Symbolic	Tacit	Not codified process, not incremental, mostly iterative	Highly affected by clients, high and medium personalization of services	Moderately innovative or innovative results that can change market
Symbolic partly synthetic	Tacit	Not codified process, not incremental, mostly iterative	Highly affected by clients, high personalization of services	Moderately innovative or innovative results
Interpretative	Codified	Codified process, iterative and incremental	Moderately affected by clients, low personalization of services	Moderate or periodically innovative results that can change market or society

The results shown in Table 8 are quite predictable. Companies with an analytical knowledge base perform the NSD process based on scientific methods that require analytics, logical approaches and objective data, in order to solve problems scarcely or not at all studied before. This approach is initially programmed to search for, absorb and produce new knowledge.

Companies with a synthetic knowledge base rely substantially on previous experience and a tacit type of knowledge. This type of approach tends to lead to improvement of previous services.

Companies with a symbolic knowledge base rely mostly on tacit knowledge, combining it with codified visual or textual sources. The results of this approach are affected by the subjective vision – the emotions or 'inspiration' -- of the creator of the service, which can produce different or new types of knowledge that may be innovative. At the same time, the requests of clients can affect the final result of the NSD process, since the clients can order varying degrees of innovativeness.

Legal firms follow a strict process based on previous experience, but this experience is codified. It produces innovative products if the results of its activity lead to a change in law. In such cases the lawyers, though they conduct a SD process in the form of a trial, can affect the decision of a judge, and this can lead to a change in existing laws. This is usually a slow evolutionary process, depending not just on the subjective will of a judge, but also on the necessity of changes in society.

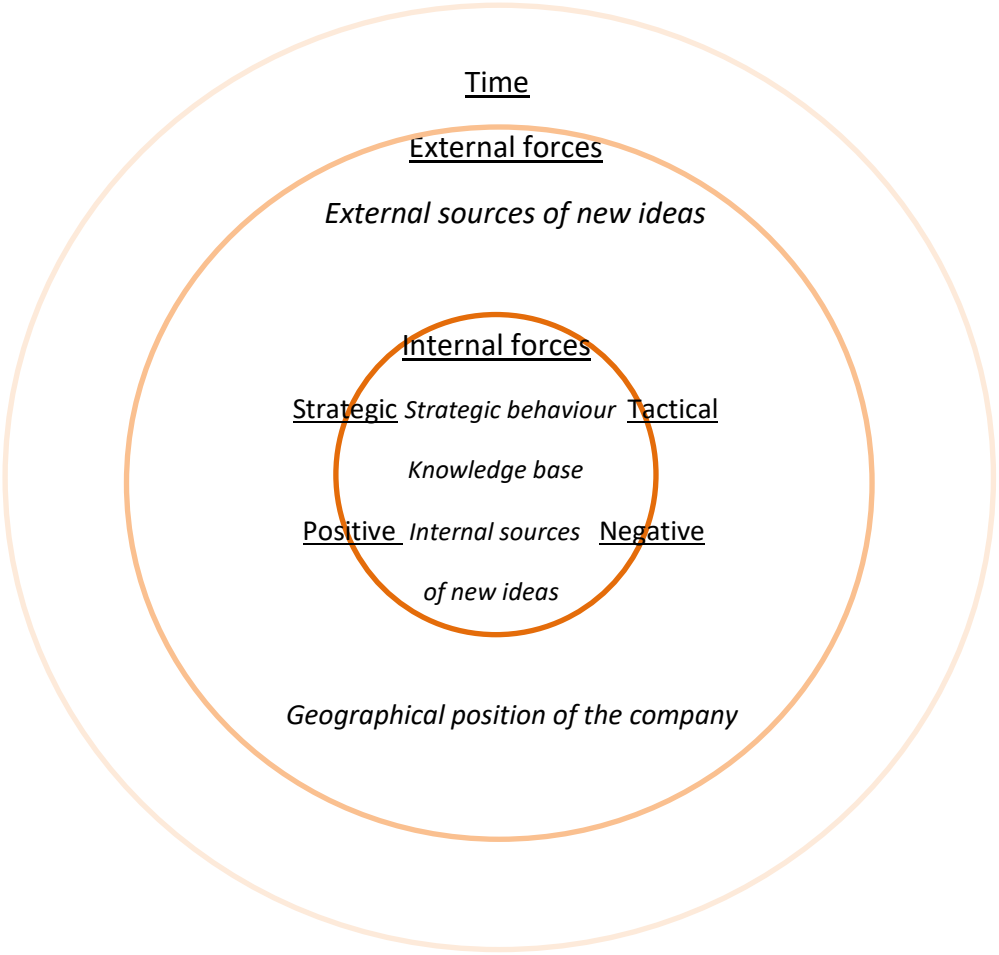
Based on the research results presented in Table 8, it is possible to assume (though it deserves further investigation) that companies having a hybrid knowledge base tend to create more innovative ideas if influenced by a more innovative knowledge base, such as analytical. For example, a company that delivers educational online programs is developing new programs through a research process based on an analytical type of knowledge. As a result, the proposed programs can include new knowledge acquired through the research process. A company providing architectural and design services, on the other hand, uses a synthetic type of knowledge for the technical development of architectural activity, which leads to less innovative products, since is based on previous experience.

This study indicates that the level of formalization is related to the characteristics of the knowledge base of the companies, and that the type of knowledge affects the level of innovativeness of a newly developed service. Analytical knowledge in particular requires a strictly codified NSD process, while symbolic knowledge allows for an uncodified ideas search and NSD process that is usually not incremental, in order to encourage the creative spirit and find innovative solutions. Most companies with a synthetic knowledge base have an uncodified process, but the T-KIBS companies have a more iterative and incremental process due to technological requirements. Companies with a less technological component, such as those in the consulting and insurance industries, have less formalized and incremental processes, and the stages can change and overlap. The exception is a company employing both synthetic and symbolic knowledge bases. In this case, the NSD process is codified, incremental and iterative, and in fact the company made the development of an effective NSD process the cornerstone of its activity (Table 8).

The results of this study allowed for the development of a framework summarizing the driving forces behind innovation in the studied companies. The framework, which is illustrated in

Figure 1 below, draws inspiration from that developed by Sundbo and Gallouj (1998), but the considered variables have been formulated in a different manner:

Figure 1: Driving forces behind innovation in KIBS



The framework proposed in Figure 1 includes all the factors and forces that affect the innovation processes in KIBS companies. The forces are subdivided into internal and external categories.

Internal forces include:

- The strategic behaviour of the company, which is defined by the general management, and can be either formal or informal. Strategic behaviour delineates the strategic goals that the company aims to achieve, such as being innovative or maintaining a stable market position (Table 7). The empirical findings of this study confirm that the new service strategy of a company deeply influences its NSD process (Table 6). It is worth noting that the offering strategy is influenced by a company's relations with its customers, and translates into high or low personalization of services.

- The knowledge base of the company. As confirmed by this analysis, the type of knowledge base affects the characteristics of the NSD process and the level of innovativeness of its outcomes (Table 8).
- The internal sources of ideas for new services. These sources reside inside the company, substantially pertain to employees' knowledge and experience, and substantially determine the level of innovativeness of the final service. The employees' knowledge and experience have various origins, including continuous learning and process improvement (Cases 4, 6, 7, 8, 10), the research and development or the creative department (Cases 1, 2, 10, 11), technical changes (Cases 3, 4, 5, 7), operational changes (Case 7), and procedural changes (Cases 6, 7).

External forces include:

- External sources of ideas for new services. Empirical analysis revealed that these sources include clients (Cases 6, 8, 10, 11, 12), suppliers (Case 12), competitors (Case 5), companies belonging to other KIBS or service sectors (this source of ideas for new services has received scant scholarly attention) (Cases 7, 9, 12), consultancy (Cases 7, 8), research centres and state or commercial labs (Cases 1, 2), networks (Cases 7, 12), and industry associations (Case 12).
- The geographical location of the company, and all the aspects that affect the company as a result of it is physical presence in a certain location. The location of the company affects the process of new ideas search, whether through the economic situation of a country, such as high competition in the market (Case 12), the legislative situation of the market (Case 5), specific national or cultural client requirements (Case 7), or environmental conditions (Case 10). In all cases, geographical location affects the process of NSD, but particularly in Cases 5, 7, 9 and 12, the respondents noted the influence of geographical location on service development activity.

The driving forces can be further sub-categorised as tactical or strategic and as positive or negative.

Tactical forces usually concern the reaction of a company to the present market situation and to the necessity of introducing new services. They can be seen as a motivation to find a solution or a reaction to an emerging need in the market. Typical examples are the level of maturity of the company, its financial situation and its product strategy, as well as the general competitive, political and economic situation. Examples in this study included the necessity of finding new clients (Case 12), the competitive situation of the market and reaction to changes in legislation (Case 5), and the level of maturity of new companies with a start-up heritage (Cases 4, 8).

Conversely, the strategic forces can derive from the plans of management for the future, and from the search of new ideas or new knowledge that result from management's vision. Cases 3, 6, 7, 9 and 10 fit this category, with management defining clear strategic goals such as improving international ranking (Case 3), digital modernization (Case 7), or acquire new market fields (Case 10).

Positive forces induce the company to look for ideas for the introduction of new services as a result of clear strategic plans that are aimed at producing innovative results. New ideas are developed within the company based on internal knowledge, research and development or creative inspiration, or the appearance of new clients, suppliers or ideas observed in other companies. These forces act as accelerators, such as successful imitation of a new service from

another country (Case 9), continuous collaboration with suppliers of new services (Cases 8, 10), or strategic goals (Cases 3, 6, 10).

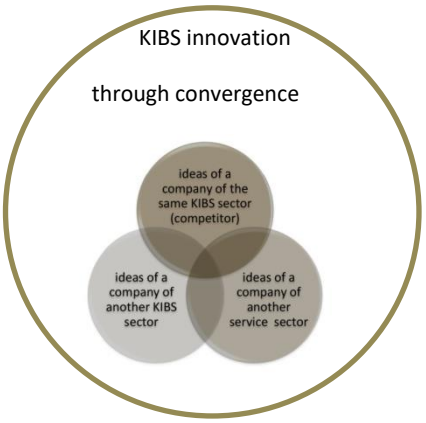
Negative forces push a company to look for ideas for introducing new services to overcome the obstacles that a company may face. Examples of this are technical modernization inside a company that requires high expenses but leads to new services due to new technologies (Cases 4, 5, 7 and nearly all T-KIBS), difficult competitive situation in the market (Cases 5, 12), and changes in legislation that negatively affect a company and which require changes in proposed services or introduction of new services to overcome competitors or to adapt to new legislation (Cases 5, 12).

The last force affecting the innovation process is time. T-KIBS (Cases 4, 5) underline the necessary modernization of technical equipment every year, and the necessity of constant monitoring of new technologies (Case 8). The companies in Cases 3 and 7 are transforming their structure to become completely digital in order to respond to changes in society. A demonstrative example of the influence of time on innovative results is the legal firm in Case 12. Lawyers may be able to impact the appearance of laws that change society, but these laws appear as a result of incremental evolutionary changes in society.

An interesting finding of this study is that some companies (Cases 7, 8, 9, 12) look for ideas for new services not just at competing companies, but also at companies in other KIBS sectors. An example is the insurance company in Case 7 for which the benchmark companies are leaders in other business sectors. Similarly, the online media company in Case 9 looks for new ideas at companies in a range of sectors, particularly companies that are based in countries where the KIBS sector is well developed, such as the United States and the United Kingdom. Through imitating and developing these ideas for new services, the company is introducing these services into the Italian market, where it aims to be the leader.

The investigated processes lead to a convergence of ideas for new services in KIBS companies, and as a result, to the convergence of services in KIBS companies predicted by previous research (Strambach, 2008; Scarso, 2015; Pina and Tether, 2016). Figure 2 below illustrates this convergence:

Figure 2: Convergence of ideas for new services in different KIBS sectors



In summary, the research results revealed several driving forces that affect the process of innovation in KIBS companies. Schematically it is possible to divide them into internal and external categories. The knowledge base of a company substantially affects the NSD process. The type of knowledge, or types of knowledge, on which companies base their activity affects the codification of the NSD process and the level of innovativeness of the final results. Lastly, when examining innovation forces, particularly at extremely dynamic KIBS companies, time is a factor that affects the level of innovativeness over the long term.

Chapter 6. Conclusion

The research discussed in this study addresses the under-investigated field of the New Service Development process in KIBS companies, a process that has been considered unsystematised by most researchers due to the complex nature of such companies. Since the study of KIBS is still a relatively new field of research, many of its concepts deserve further clarification and definition. Today the topic is of particular relevance, given the KIBS sector's continuously increasing share of the world economy. At the same time, the specific characteristics of these companies, and specifically the fact that knowledge is their key competitive asset, makes investigations of their processes quite difficult.

Literature systematization allowed for analysis of a significant number of works dedicated to the topic, and to specify the research topics that concentrated not only on the NSD process, but also on the dynamic links between knowledge base, performance and innovation. Since knowledge is the main outcome of the NSD process in these companies, scholars encountered difficulties in defining and evaluating knowledge results, particularly in defining and evaluating their knowledge bases. Previous scholars have noted the lack of empirical studies on the NSD process in KIBS companies, which is why the case study method was used for this research. The cases were selected with the aim of having range of companies in terms of both type and geographic location.

The results from these case studies provided answers to the three main questions posed in this research.

The first research question concerned the analysis of the NSD processes as they are implemented in various companies, including looking for similarities and differences. In contrast to the findings of previous researchers, the NSD processes turned out to be quite systemized in the studied companies. The level of the systematization depended on the special characteristics of a company's activities, its size and structure, and its relations with clients. As a basis for the research, a previously developed framework was chosen to compare the stages of the NSD process in the investigated companies. The framework was chosen because it was developed on the basis of an empirical investigation. Most of the stages included in that framework were also found in the investigated companies, with some variation in their nature and order of execution. Some significant differences seem to distinguish the NSD processes of companies that introduce new services on a made-to-order basis versus those that develop new services based on an internal idea. The research also revealed that in most cases, the companies follow sequential stages in their SD processes, both iterative and incremental, while in some companies these stages may be skipped or may overlap, depending on the project.

The second research question addressed the issue of if, and how, the NSD process is affected by the knowledge base of a company. It is worth noting that the definition and evaluation of the knowledge base of a company is an open topic in the extant literature. This research proposed a new method for defining and evaluating knowledge bases – by studying the NSD process of a company, in particular the type of knowledge during each stage of the NSD process. The definition of each of the knowledge bases was taken from the Oxford Dictionary, in order to avoid any linguistic influence from previous scholarship on the subject. The main characteristics of the NSD process that can help to define the knowledge base were defined as the kind of knowledge (more tacit or more codified) used during the NSD process in a prevalent way; the nature (more or less codified) of the process, the origin and the goal of the process.

The more codified process based on strict rules is more characteristic for the process-based analytical knowledge, while the less codified process based on tacit knowledge and experience of employees with the goal to satisfy clients' needs is more characteristic for the process-based synthetic or symbolic knowledge. At the same time companies basing the processes on the goal of addressing clients' emotions base their activity on the symbolic type of knowledge.

The method employed in this research helped to confirm the existence of another knowledge base, proposed previously only by Pina and Tether (2016). The new knowledge base has been termed 'interpretative', due to the specific use of knowledge by legal firms – namely, interpreting laws. The new knowledge base was confirmed through the investigation of NSD processes that were different from process-based synthetic and symbolic knowledge. The codification of the process and its rules originated outside the company, the company cannot deviate from them, making it more akin to the process based on analytical knowledge. At the same time, the research results showed that different stages of the process can be affected by different types of knowledge, confirming previous research that a company can base its activity on multiple knowledge bases. In such cases, it is possible to state that a company possesses a type of hybrid knowledge base, one in which a prevalent type of knowledge base is supplemented by another type.

The third research question, regarding driving forces for innovation in KIBS companies, was likewise closely examined in this study. The main forces driving the level of innovativeness of the final service, and the process of innovation in general, were identified as follows:

- Sources of ideas search for new services
- Influence of clients on the NSD process
- Knowledge base of the company
- Product and the general strategy of the company
- Geographical location of the company, and time

The results confirmed the assumption that the level of structuring and formalization of the NSD process can affect the level of innovativeness of the final service. But the effects of this influence depend on the knowledge base of the company, since it affects the NSD process and the innovation process in general. Companies with analytical knowledge bases tend to have more codified and organized processes, while those with symbolic knowledge bases are often less organized. At the same time, companies with these knowledge bases produce more innovative products.

The application of certain types of knowledge determines the NSD process and the desired results. Analytical knowledge aims at achieving results previously not achieved, synthetic at achieving results based more on existing knowledge and experience (with the goal of improving existing services), and symbolic at addressing the emotions of clients through symbols, thus transforming existing knowledge through internal inspiration of the employees. In companies with an interpretative knowledge base, activities can bring about a new type of knowledge over the long term, through evolutionary changes in society.

In summary, the research conducted for this study led to new concepts in the scholarship on the New Service Development process, including the following contributions:

1. The research systemized the existing literature devoted to NSD in KIBS companies and highlighted several related research streams.
2. The empirical investigation of companies from different KIBS sectors and geographic locations filled a gap in empirical studies of the subject.
3. The research proposed new methods for defining and evaluating knowledge bases in KIBS companies based on their NSD processes.
4. The research confirmed the proposed existence of a new type or subtype of knowledge base for legal firms, 'interpretative'. Further research on a larger number of legal firms is needed to test this statement.
5. The research confirmed the results of previous research (Scarso, 2015; Pina and Tether, 2016) that broadening their range of services leads KIBS companies to convergence of their activity among the different sectors, and as a result to the application of several knowledge bases to their activity.
6. The research confirmed the connection between the knowledge base of a company, its NSD process, and the level of innovativeness of the final results.
7. The research investigated new sources of ideas in KIBS companies, a topic that has received scant scholarly attention.
8. And finally, the research proposed a new model for the driving forces behind innovation in KIBS companies.

Further research, based on a larger number of companies in different geographic locations, is needed to confirm the results of this research. It is necessary to take in account that companies from different countries can raise the issue of cultural differences but this is unavoidable when making such kind of comparisons. Further investigation is also necessary to systemize and classify more precisely all types of innovations in KIBS companies. The proposed framework for driving forces is based on the results only of this research, and further studies could take into account more categories, and otherwise enrich or change the model. Additionally, the new services assessment in KIBS was studied quite superficially in this research, and further research into the approaches of NSD assessment is necessary for developing new methods for evaluating KIBS performance.

This research can help KIBS companies understand how they can improve their NSD processes, and which models exist for the search and development of innovative ideas. The results of this research may help KIBS companies to classify themselves according to knowledge base type, and thereby be better positioned to choose the right strategy for developing innovating services. The results also help to understand which factors influence the innovation process in KIBS companies. A final, practical implication of this research derives from the dynamic links

that connects knowledge bases, NSD processes and innovation outcomes. Companies that, for different reasons, intend to modify their NSD process could integrate or modify their knowledge base. This is a sizable challenge, since acquiring and absorbing a different type of knowledge can take a long time.

Our understanding of knowledge and its classification is still at the beginning. The present research helps to glance at a small part of this concept through the study of the NSD process in companies. The study of NSD processes can help to approximate the understanding of such important aspect of the human activity as creation. The complexity of this phenomenon is a subject of investigation of several research fields and there is still a long way to go in the study of its depth.

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Appendix 1

In the appendix the interviews outline is presented. The respondents were encouraged to answer in a free way to the proposed topics without a limit of time. Some respondents refused to answer some of the proposed topics for the reasons of privacy. If they did not understand some questions they asked to clarify it.

1. Activity of the company.

2. Year of establishment. Brief history, main stages of development.

3. Number of employees.

4. Level of maturity of the company.

5. Level of maturity of the market.

6. Competitive situation on the market (principal competitors).

7. Competitive sides.

8. Main clients.

9. Organizational structure.

10. Formalization in the company (codified procedures).

11. Necessary equipment for company's production.

- how often is upgraded

12. Product strategy of the company (productisation/customization).

13. General strategy of the company.

<u>Process of new ideas search and development.</u>

1. How often the company introduces new products/services (both radical that change the market and improvements of existing services).
2. Can the company systematize these services (e.g. product, process, organizational, etc.)
3. Which are the reasons (forces) of new ideas search
    a. Internal
    b. External
4. In which sources the company is looking for new ideas:

a. Internal (e.g. employee knowledge and previous experience)
b. External (e.g. the company is looking for new ideas in their clients, competitors, universities, consultancy, exhibitions, and companies of other sectors)

5. Why the company chooses certain kinds of sources.
Classify the sources according to their importance for the company.

6. Describe the process of new ideas search.
   - who is responsible for new ideas search: department, single employee, all employees
   - is the process is systematic, repetitive or not systematic, always different
   - is the process codified or no
   - how the process of interaction of ideas is built in the company
   - how is organized the process of ideas screening and evaluation

7. Describe the process of new services development.

- Is the process codified
- Is the process systemized
- General timing (if important)
- Who is responsible for the process
- How the cross teams are organized (if there are)
- Necessary technical equipment for the process

1) Describe the stages of the process (if there are)
- Are the stages sequential
- Can the stages change or overlap

2) Interaction with the clients during the process
- First contacts (if the clients influence new ideas)
- Contacts during ideas screening
- Interaction during new services development
- Interactions during first trials
- Post-delivery interactions

3) Is it possible to evaluate the percent in the final product of the company own ideas and affected by clients or market (for example X% own ideas, X% - client's desires)?

4) Knowledge used in the process.
- Explicit/Implicit knowledge application
- Applied learning cycle: externalization/internalization, generalization/localization, and association/dissociation (if the respondent can identify).
- Knowledge necessary for the process: market, technological, procedural, human etc.

8. Estimation of new services (how the company estimates investment in new services)

- E.g. business case
- Tests
- Clients investment

9. How the process of new service development is connected with the strategy of the company (strategical orientation).